An annotated checklist of the vascular plants of the Udaipur wildlife sanctuary, West Champaran, Bihar, India

Anand Kumar¹, Saurabh Sachan¹, Tanay Shil¹ and Onkar Nath Maurya²*

¹Central National Herbarium, Botanical Survey of India, P.O. Botanic Garden, Howrah-711103, West Bengal, India
²Botanical Survey of India, CGO Complex, Salt Lake City, Kolkata-700064, West Bengal, India

*Corresponding Author: onkar98@gmail.com [Accepted: 17 April 2020]

Abstract: The Udaipur forest was notified as a wildlife sanctuary in 1978 and is situated around the Sarayaman Lake in West Champaran district of Bihar. The sanctuary is known for the migratory birds who visit the Sarayaman Lake during the winter season. Field surveys were conducted periodically in 2017–2018 in the Sanctuary to access the plant diversity. A total of 283 taxa under 225 genera are enumerated from 71 families. It includes one species, endemic to India and two species listed in appendix-II of CITES. Poaceae is the most dominant family with high species representation, followed by Fabaceae, Asteraceae, Lamiaceae, Cyperaceae, Apocynaceae, Rubiaceae, Euphorbiaceae, Malvaceae, Acanthaceae, Boraginaceae, Convolvulaceae and Cucurbitaceae. In addition, 23 species belonging to 23 genera and 14 families were new additions to the ‘Flora of West Champaran district, Bihar’.

Keywords: Bihar - Checklist - Udaipur Wildlife Sanctuary - Vascular plants.

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INTRODUCTION

India is one of the 18 mega diverse nations in the world in terms of biodiversity with its rich and diverse floral wealth, ranking 10th among the top 25 species rich countries. With only 2.4% of the world’s geographical area, it accounts for 7–8% of the world’s recorded plant and animal species (IUCN 2019). At present, the country has 869 protected areas, including 104 National Parks, 551 Wildlife Sanctuaries, 87 Conservation Reserves and 127 Community Reserves. In addition, 18 Biosphere Reserves, 32 Elephant Reserves and 50 Tiger Reserves are also found in India (WII 2019). Protected areas are one of the well-recognized in situ conservation methods to protect the biodiversity across the world.

Bihar covers an area of 94,163 km², of which about 7,305 km² is under forest cover that constitutes 7.76% of total geographical area (FSI 2019). The state has 11 Wildlife Sanctuaries and a National Park (Singh & Singh 2002, WII 2019) covering about 3280 km². Previous documentation includes enumeration of the flora of Udaipur forests from Champaran district (Thothathri et al. 1966) and flora of West Champaran (Bhattacharya & Sarkar 1998). Moreover, new additions to the state and district flora were also published (Thothathri 1965, Singh 2005). The present survey has been conducted to study the vegetation/flora of Udaipur wildlife sanctuary, West Champaran, Bihar, India. Since, the documentation of the area was carried out 55 years ago (Thothathri et al. 1966) before its notification as Sanctuary in 1978. Therefore, the present study is one such effort to document all floral elements and assess the vascular plants diversity of the Sanctuary.

MATERIALS AND METHODS

Study area

The Udaipur forest was notified as a wildlife sanctuary in 1978 under Wildlife (Protection) Act, 1972 (Figs. 1–3). It was earlier owned by the erstwhile Bettiah Estate with shooting facilities. The name of the sanctuary was coined in the memory of Sri Udai Singh, one of the successors of Bettiah Estate and owners of these forests before independence. The sanctuary is situated 14.5 km west of Bettiah town in the West Champaran district of...
Bihar and lies between 26° 46'42" N to 26° 49'15" N and 84° 24'24" E to 84° 27'15" E. It is predominantly forested wetland, located on both sides of an Oxbow Lake (Sareyaman Lake) and covers an area of 8.87 km². The soil is of immature riverain type and it is clayey, sandy loam and greyish with slightly alkaline in nature. Annual average rainfall is 1201 mm (Roy 2016). The sanctuary was created to protect the bird diversity in the area and to also conserve the ecosystem functions as it is one of the most important wetland in this highly urbanized landscape. The main attraction of the sanctuary is the Sareyaman Lake where migratory birds visit during the winter season and the lake acts as wintering sites for these migratory birds. The area is one of the recognized important bird area and a centre for conservation, education and recreation in the State. Tourists, school and college students visit the sanctuary for watching migratory bird in winter (November to March) and collecting information on floral and faunal diversity to study the ecosystem. The vegetation falls under four categories such as mixed deciduous forest, vegetation in plantation, grasslands and aquatic vegetation.

**Figure 1.** Location map of the Udaipur wildlife sanctuary, West Champaran, Bihar, India.

**Figure 2.** Udaipur wildlife sanctuary, West Champaran, Bihar, India.
**Data collection**

Literature pertaining to the flora of Udaipur wildlife sanctuary, West Champaran district, Bihar was collected from published works prior to undertaking explorations. Specimens collected by K. Thothathri and B.V. Shetty exclusively from Udaipur forests deposited at Central National Herbarium (CAL) were studied during the present documentation. Field surveys were undertaken periodically in the sanctuary during 2017–2018 and plant samples with flowers and fruits were collected during field surveys. The collected specimens were processed following standard herbarium techniques (Bridson & Forman 1998). Specimens were identified using national and regional floras (Hooker 1872–1897, Haines 1921–25, Hajra et al. 1995a, 1995b, Rajendran & Daniel 2002, Balakrishnan et al. 2012, Bandyopadhyay 2014) and also compared with authentic specimens deposited at CAL. A set of voucher specimens duly labelled are deposited at CAL. The Angiosperm Phylogeny Group (2016) system of classification is followed in the present documentation. The species under a family have been arranged in alphabetical order. The nomenclature of plants has been updated using Plants of the World Online (2019) and International Plant Name Index (2019). Authors of Plant Names have been given according to Brummitt & Powell (1992).

**RESULTS**

The flora comprises 283 taxa (angiosperms: 278, pteridophytes: 5) belonging to 225 genera and 71 families (Table 1). The study of literature (Thothathri 1965, Bhattacharya & Sarkar 1998, Singh et al. 2001) revealed that out of the 283 taxa, 23 species belonging to 23 genera and 14 families are new additions to the ‘Flora of West Champaran district, Bihar’. Poaceae with 31 species followed by Fabaceae (27 species), Asteraceae & Lamiaceae (15 spp. each), Cyperaceae (13 spp.), Apocynaceae & Rubiaceae (11 spp. each), Euphorbiaceae & Malvaceae (10 spp. each) and Acanthaceae, Boraginaceae, Convolvulaceae & Cucurbitaceae (7 spp. each) are the dominant families with high species representation (Fig. 4). *Cyperus* is the most dominant genus with 5 species, followed by *Euphorbia*, *Fimbristylis* & *Solanum* (4 spp. each) and *Alysicarpus*, *Commelina*, *Ipomoea*, *Ficus* and *Phyllanthus* (3 spp. each) (Fig. 5). An analysis on the life-form composition of the flora reveals that there are 189 herbaceous species that constitute 66.8% of flora, followed by 34 tree species (12%), 31 species of shrubs (11%) and 29 species of climbers (10.2%) (Fig. 6). Photographs of habitats and important plants have also been provided in photoplates (Figs. 7–13).

| S.N. | Family/ Plants name | Flowering and Fruiting | Habit | Specimens examined |
|------|---------------------|------------------------|-------|--------------------|
| **NYMPHAEACEAE** |
| 1.   | *Nymphaea nouchali*  | Aug.–Dec.              | Herb  | ONM, AK & SS 85567 |
| 2.   | *Nymphaea pubescens* | Sept.–Nov.             | Herb  | ONM, AK & SS 85608 |
| **PIPERACEAE** |
| 3.   | *Peperomia pellucida* (L.) Kunth | April–Sept.  | Herb  | ONM, AK & SS 74784 |

*Figure 3. Udaipur wildlife sanctuary, West Champaran, Bihar, India (Satellite view).*
### ANNONACEAE
4. *Miliusa lomentosa* (Roxb.) Finet & Gagnep.*
   March–June
   Tree
   ONM, AK & SS 65570

### ARACEAE
5. *Colocasia esculenta* (L.) Schott
   Aug.–Dec.
   Herb
   ONM, AK & SS 85627

### ALISMATACEAE
6. *Caldesia pannassifolia* (L.) Parl.
   May–Oct
   Herb
   K. Thothathi 9902

### HYDROCHARITACEAE
7. *Hydrilla verticillata* (L.f.) Royle
   Apirl–Dec.
   Herb
   ONM, AK & SS 65582; K. Thothathi 9941

8. *Najas marina* L.
   Aug.–Sept.
   Herb
   ONM, AK & SS 65584, 85536

9. *Nechamandra alternifolia* (Roxb. ex Wight) Thwaites
   Aug.–Nov.
   Herb
   ONM, AK & SS 85606

10. *Ottelia alismoides* (L.) Pers.
    Nov.–April
    Herb
    B.V. Shetty 197

### POTAMOGETONACEAE
11. *Potamogeton nodosus* Poir.
    July–Sept.
    Herb
    ONM, AK & SS 65583, 85512, 85544; K. Thothathi 9939

### DIOSCOREACEAE
12. *Dioscorea bulbifera* L.
    Sept.–March
    Climber
    ONM, AK & SS 85516

13. *Dioscorea glabra* Roxb.
    Sept.–Jan.
    Climber
    ONM, AK & SS 85550

### ORCHIDACEAE
14. *Habenaria plantaginea* Lindl.*
    Aug.–Oct.
    Herb
    ONM, AK & SS 74776, 85515

15. *Vanda tessellata* (Roxb.) Hook. ex G. Don
    April–July
    Herb
    ONM, AK & SS 85529

### HYPOXIDACEAE
16. *Curculigo orthioides* Gaertn.
    April–Aug.
    Herb
    ONM, AK & SS 85530

### ARECACEAE
17. *Calamus tenuis* Roxb.
    July–Dec.
    Shrub
    ONM, AK & SS 74708

18. *Phoenix sylvestris* (L.) Roxb.
    March–June
    Tree
    ONM, AK & SS 85634

### COMMELINACEAE
19. *Commelina benghalensis* L.
    June–Nov.
    Herb
    ONM, AK & SS 85541

20. *Commelina longifolia* Lam.
    Aug.–Nov.
    Herb
    ONM, AK & SS 65525, 74767

21. *Commelina undulata* R.Br.*
    May–July
    Herb
    ONM, AK & SS 85578

22. *Murdannia nudiflora* (L.) Brenan
    Aug.–Nov.
    Herb
    ONM, AK & SS 65519, 85542

### PONTEDERIACEAE
23. *Pontederia crassipes* Mart.
    July–Nov.
    Herb
    ONM, AK & SS 65517, 74733

24. *Pontederia vaginalis* Burm.f.
    July–Nov.
    Herb
    ONM, AK & SS 85575

### CYPERACEAE
25. *Cyperus alopecuroides* Rottb
    July–March
    Herb
    ONM, AK & SS 85515, 85572

26. *Cyperus articulatus* L.
    Throughout the year
    Herb
    ONM, AK & SS 85506, 8559

27. *Cyperus exaltatus* Retz.*
    July–March
    Herb
    ONM, AK & SS 85572

28. *Cyperus niveus* Retz
    May–Aug.
    Herb
    ONM, AK & SS 65567, 85602

29. *Cyperus platystylis* R. Br.
    May–Nov.
    Herb
    ONM, AK & SS 85605

30. *Eleocharis geniculata* (L.) Roem. & Schult.
    Throughout the year
    Herb
    B.V. Shetty 242

31. *Fimbristylis aestivalis* (Retz.) Vahl
    Sept.–Nov.
    Herb
    ONM, AK & SS 65565

32. *Fimbristylis dichotoma* (L.) Vahl
    May–Oct.
    Herb
    ONM, AK & SS 85569

33. *Fimbristylis falcatata* (Vahl) Kunth*
    June–Nov.
    Herb
    ONM, AK & SS 85587

34. *Fimbristylis ovata* (Burm.f.) J. Kern
    March–Dec.
    Herb
    ONM, AK & SS 65543

35. *Kyllinga squamulata* Vahl*
    Aug.–Sept.
    Herb
    ONM, AK & SS 85571

36. *Pycreus sanguinolentus* (Vahl) Nees
    Oct.–March
    Herb
    ONM, AK & SS 85560

37. *Schoenoplectus lateriflorus* (J.F. Gmel.) Lye*
    Oct.–March
    Herb
    K. Thothathi 9948

### POACEAE
38. *Brachiaria reptans* (L.) C.A. Gardner & C.E. Hubb.
    July–March
    Herb
    ONM, AK & SS 85534, 85565

39. *Brachiaria subquadripara* (Trin.) Hitchc.*
    July–Feb.
    Herb
    ONM, AK & SS 74757

40. *Chrysopogon aciculatus* (Retz.) Trin.
    Throughout the year
    Herb
    ONM, AK & SS 85570
| No. | Common Name | Scientific Name | Flowering/Season | Life Form | Reference |
|-----|-------------|-----------------|------------------|-----------|-----------|
| 41. | Chrysopogon zizanioides | (L.) Robersty | Sept.–Feb. | Herb | ONM, AK & SS 65514, 85601 |
| 42. | Cymbopogon flexuosus | (Nees ex Steud.) W. Watson* | July–April | Herb | ONM, AK & SS 74723 |
| 43. | Cymbopogon nardus | (L.) Rendle | July–April | Herb | ONM, AK & SS 65559 |
| 44. | Cyndon dactylon | (L.) Pers. | Throughout the year | Herb | ONM, AK & SS 85588, 855611 |
| 45. | Cyrtococcum patens | (L.) A. Camus* | Throughout the year | Herb | ONM, AK & SS 65511 |
| 46. | Dactyloctenium aegyptium | (L.) Willd. | June–Oct. | Herb | ONM, AK & SS 85552 |
| 47. | Desmostachya bipinnata | (L.) Stapf | Aug.–Sept. | Herb | ONM, AK & SS 65566 |
| 48. | Digitaria stricta | Roth | Oct.–Dec. | Herb | ONM, AK & SS 85538; B.V. Shetty 140 |
| 49. | Echinocloa colonum | (L.) Link | Throughout the year | Herb | B.V. Shetty 195 |
| 50. | Echinocloa stagnina | (Retz.) P. Beauv. | June–March | Herb | B.V. Shetty 191 |
| 51. | Enteropogon dolichostachys | (Lag.) Keng* | Sept.–March | Herb | ONM, AK & SS 65513 |
| 52. | Eragrostis amabilis | (L.) Wight & Arn. | Almost throughout the year | Herb | ONM, AK & SS 74778, 85540 |
| 53. | Hemarthria compressa | (L.f.) R. Br. | July–Feb. | Herb | ONM, AK & SS 85590 |
| 54. | Imperata cylindrica | (L.) Raesusch. | Throughout the year | Herb | K. Thothathri 9977 |
| 55. | Leersia hexandra | Sw. | June–March | Herb | ONM, AK & SS 65510 |
| 56. | Oplismenus compositus | (L.) P. Beauv. | July–March | Herb | ONM, AK & SS 74766 |
| 57. | Oryza rufipogon | Griff. | Oct.–March | Herb | ONM, AK & SS 74771; B.V. Shetty 212 |
| 58. | Panicum curvilorum | Hornem.* | May–Feb. | Herb | ONM, AK & SS 85533, 85562, 85564 |
| 59. | Panicum repens | L. | Throughout the year | Herb | ONM, AK & SS 65512, 85568 |
| 60. | Paspalidium flavidum | (Retz.) A. Camus | May–March | Herb | ONM, AK & SS 85589 |
| 61. | Paspalum scrobiculatum | L. | Aug.–Nov. | Herb | ONM, AK & SS 65516, 85561, 85591 |
| 62. | Perotis indica | (L.) Kunze | Almost throughout the year | Herb | ONM, AK & SS 74780, 85523 |
| 63. | Phragmites karka | (Retz.) Trin. ex Steud. | June–March | Herb | ONM, AK & SS 74709, 74772 |
| 64. | Saccharum narenga | (Nees ex Steud.) Hack. | Sept.–March | Herb | ONM, AK & SS 65544 |
| 65. | Saccharum spontaneum | L. | July–April | Herb | ONM, AK & SS 85626 |
| 66. | Setaria pumila | (Poir.) Roem. & Schult. | Throughout the year | Herb | ONM, AK & SS 85580; B.V. Shetty 172 |
| 67. | Setaria verticillata | (L.) P. Beauv.* | June–April | Herb | ONM, AK & SS 65547, 85598 |
| 68. | Sporobolus diandrus | (Retz.) P. Beauv. | Sept.–Jan. | Herb | ONM, AK & SS 74752 |

**CERATOPHYLLACEAE**

| No. | Common Name | Scientific Name | Flowering/Season | Life Form | Reference |
|-----|-------------|-----------------|------------------|-----------|-----------|
| 69. | Ceratophyllum demersum | L. | June–Sept. | Herb | ONM, AK & SS 65585, 85603 |

**MENISPERMACEAE**

| No. | Common Name | Scientific Name | Flowering/Season | Life Form | Reference |
|-----|-------------|-----------------|------------------|-----------|-----------|
| 70. | Cissampelos pareira | L. | Aug.–Oct. | Climber | ONM, AK & SS 65539 |
| 71. | Stephanos japonica | (Thunb.) Miers var. discolor | (Blume) Forman | March–Dec. | Climber | ONM, AK & SS 85556 |
| 72. | Tiliacora acuminata | (Lam.) Miers | April–Dec. | Climber | ONM, AK & SS 65540 |
| 73. | Tinospora cordifolia | (Wild.) Hook.f. & Thomson | Aug.–Nov. | Climber | ONM, AK & SS 65548 |

**RANUNCULACEAE**

| No. | Common Name | Scientific Name | Flowering/Season | Life Form | Reference |
|-----|-------------|-----------------|------------------|-----------|-----------|
| 74. | Clematis gouriana | Roxb. ex DC. | Sept.–Dec. | Climber | ONM, AK & SS 74793; B.V. Shetty 102 |

**NELUMBONACEAE**

| No. | Common Name | Scientific Name | Flowering/Season | Life Form | Reference |
|-----|-------------|-----------------|------------------|-----------|-----------|
| 75. | Nelumbo nucifera | Gaertn. | March–Dec. | Herb | ONM, AK & SS 85505 |
VITACEAE

76. Ampelocissus latifolia (Roxb.) Planch. April–Dec. Climber ONM, AK & SS 65587
77. Cayratia trifolia (L.) Domin Aug.–Dec. Climber ONM, AK & SS 65592
78. Cissus adnata Roxb.* June–Sept. Climber ONM, AK & SS 74704, 74775
79. Leea indica (Burm. f.) Merr.* Aug.–Dec. Herb ONM, AK & SS 65563, 85596

FABACEAE

80. Abrus precatorius L. Aug.–March Climber ONM, AK & SS 65541
81. Albizia lebbek (L.) Benth. April–March Tree ONM, AK & SS 74702
82. Alysicarpus roxburghianus Thoth. & A.Pramanik* Sept.–Dec. Climber B.V. Shetty 241
83. Alysicarpus rugosus (Wild.) DC. Sept.–Jan. Herb B.V. Shetty 160
84. Alysicarpus vaginalis (L.) DC. Throughout the year Herb ONM, AK & SS 85524, 85545
85. Bauhinia purpurea L. Sept.–March Tree ONM, AK & SS 65504, 74779
86. Bauhinia racemosa Lam. March–Jan. Tree ONM, AK & SS 74745
87. Cajanus scarabaeoides (L.) Thouars Aug.–Nov. Herb ONM, AK & SS 85520
88. Cassia fistula L. Feb.–April Tree ONM, AK & SS 65598
89. Crotalaria medicaginea Lam. Aug.–Dec. Herb ONM, AK & SS 85583, 85584, 65546
90. Crotalaria prostrata Rottler ex Willd. Sept.–March Herb ONM, AK & SS 85566; K. Thothathri 9959
91. Dalbergia sissoo Roxb. ex DC. March–Nov. Tree ONM, AK & SS 85612
92. Desmodium gangeticum (L.) DC. March–Oct. Herb ONM, AK & SS 74777
93. Desmodium triflorum (L.) DC. Oct.–April Herb ONM, AK & SS 65560
94. Indigofera australiniana DC. Aug.–Nov. Herb ONM, AK & SS 85547
95. Indigofera linifolia (L.f.) Retz. Aug.–March Herb ONM, AK & SS 85553
96. Mimosa hilmayana Gamble Aug.–Nov. Shrub ONM, AK & SS 65538, 85532
97. Moullava digyna (Rottler) Gagnon & G.P. Lewis March–April Shrub ONM, AK & SS 74706
98. Mucuna pruriens (L.) DC. Sept.–April Climber ONM, AK & SS 65503
99. Phanera vahlii (Wight & Arn.) Benth. March–April Liana ONM, AK & SS 85611
100. Pongamia pinnata (L.) Pierre May–Feb. Tree ONM, AK & SS 85610
101. Senegalia rugata (Lam.) Britton & Rose April–March Shrub ONM, AK & SS 74744
102. Senna occidentalis (L.) Link Sept.–Dec. Herb ONM, AK & SS 65591, 74730, 74763

POLYGALACEAE

107. Polygala chinensis L. April–Jan. Herb ONM, AK & SS 85582

RHAMNACEAE

108. Ziziphus mauritiana Lam. Aug.–Dec. Tree ONM, AK & SS 65555
109. Ziziphus oenoplia (L.) Mill. Sept.–June. Shrub ONM, AK & SS 74707

ULMACEAE

110. Holopelea integrifolia (Roxb.) Planch. Feb.–May Tree ONM, AK & SS 85632

CANNABACEAE

111. Trema orientale (L.) Blume March–Nov. Tree ONM, AK & SS 85633

MORACEAE

112. Ficus benghalensis L. Jan.–March Tree ONM, AK & SS 85624
113. Ficus hispida L.f. Jan.–March Tree ONM, AK & SS 65554, 74705
114. Ficus religiosa L. March–June Tree ONM, AK & SS 85625
115. Streblus asper Lour. May–Aug. Tree K. Thothathri 9897

URTICACEAE

116. Pouzolzia pentandra (Roxb.) Benn. Aug.–Dec. Herb ONM, AK & SS 65530, 74792, 85513
117. Pouzolzia zeylanica (L.) Benn. July–Oct. Herb ONM, AK & SS 65595, 74754

CUCURBITACEAE

118. Actinostemma tenerum Griff. July–Nov. Climber ONM, AK & SS 85607
| No. | Scientific Name                     | Bloom Period       | Habit        | Authors                          |
|-----|------------------------------------|--------------------|--------------|----------------------------------|
| 119 | Coccinia grandis (L.) Voigt        | Dec.–June          | Climber     | ONM, AK & SS 65522, 74795, 85504|
| 120 | Cucumis maderaspatus L.            | Aug.–Dec.          | Tree        | ONM, AK & SS 65558               |
| 121 | Cucumis melo L.                    | March–Sept.        | Climber     | ONM, AK & SS 85522               |
| 122 | Momordica charantia L.             | May–Oct.           | Climber     | ONM, AK & SS 85539               |
| 123 | Momordica dioica Roxb. ex Willd.   | June–Oct.          | Climber     | ONM, AK & SS 65531, 85551       |
| 124 | Trichosanthes cucumerina L.        | Aug.–Jan.          | Climber     | ONM, AK & SS 85593               |

**Oxalidaceae**

| No. | Scientific Name                      | Bloom Period       | Habit | Authors                          |
|-----|--------------------------------------|--------------------|-------|----------------------------------|
| 125 | Biophytum sensitivum (L.) DC.        | Oct.–Jan.          | Herb  | ONM, AK & SS 85609; B.V. Shetty 130|

**Pattyriovaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 126 | Oxalis corniculata L.                | Oct.–Jan.          | Herb   | K. Thothathri 9870               |

**Passifloraceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 128 | Passiflora suberosa L.               | March–May          | Climber| ONM, AK & SS 74789               |

**Salicaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 129 | Casearia tomentosa Roxb.             | Feb.–April         | Shrub  | ONM, AK & SS 85615               |

**Euphorbiaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 130 | Acalypha indica L.                   | Aug.–Feb.          | Herb   | ONM, AK & SS 74782, 65529        |
| 131 | Euphorbia hirta L.                   | Aug.–Oct.          | Herb   | ONM, AK & SS 65577, 74729        |
| 132 | Euphorbia hypericifolia L.           | July–Nov.          | Herb   | ONM, AK & SS 85630               |
| 133 | Euphorbia prostrata Aiton            | Throughout the year| Herb   | ONM, AK & SS 65580               |
| 134 | Euphorbia thymifolia L.              | July–March         | Herb   | B.V. Shetty 169                  |
| 135 | Jatropha curcas L.                   | May–Jan.           | Shrub  | ONM, AK & SS 65556               |
| 136 | Jatropha gossypifolia L.             | April–Sept.        | Shrub  | ONM, AK & SS 65505               |
| 137 | Mallotus nudiflorus (L.) Kulju & Welzen| Feb.–Aug.        | Tree   | ONM, AK & SS 85514               |
| 138 | Mallotus philippensis (Lam.) Müll. Arg.| Oct.–May       | Tree   | ONM, AK & SS 74748, 74751, 74768|
| 139 | Ricinus communis L.                  | Sept.–June         | Shrub  | ONM, AK & SS 85631               |

**Phyllanthaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 140 | Breynia viit-idaea (Burm.f.) C.E.C. Fisch.| June–Oct. | Shrub  | ONM, AK & SS 74794               |
| 141 | Bridelia stipularis (L.) Blume       | Sept.–April        | Shrub  | ONM, AK & SS 74701, 85535        |
| 142 | Phyllanthus reticulatus Poir.        | Throughout the year| Shrub  | ONM, AK & SS 85526               |
| 143 | Phyllanthus urinaria L.              | July–Dec.          | Herb   | ONM, AK & SS 65561               |
| 144 | Phyllanthus virgatus G. Forst.       | Aug.–Nov.          | Herb   | ONM, AK & SS 74737, 85507        |

**Combretaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 145 | Terminalia arjuna (Roxb. ex DC.) Wight & Arn.| March–Sept. | Tree   | ONM, AK & SS 85595               |

**Lythraceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 146 | Ammannia baccifera L.                | Nov.–April         | Herb   | B.V. Shetty 150                  |
| 147 | Woodfordia fruticosa (L.) Kurz       | Jan.–May           | Shrub  | K. Thothathri 9919               |

**Onagraceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 148 | Ludwigia adscendens (L.) H. Hara*   | June–Sept.         | Herb   | ONM, AK & SS 85614               |
| 149 | Ludwigia hyssopifolia (G. Don) Exell| Oct.–Jan.          | Herb   | ONM, AK & SS 65524               |

**MYRTACEAE**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 150 | Syzygium cumini (L.) Skeels          | March–Aug.        | Tree   | K. Thothathri 9907               |

**Sapindaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 151 | Cardiospermum halicacabum L.         | March–Nov.         | Herb   | ONM, AK & SS 65526               |
| 152 | DODONAEA VISCOSA JACQ.               | Jan.–Aug.          | Shrub  | K. Thothathri 9975               |

**Rutaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 153 | Aegle marmelos (L.) Corrêa           | Oct.–Jan.          | Tree   | B.V. Shetty 199                  |
| 154 | Murraya koenigii (L.) Spreng.        | March–Aug.        | Shrub  | ONM, AK & SS 65571               |

**Meliaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 155 | Azadirachta indica A. Juss.          | Feb.–Aug.          | Tree   | K. Thothathri 9903               |

**Malvaceae**

| No. | Scientific Name                      | Bloom Period       | Habit  | Authors                          |
|-----|--------------------------------------|--------------------|--------|----------------------------------|
| 156 | Abutilon indicum (L.) Sweet          | Aug.–April         | Herb   | ONM, AK & SS 65535               |
| No. | Species                                      | Flowering Period | Habit    | Collection Code |
|-----|---------------------------------------------|------------------|----------|-----------------|
| 157 | Bombax ceiba L.                             | Feb.–May         | Tree     | ONM, AK & SS 85613 |
| 158 | Corchorus aetosans L.                       | Aug.–Feb.        | Herb     | ONM, AK & SS 85519 |
| 159 | Grewia hirsuta Vahl.                        | July–Nov.        | Herb     | ONM, AK & SS 85549 |
| 160 | Melochia corchorifolia L.                   | Aug.–Dec.        | Herb     | ONM, AK & SS 85518 |
| 161 | Sida cordata (Burm.f.) Borss. Waalk.        | June–Nov.        | Herb     | ONM, AK & SS 74761, 74781, 85525. |
| 162 | Sida rhombifolia L.                         | July–Dec.        | Herb     | ONM, AK & SS 85531, 85568; B.V. Shetty 129; K. Thothathri 9882 |
| 163 | Triumfetta rhomboidea Jacq.                 | Aug.–Nov.        | Herb     | ONM, AK & SS 65542 |
| 164 | Urena lobata L.                             | July–Oct.        | Herb     | ONM, AK & SS 74749,74764, 74788; B.V. Shetty 149 |
| 165 | Urena repanda Roxb. ex Sm.                  | Aug.–Nov.        | Herb     | ONM, AK & SS 85528 |
| 166 | Dendrophthoe falcata (L.f.) Etingsh.        | Nov.–March       | Shrub    | K. Thothathri 9911 |
| 167 | Persicaria barbata (L.) H.Hara              | May–Dec.         | Herb     | ONM, AK & SS 74719, 85511 |
| 168 | Polygonum plebeium R. Br.                  | Nov.–June        | Herb     | ONM, AK & SS 85586, 74722 |
| 169 | Rumex dentatus L.                           | May–July         | Herb     | K. Thothathri 9969 |
| 170 | Achyranthas aspera L.                       | Aug.–Feb.        | Herb     | ONM, AK & SS 65534, 65597, 85563 |
| 171 | Aerva sanguinolenta (L.) Blume              | April–Oct.       | Herb     | ONM, AK & SS 65533, 74756, 85579 |
| 172 | Alternanthera sessilis (L.) R. Br. ex DC.   | July–March       | Herb     | ONM, AK & SS 65509, 65581, 74718 |
| 173 | Amaranthus viridis L.                       | Aug.–May         | Herb     | ONM, AK & SS 65594, 74799 |
| 174 | Digera muricata (L.) Mart.                  | Aug.–Dec.        | Herb     | ONM, AK & SS 74800, 85543 |
| 175 | Boerhavia diffusa L.                        | June–Dec.        | Herb     | ONM, AK & SS 85517 |
| 176 | Portulaca oleracea L.                       | May–Sep.         | Herb     | B.V. Shetty 227 |
| 177 | Androsace umbellata (Lour.) Merr.           | Feb.–April       | Herb     | ONM, AK & SS 74712 |
| 178 | Lysimachia arvensis (L.) U. Manns & Anderb. | Dec.–April       | Herb     | ONM, AK & SS 74753 |
| 179 | Catunaregam spinosa (Thumb.)                | May–Jan.         | Tree     | B.V. Shetty 124 |
| 180 | Dentella repens (L.) J.R. Forst. & G. Forst.| Jan.–July        | Herb     | K. Thothathri 9929 |
| 181 | Haldina cordifolia (Roxb.) Ridsdale         | Aug.–May         | Tree     | ONM, AK & SS 85616 |
| 182 | Hymenodictyon orixense (Roxb.) Mabb.        | Aug.–April       | Tree     | ONM, AK & SS 85617 |
| 183 | Knoxia sumatrensis (Retz.) DC,.             | July–Nov.        | Herb     | B.V. Shetty 203 |
| 184 | Mitragyna parvifolia (Roxb.) Korth.         | April–June       | Tree     | ONM, AK & SS 85618, 65575, 65578; B.V. Shetty 189; K. Thothathri 9967 |
| 185 | Oldenlandia biflora L.                      | Jan.–Sept.       | Herb     | ONM, AK & SS 65557, 85585; B.V. Shetty 144 |
| 186 | Oldenlandia corymbosa L.                    | Sept.–April      | Herb     | Thothathri 9865 |
| 187 | Spermacoce articulatis L.f.                 | Aug.–Feb.        | Herb     | ONM, AK & SS 85506, 85581 |
| 188 | Spermacoce lasiocarpa R.Br. ex Wall.*       | Aug.–Dec.        | Herb     | ONM, AK & SS 85597; B.V. Shetty 144 |
| 189 | Wendlandia heynei (Schult.) Santapau & Merchant | March–April      | Tree     | Thothathri 9865 |
| 190 | Calotropis gigantea (L.) W.T. Aiton         | March–June       | Shrub    | ONM, AK & SS 65553 |
| 191 | Calotropis procera (Aiton) W.T. Aiton       | March–Sept.      | Shrub    | K. Thothathri 9931 |
| 192 | Cryptolepis dubia (Burm.f.) M.R. Almeida    | May–Feb.         | Liana    | ONM, AK & SS 85558 |
| No. | Species Name | Flowering Period | Type | Other Information |
|-----|--------------|------------------|------|-------------------|
| 193 | *Dregea volubilis* (L.f.) Benth. ex Hook.f. | March–Sept. | Liana | ONM, AK & SS 74743 |
| 194 | *Hemidesmus indicus* (L.) R.Br. | Aug.–Jan. | Climber | ONM, AK & SS 85628 |
| 195 | *Holarrhena pubescens* Wall. ex G. Don | April–Feb. | Shrubs | ONM, AK & SS 74710; K. Thothathri 9921 |
| 196 | *Ichnocarpus frutescens* (L.) W.T. Aiton | Sept.–April | Liana | AK & SS 74774; K. Thothathri 9933 |
| 197 | *Oxystelma esculentum* (L.f.) Sm. | July–Dec. | Climber | ONM, AK & SS 85557 |
| 198 | *Rauvolfia serpentina* (L.) Benth. ex Kurz | Feb.–Dec. | Herb | K. Thothathri 9900 |
| 199 | *Telosma cordata* (Burm.f.) Merr.* | July–Sept. | Climber | ONM, AK & SS 85548 |
| 200 | *Vallaris solanacea* (Roth) Kuntze | March–Sept. | Shrub | K. Thothathri 9880 |

**Boraginaceae**

201. *Arnebia hispida* (Sieber ex Lehm.) A. DC. | March–May | Herb | K. Thothathri 9866 |
202. *Cordia dichotoma* G. Forst. | Feb.–Aug. | Tree | K. Thothathri 9908 |
203. *Cynoglossum wallichii* G. Don* | May–Aug. | Herb | ONM, AK & SS 65564, 85501; K. Thothathri 9887 |
204. *Ehretia acuminata* R. Br. | March–July | Tree | K. Thothathri 9934 |
205. *Ehretia laevis* Roxb. | March–June | Tree | K. Thothathri 9890 |
206. *Heliotropium indicum* L. | March–Sept. | Herb | ONM, AK & SS 85508 |
207. *Heliotropium strigosum* Willd. | April–Dec. | Herb | ONM, AK & SS 65507, 65586; K. Thothathri 9928 |

**Convulvulaceae**

208. *Cascuta reflexa* Roxb. | Oct.–Jan. | Herb | ONM, AK & SS 65518; B.V. Shetty 201 |
209. *Evolvulus alsinoides* (L.) L. | July–March | Herb | ONM, AK & SS 65551, 65568 |
210. *Evolvulus nummularias* (L.) L. | July–Feb. | Herb | ONM, AK & SS 74765 |
211. *Ipomoea aquatica* Forssk. | Nov.–April | Herb | ONM, AK & SS 74758 |
212. *Ipomoea nil* (L.) Roth | June–Oct. | Herb | B.V. Shetty 106 |
213. *Ipomoea pes-tigrisidis* L. | July–Oct. | Climber | ONM, AK & SS 85599 |
214. *Poranopsis paniculata* (Roxb.) Roberty | Nov.–April | Climber | B.V. Shetty 131 |

**Solanaceae**

215. *Datura metel* L. | Aug.–Nov. | Herb | ONM, AK & SS 65532 |
216. *Physalis minima* L. | Aug.–Dec. | Herb | ONM, AK & SS 65501 |
217. *Solanum erianthum* D. Don | Throughout the year | Shrub | ONM, AK & SS 65536, 74730; B.V. Shetty 179 |
218. *Solanum nigrum* L. | May–Nov. | Herb | K. Thothathri 9960 |
219. *Solanum violaceum* Ortega | Throughout the year | Shrub | ONM, AK & SS 74725; B.V. Shetty 198 |
220. *Solanum virginianum* L. | Aug.–June | Herb | ONM, AK & SS 65569, 74735; B.V. Shetty 238 |

**Oleaceae**

221. *Jasminum sambac* (L.) Aiton | May–Sept. | Shrub | ONM, AK & SS 74727 |

**Plantaginaceae**

222. *Adenosma indica* (Lour.) Merr. | Sept.–Nov. | Herb | ONM, AK & SS 65562 |
223. *Bacopa monnieri* (L.) Wettst. | July–March | Herb | ONM, AK & SS 65520, 65599 |
224. *Linophila indica* (L.) Druce | Sept.–March | Herb | ONM, AK & SS 74731; K. Thothathri 9945 |
225. *Mecardonia procumbens* (Mill.) Small | March–May | Herb | ONM, AK & SS 85574 |
226. *Scoparia dulcis* L. | Sept.–Feb. | Herb | ONM, AK & SS 65572, 74728; B.V. Shetty 151 |
227. *Veronica anagallis-aquatica* L. | April–Aug. | Herb | K. Thothathri 9913 |

**Scrophulariaceae**

228. *Verbasum chinense* (L.) Santapau | Feb.–March | Herb | K. Thoothathri 9885 |

**Linderniaceae**

229. *Bonnaya ciliata* (Colsm.) Spreng. | Aug.–Feb. | Herb | ONM, AK & SS 65523 |
230. *Torenia crustacea* (L.) Cham. & Schltdl. | July–Dec. | Herb | ONM, AK & SS 74760, 85577 |
| Family             | Species                          | Flowering Period | Life Form | Location                       |
|--------------------|----------------------------------|------------------|-----------|--------------------------------|
| MARTYNIACEAE       | Martynia annua L.                | Aug.–Dec.        | Herb     | ONM, AK & SS 65545, 85527     |
| PEDALIACEAE        | Sesamum indicum L.               | June–Oct.        | Herb     | ONM, AK & SS 74796             |
| ACANTHACEAE        | Dicliptera paniculata (Forssk.) I. Darbysh. | Aug.–March       | Herb     | ONM, AK & SS 65502; B.V. Shetty 157 |
|                    | Hemigraphis latebrosea (B.Heyne ex Roth) Nees* | Sept.–April      | Herb     | K. Thothathri 9952             |
|                    | Hygrophila polysperma (Roxb.) T. Anderson | Oct.–April       | Herb     | ONM, AK & SS 74742; B.V. Shetty 188; K. Thothathri 9878 |
|                    | Ruellia prostrata Poir.          | July–Dec.        | Herb     | ONM, AK & SS 74769             |
|                    | Ruellia tuberosa L.              | Sept.–Dec.       | Herb     | ONM, AK & SS 85509             |
|                    | Rangia pectinata (L.) Nees       | Nov.–April       | Herb     | ONM, AK & SS 74711; B.V. Shetty 110; K. Thothathri 9973 |
|                    | Rangia repens (L.) Nees          | Aug.–Feb.        | Herb     | ONM, AK & SS 74716             |
| BIGNONIACEAE       | Oroxylum indicum (L.) Benth. ex Kurz | July–March       | Tree     | ONM, AK & SS 85619             |
| VERBENACEAE        | Lantana camara L.                | April–June       | Shrub    | ONM, AK & SS 85629             |
|                    | Lippia alba (Mill.) N.E. Br. ex Britton & P. Wilson | Throughout the year | Herb     | K. Thothathri 9920             |
|                    | Phyla nodiflora (L.) Greene      | Throughout the year | Herb     | ONM, AK & SS 65589; K. Thothathri 9867 |
| LAMIACEAE          | Anisomeles indica (L.) Kunze     | Sept.–March      | Herb     | ONM, AK & SS 74759             |
|                    | Callicarpa macrophylla Vahl      | April–Dec.       | Shrub    | ONM, AK & SS 74762, 74773      |
|                    | Clerodendrum cordatum D. Don*    | April–June       | Shrub    | ONM, AK & SS 85620             |
|                    | Colebrookea oppositifolia Sm.    | Nov.–April       | Shrub    | ONM, AK & SS 74747             |
|                    | Gmelina arborea Roxb. ex Sm.     | Feb.–June        | Tree     | ONM, AK & SS 85621             |
|                    | Hyptis suaveolens (L.) Poit.     | Oct.–Jan.        | Herb     | ONM, AK & SS 74787             |
|                    | Leonotis nepetifolia (L.) R. Br. | Oct.–March       | Herb     | B.V. Shetty 162                 |
|                    | Leucas aspera (Willd.) Link      | July–March       | Herb     | ONM, AK & SS 85594             |
|                    | Leucas cephalotes (Roth) Spreng. | Sept.–Dec.       | Herb     | ONM, AK & SS 65593, 74736; B.V. Shetty 161 |
|                    | Nepeta hindostana (B. Heyne ex Roth) Haines | Aug.–March       | Herb     | ONM, AK & SS 65550, 74797; B.V. Shetty 183; K. Thothathri 9954 |
|                    | Ocimum basilicum L.              | Aug.–Feb.        | Herb     | ONM, AK & SS 74738; B.V. Shetty 156 |
|                    | Pogostemon benghalensis (Burm.f.) Kunze | March–April     | Herb     | ONM, AK & SS 74726             |
|                    | Salvia plebeia R. Br.            | Dec.–March       | Herb     | K. Thothathri 9896             |
|                    | Tectona grandis L.f.             | July–Jan.        | Tree     | ONM, AK & SS 85622             |
|                    | Vitex negundo L.                 | June–Dec.        | Shrub    | ONM, AK & SS 85623             |
| MAZACEAE           | Mazus pumilus (Burm.f.) Steenis   | July–Dec.        | Herb     | ONM, AK & SS 74717             |
| MENVANTHACEAE      | Nymphoides cristata (Roxb.) Kunze | April–Nov.       | Herb     | K. Thothathri 9943             |
|                    | Nymphoides indica (L.) Kunze     | Aug.–Nov.        | Herb     | ONM, AK & SS 65508; B.V. Shetty 209 |
| ASTERACEAE         | Acmella ciliata (Kunth) Cass.*   | Throughout the year | Herb     | ONM, AK & SS 74715, 74740, 74785, 85503 |
|                    | Adenostemma lavenia (L.) Kunze   | Aug.–Oct.        | Herb     | B.V. Shetty 108                 |
|                    | Ageratum conyzoides L.           | Oct.–Jan.        | Herb     | ONM, AK & SS 74703, 74798      |
|                    | Blumea axillaris (Lam.) DC.      | Throughout the year | Herb     | K. Thothathri 9895             |
|                    | Blumea laciniata (Roxb.) DC.     | March–April      | Herb     | K. Thothathri 9888             |
|                    | Chromolaena odorata (L.) R.M. King & H. Rob. | April–Dec.     | Shrub    | ONM, AK & SS 74721             |


| 268. | Cyanthillium cinereum (L.) H. Rob. | Throughout the year | Herb | ONM, AK & SS 65549, 65552, 74732, 85592 |
| 269. | Eclipta prostrata (L.) L. | June–Feb. | Herb | ONM, AK & SS 65573, 74755 |
| 270. | Elephantopus scaber L. | Aug.–Dec. | Herb | ONM, AK & SS 65527, 85600 |
| 271. | Erigeron asteroidis Roxb. | April–July | Herb | K. Thothathri 9889 |
| 272. | Laggera aurita (L.f.) Bent. ex C.B. Clarke | March–April | Herb | K. Thothathri 9891 |
| 273. | Launaea nudicaulis Hook.f. | March–Sept. | Herb | ONM, AK & SS 65574, 74724, 74799, 85521 |
| 274. | Parthenium hysterophorus L. | July–March | Herb | ONM, AK & SS 65537, 85576 |
| 275. | Tridax procumbens L. | April–July | Herb | ONM, AK & SS 65576, 74741, 74790 |
| 276. | Xanthium strumarium L. | March–Dec. | Herb | ONM, AK & SS 65528, 85502 |

**APIACEAE**

277. Centella asiatica (L.) Urb. | Feb.–Nov. | Herb | ONM, AK & SS 65590, 65521 |

**PTERIDOPHYTES**

**ASPLENIACEAE**

278. Trachyspermum ammi (L.) Sprague | May–Aug. | Herb | ONM, AK & SS 65600 |

**EQUISETACEAE**

279. Diplazium esculentum (Retz.) Sw. | Nov.–Feb. | Herb | ONM, AK & SS 74714 |

**PTERIDACEAE**

280. Thelypteris dentata (Forssk.) E.P. St. John | June–Jan. | Herb | ONM, AK & SS 74746, 85546 |

**MARSILEACEAE**

281. Equisetum debile Roxb. ex Vaucher | Sept.–Dec. | Herb | ONM, AK & SS 74739 |

282. Pteris multifida Poir. | Sept.–Jan. | Herb | ONM, AK & SS 85555 |

Note: Plant species marked with asterisk (*) are additions to the Flora of West Champaran District, Bihar.

**DISCUSSION**

The sanctuary covers an area of about 8.87 km² (WII 2019) and the present study has established its richness in vegetation along with angiospermic and pteridophytic wealth of the sanctuary of which angiosperms are the key elements of the flora. Thothathri et al. (1966) reported 215 species from the area while in the present study 283 taxa have been documented. Furthermore, one species namely Alysicarpus roxburghianus (L.) Benth. ex Kurz endemic to India (Singh et al. 2015) and two species [Rauvolfia serpentina (L.) Benth. ex Kurz and Vanda tessellata (Roxb.) Hook. ex G. Don] listed in appendix-II of CITES have been documented which were not reported by Thothathri et al. (1966). During the present investigation, it is also noted that Senegalia catechu...
(L.f.) P.J.H. Hurter & Mabb. reported by Thothathri et al. (1966) is now understory which is an important economic plant used in ‘Kattha’ production. ‘Kattha’ is an extract of heartwood and is used as an ingredient to give red color and typical flavor to betel. Habenaria plantaginea Lindl. and Vanda tessellata (Roxb.) Hook. ex G. Don are the only two orchid species recorded from the sanctuary.

Figure 5. Dominant genera with respect to number of species.

Figure 6. Life forms of the plant species occurring in the Udaipur wildlife sanctuary.

The sanctuary lacks many forest species with economic values. Therefore, about 222.5 ha forest area was cleared for raising economically important forest species like Dalbergia sissoo Roxb. ex DC., Eucalyptus saligna Sm., Shorea robusta C.F. Gaertn. and Tectona grandis L.f. (Thothathri et al. 1966). Besides, Mangifera indica L. and Syzygium cumini (L.) Skeels are also raised. At present, the sanctuary is the storehouse of many economically important plants such as medicinal plants, timber yielding plants, wild edible plants, dye yielding plants, fish sedative and mats & baskets making plants. The medicinal plants include Abrus precatorius L., Abutilon indicum (L.) Sweet, Achyranthes aspera L., Azadirachta indica A. Juss., Cajanus scarabaeoides (L.) Thouars, Centella asiatica (L.) Urb., Curculigo orchioides Gaertn., Cuscuta reflexa Roxb., Cynodon dactylon (L.) Pers., Dalbergia sissoo Roxb. ex DC., Dregea volubilis (L.f.) Benth. ex Hook.f., Eclipta prostrata (L.) L., Ficus benghalensis L., Habenaria plantaginea Lindl., Hemidesmus indicus (L.) R. Br., Holarrhena pubescens Wall. ex G. Don, Leucas cephalotes (Roth) Spreng., Nelumbo nucifera Gaertn., Pongamia pinnata (L.) Pierre, Pouzolzia zeylanica (L.) Benn., Putranjiva roxburghii Wall., Rauwolfia serpentina (L.) Benth. ex Kurz, Solanum...
Figure 7. A, Entrance gate of the Udaipur wildlife sanctuary; B–C, Sareyaman lake; D, Mixed deciduous forest; E, Grassland; F, Patches of *Putranjiva roxburghii* Wall.

virginianum L., *Streblus asper* Lour., *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn. and *Tinospora cordifolia* (Willd.) Hook.f. & Thomson (Ved et al. 2016). Timber yielding plants are *Dalbergia sissoo* Roxb. ex DC., *Gmelina arborea* Roxb. ex Sm., *Mitragyna parvifolia* (Roxb.) Korth. and *Tectona grandis* L.f. During field surveys, it was observed that the people inhabiting around the sanctuary consume wild edible plants which
Figure 8. A, Actinostemma tenerum Griff.; B, Alysicarpus roxburghianus (L.) Benth. ex Kurz; C, Androsace umbellata (Lour.) Merr.; D, Calamus tenuis Roxb.; E–F, Callicarpa macrophylla Vahl.

include fruits of Aegle marmelos (L.) Corrêa, Momordica charantia L., M. dioica Roxb. ex Willd., Nymphaea pubescens Willd., Syzygium cumini (L.) Skeels; seeds of Nelumbo nucifera Gaertn.; leaves of Amaranthus viridis L., Colocasia esculenta (L.) Schott; receptacle of Ficus hispida L.f.; flowers of Dregea volubilis (L.f.) Benth. ex Hook.f.; bulbs of Dioscorea bulbifera L., young leaves of Bauhinia purpurea L.; leaves of Bacopa monnieri (L.) Wettst. and Centella asiatica (L.) Urb. Among Dye yielding plants, fruits of Mallotus philippensis
Figure 9. A, Ceratophyllum demersum L.; B, Cissus adnata Roxb.; C, Clematis gouriana Roxb. ex DC.; D–E, Habenaria plantaginea Lindl.; F, Limnophila indica (L.) Druec.

Furthermore, during field surveys when we crushed the fruits of Cayratia trifolia (L.) Domin and Passiflora suberosa L., we immediately get violet colour on our hand. Therefore, these two plants may also be the source of dye. Casearia tomentosa Roxb. and Catunaregam spinosa (Thumb.) Tirveng. are used as fish sedative (Kulakkattolickal 1989, Singh et al. 2001). Chrysopogon zizanioides (L.) Roberty and Phoenix...
Furthermore, some cultivated or planted species such as *Alstonia scholaris* (L.) R. Br., *Calliandra surinamensis* Benth., *Eucalyptus saligna* Sm., *Euryale ferox* Salm., *Lagerstroemia speciosa* (L.) Pers., *Mangifera indica* L. and *Nerium oleander* L. are also growing in the sanctuary.
The documentation of the flora is of immense help to botanists/teachers/students in general and foresters in particular in correct identification of plants available in the sanctuary. Further, this will play a vital role in the management of the sanctuary, implementation of various conservation strategies. The data provides scientific support in planning in-situ conservation of available species found inside the sanctuary. Moreover, threats to the phytodiversity such as cattle grazing, fuel wood collection, invasive species, encroachment of land are identified.
Figure 12. A–B, *Passiflora suberosa* L.; C, *Potamogeton nodosus* Poir.; D–E, *Pouzolzia pentandra* (Roxb.) Benn.; F, *Putranjiva roxburghii* Wall.

and possible conservation measures are suggested to design the conservation strategy to restore the plant genetic resources of the sanctuary keeping in view the observed threats. Cattle grazing, fuel wood collection, illegal fishing activity in Sareyaman Lake and encroachment of land should be avoided by deployment of adequate forest staffs. Invasive species need to be controlled preferably through physical methods, biocontrol and their spread is to be monitored. People’s participation is also necessary and ‘Van Mahotsava’ should be launched to make degraded areas green and bring in awareness in local communities about the flora and fauna.
Figure 13. A–B, Rauvolfia serpentina (L.) Benth. ex Kurz; C–D, Urena repanda Roxb. ex Sm.; E–F, Vanda tessellata (Roxb.) Hook. ex G. Don.

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