**Research Article**

**Butterfly Diversity in Mahadare Conservation Reserve, Satara (MS), Western Ghats: A Synoptic Checklist**

 **Abstract:**

 The Dare Khurd Mahadare Conservation Reserve (MCR) a forest situated near Satara City in the Mahadare village, is a vital part of Northern Western Ghats. The landscape of this reserve comprises grassland, semi-evergreen, and deciduous forest creating an ecotone. The diverse floral composition of the forest provides an ideal habitat for many butterfly species, which led to the documentation of 184 butterfly species in this study area, marking the first comprehensive sampling of the butterfly fauna in the reserve. A checklist has been compiled, following a thorough investigation of butterfly diversity within the reserve and its surrounding areas. The checklist comprises 184 butterfly species, from 112 genera and six families notably, out of the 364-butterfly species documented in the Western Ghats region.

**Keywords:** Mahadare, Western Ghats, Ecotone, Conservation Reserve, Butterfly Diversity

**Introduction:**

Studying species diversity is crucial for understanding the effects of human development on ecosystem reliability and sustainability (Virani et al. 2022). Butterflies are flagship taxa in biodiversity (Lawton et al. 1998). Butterflies are highly sensitive to environmental variations and changes (Pollard, 1977; Blair, 1999). They are valuable for assessing habitat conditions (MacNally et al. 2004) and evaluating the health of terrestrial ecosystems (Thomas, 2005; Bonebrake, 2010). Due to their dependence on nectar plants as adults and foliage in their caterpillar stage (Nimbalkar et al. 2011) and as they serve as pollinators, their relation with the flora can be considered a symbiotic association, thus, they are a crucial model group in ecology, and conservation (Watt & Boggs, 2003; Ehrlich & Hanski, 2004). Various studies have been carried out to study the butterfly diversity in (Gaonkar, 1996; Kunte, 2000; Padhye 2006; Padhye, 2012; Bhakare and Ogale 2018). In Satara district some researcher also studied butterflies. (Pawar and Deshpande, 2016) recorded butterfly diversity in Satara tehsil whereas, (Sayyed, 2016) studied faunal diversity of Satara district in which recorded 153 species of butterflies.

Mahadare Conservation Reserve (MCR), is situated in the Satara city within Satara district. The district itself is an integral part of the geographical zone of Northern Western Ghats. Historically Satara city served as the capital of Maratha Empire, during this period pathways connecting high altitudinal mountain ranges and low line areas of the Deccan plateau were used for trading and transportation, the opening of these routes locally referred as ‘Dare’ (दारे). Among these corridors the corridor known as Mahadare had the largest Dare. Thus, the name 'Mahadare' signifies the vastness 'Maha' (in Marathi ‘महा’ means larger) and 'Dare,' indicating the passage from mountain to plain region. The area has a diverse forest cover with deciduous and semi-evergreen forest, creating an ecotone (Pawar et al. 2020), also showing presence of shrubs and grasses which thrive great variety of fauna. The area is intersected by several small seasonal streams and includes the perennial "Karanjacha Odha" stream (Mohite et al. 2020). Mahadare forest holds aesthetic value, being designated as a sacred groove (Devrai) and this forest is conserved under the auspicious deity Pisai Devi. Previously Pawar et al. 2024 recorded paddy filed diversity of Mahadare forest and adjoining, Dhale et al. 2024 had recorded the diversity Amphibians and Reptiles in study region. Recently in 2022 the forest area is declared as conservation reserve but no has been done on butterfly diversity. Thus, the present study provides a baseline information about the butterfly fauna of this region.

**Material and methods:**

**Study Area:**

The study area comprises approximately 107 hectares, situated at an elevation of 768 m, and coordinates 17°40'49.74"N, 73°57'47.14"E. The average annual rainfall in the MCR is between 1000-1200 mm and temperature ranges from 19°C to 31°C. The area has a diverse forest cover with deciduous and semi-evergreen/evergreen forest, creating an ecotone also showing presence of shrubs and grasses which thrive great variety of fauna. The area is intersected by several small seasonal and perennial streams. The study has been carried out from 2019 to 2024 for past 6 years butterfly observations were made. For the survey opportunistic observations and the protocol, pollard walk (Pollard, 1977) was used.

**Identification:**

The butterflies were photographed using DSLR camera and identified with the help of keys and litratures such as Evans (1932), Wynter-Blyth (1957), Varshney and Smetacek (2015).

Fig.1 Location Map of Mahadare Conservation Reserve.

**Observation table:**

 **Table 1. Synoptic checklist of butterflies from MCR**

|  |
| --- |
| * Superfamily: **PAPILIONOIDEA**
* Family:  **PAPILIONIDAE**
* Subfamily: **PAPILIONINAE**
* Tribe:  **Troidini**
1. Genus ***Pachliopta*** Reakirt, [1865]
 |
| **Sr. No.** | **Scientific Name** | **Common Name** | **Status (SA)** |
| 1.  | ***P. hector*** (Linnaeus,1758) **EN, II, LC** | Crimson Rose | UC |
| ***P. aristolochiae*** (Fabricius, 1775) |
| 2. | ***P. a. aristolochiae*** (Fabricius,1775) **LC** | Common Rose | UC |
| 1. Genus ***Troides*** Hübner, [1819]
 |
| 3. | ***T. minos*** (Cramer, [1779]) **EN, II, LC** | Southern Birdwing | R |
| * Tribe: **Papilionini**
1. Genus ***Papilio*** Linnaeus, 1758
 |
| 4. | ***P. buddha*** Westwood, 1872 **EN, II** | Malabar Banded Peacock | UC |
| ***P. clytia*** Linnaeus, 1758  |
| 5. | ***P. c. clytia*** Linnaeus, 1758**II** | Common Mime | UC |
| ***P. demoleus*** Linnaeus, 1758  |
| 6. | ***P. d. demoleus*** Linnaeus, 1758 | Lime Butterfly | C |
| ***P. daksha*** Linnaeus, 1758 Red Helen |
| 7.  | ***P. d. daksha*** Moore, [1889] | Red Helen | UC |
| ***P. agenor*** Cramer, 1775  |
| 8. | ***P. a. polymnester*** Cramer, 1775 | Blue Mormon | C |
| ***P. polytes*** Linnaeus, 1758  |
| 9. | ***P. p. romulus*** Cramer, [1775] | Common Mormon | C |
| * Tribe: **Leptocircini**
1. Genus ***Graphium*** Scopoli, 1777
 |
| ***G. agamemnon* (**Linnaeus, 1758)  |
| 10. | ***G. a. menides*** (Fruhstorfer,1904) | Tailed Jay | C |
| ***G. doson* (**C & R Felder, 1864)  |
| 11. | ***G. d. eleius*** (Fruhstorfer,1907) | Common Jay | C |
| ***G. nomius* (**Esper, 1799) |
| 12. | ***G. n. nomius*** (Esper, 1799) | Spot Swordtail | R |
| * **Family: HESPERIIDAE**
* Subfamily: **COELIADINAE**
1. Genus ***Badamia*** Moore, [1881]
 |
| 13. | ***B. exclamations*** (Fabricius, 1775) | Brown Awl | C |
| 1. Genus ***Bibasis*** Moore, [1881]
 |
| ***B. sena*** Moore, [1866]  |
| 14. | ***B. s. sena*** (Moore, [1866]) **II** | Orange-tailed Awl | R |
| 1. Genus ***Burara*** Swinhoe, 1893
 |
| ***B. jaina*** (Moore, [1866]) |
| 15. | ***B. j. fergusonii*** (de Nicéville, [1893]) | Orange Awlet | R |
| 1. Genus ***Hasora*** Moore, [1881]
 |
| ***H. chromus*** (Cramer, [1780])  |
| 16. | ***H. c. chromus*** (Cramer, [1780])  | Common Banded Awl | C |
| * Subfamily: **TAGIADINAE**
* Tribe: **Tagiadini**

**9.** Genus ***Tapena*** Moore, [1881] |
| 17. | ***T. thwaitesi*** Moore, [1881]  | Black Angle | R |
| 1. Genus ***Coladenia*** Moore, [1881]
 |
| ***C. indrani*** (Moore, [1881]) |
| 18. | ***C. i. indra*** Evans, 1926 | Tricolour Pied Flat | UC |
| 1. Genus ***Tagiades*** Hübner, [1819]
 |
| ***T. litigiosa*** Möeschler, 1878  |
| 19. | ***T. l. litigiosa*** Möeschler, 1878  | Water Snow Flat | C |
| 1. Genus ***Abaratha*** Moore, 1881.
 |
| ***A. angulata*** (Felder, 1862)  |
| 20. | ***A. a. angulata*** (Felder, 1862) | Chestnut Angle | UC |
| ***A. ransonnetii*** (Felder, 1868)  |
| 21. | ***A. r. potiphera*** (Hewitson, 1873) | Golden Angle | UC |
| * Tribe: **Celaenorrhinini**
1. Genus ***Celaenorrhinus*** Hübner, [1819]
 |
| 22. | ***C. ambareesa*** (Moore, [1866]) | Malabar Spotted Flat | UC |
| 23. | ***C. leucocera*** (Kollar, [1844]) | Common Spotted Flat | C |
| 24. | ***C. fusca*** (Hampson, 1888) **EN** | Tamil Spotted Flat | C |
| 1. Genus ***Pseudocoladenia*** Shirozu & Saigusa, 1962
 |
| 25. | ***P. dan*** (Fabricius, 1787)  | Fulvous Pied Flat | UC |
| 1. Genus ***Sarangesa*** Moore, [1881]
 |
| ***S. purendra*** Moore, 1882  |
| 26. | ***S. p. hopkinsi*** Evans, 1921 | Spotted Small Flat | C |
| ***S. dasahara*** Moore, 1866  |
| 27. | ***S. d. davidsoni*** Swinhoe, 1912 | Common Small Flat | C |
| * Subfamily: **PYRGINAE**
* Tribe: **Carcharodini**
1. Genus  ***Spialia*** Swinhoe, [1912]
 |
| ***S. galba*** (Fabricius, 1793) |
| 28. | ***S. g. galba*** (Fabricius, 1793) | Indian Skipper | C |
| * Subfamily: **HESPERIINAE**
* Tribe: **Aeromachini**
1. Genus ***Ampittia*** Moore, [1888]
 |
| ***A. dioscorides*** (Fabricius,1793)  |
| 29. | ***A. d. dioscorides*** (Fabricius, 1793) | Bush Hopper | UC |
| 1. Genus ***Aeromachus*** de Nicéville,1890
 |
| 30. | ***A. pygmaeus*** (Fabricius, 1775) | Pygmy Scrub Hopper | UC |
| 1. Genus ***Arnetta***  Watson, 1893
 |
| 31. | ***A. vindhiana*** (Moore, [1884]) | Vindyan Bob | C |
| * Tribe: **Ismini**
1. Genus ***Iambrix*** Watson, 1893
 |
| ***I.salsala*** (Moore, [1866])  |
| 32. | ***I.s. luteipalpis*** (Plötz, 1886) | Chestnut Bob | C |
| * Tribe: **Ancistroidini Chou, 1994**
1. Genus ***Ancistroides*** Butler, 1874
 |
| 33. | ***A. folus*** (Crammer, [1775]) |  Grass Demon | C |
| ***A. curvifascia*** (Felder & Felder, 1862) |
| 34. | ***A. c. curvifascia*** (Felder & Felder, 1862) |  Restricted Demon | UC |
| * Tribe: **Plastingini**
1. Genus ***Suastus*** Moore, [1881]
 |
| ***S. gremius*** (Fabricius, 1798) |
| 35. | ***S. g. gremius*** (Fabricius, 1798) | Indian Palm Bob | C |
| * Tribe:  **Erionotini**
1. Genus  ***Erionota*** Mabille, 1878
 |
| 36. | ***E. torus*** Evans, 1941 | Banana Skipper | UC |
| 1. Genus ***Matapa*** (Moore, [1866])
 |
| 37. | ***M. aria*** (Moore, [1866]) | Common Redeye | UC |
| * Tribe:  **Baorini**
1. Genus ***Parnara*** Moore, [1881]
 |
| ***P. bada*** Moore, 1878  |
| 38. | ***P. b. bada*** (Moore, 1878) | Ceylon Swift | UC |
| 1. Genus ***Borbo*** Evans, 1949
 |
| 39. | ***B. cinnara*** (Wallace, 1866) | Rice Swift | C |
| 1. Genus ***Pseudoborbo***
 |
| 40. | ***P. bevani*** (Moore, 1878) | Bevan’s Swift | UC |
| 1. Genus ***Pelopidas*** Walker, 1870
 |
| ***P. agna*** (Moore, [1866]) |
| 41. | ***P. a. agna*** (Moore, [1866]) | Obscure Branded Swift | UC |
| ***P.mathias*** (Fabricius, 1798)  |
| 42. | ***P. m. mathias*** (Fabricius, 1798) **LC** | Variable/Small Branded Swift | C |
| ***P. subochracea*** (Moore, 1878)  |
| 43. | ***P. s. subochracea*** (Moore, 1878) | Large Branded/Moore’s Swift | C |
| ***P. conjuncta*** (Herrich-Schaeffer, 1869)  |
| 44. | ***P. c. narooa*** (Moore, 1878) | Conjoined Swift | C |
| 1. Genus ***Baoris*** Moore, [1881]
 |
| 45. | ***B. farri*** (Moore, 1878) | Paintbrush Swift | C |
| 1. Genus ***Caltoris*** Swinhoe, 1893
 |
| ***C. kumara*** (Moore,1878)  |
| 46. | ***C. k. kumara*** (Moore, 1878) | Blank Swift | C |
| * Tribe: **Taractrocerini**
1. Genus ***Taractrocera*** Butler, [1870]
 |
| 47. | ***T. ceramas*** (Hewitson,1868) | Tamil Grass Dart | C |
| 48. | ***T.maevius*** (Fabricius, 1793)  | Common Grass Dart | C |
| 1. Genus ***Oriens*** Evans, 1932
 |
| 49. | ***O. goloides*** (Moore, [1881]) | Indian/ Ceylon Dartlet | UC |
| 1. Genus  ***Potanthus*** Scudder, 1872
 |
| 50. | ***P. pseudomaesa*** (Moore, [1881]) | Indian dart/ Common Dart | C |
| 1. Genus ***Telicota*** Moore, [1881]
 |
| ***T. bambusae (***Moore,1878) |
| 51. | ***T. b. bambusae*** (Moore,1878) | Dark Palm Dart | C |
| ***T. colon*** (Fabricius, 1775)  |
| 52. | ***T. c. colon*** (Fabricius, 1775)  | Pale Palm Dart | C |
| * Family: **PIERIDAE**
* Subfamily: **COLIADINAE**
1. Genus ***Catopsilia*** Hübner, [1819]
 |
| ***C. pomona*** (Fabricius, 1775) |
| 53. | ***C. p. pomona*** (Fabricius, 1775) | Common Emigrant | C |
| ***C. pyranthe*** (Linnaeus, 1758) |
| 54. | ***C. p. pyranthe*** (Linnaeus, 1758) | Mottled Emigrant | C |
| 1. Genus ***Eurema*** Hübner, [1819]
 |
| ***E. (Terias) blanda*** (Boisduval, 1836)  |
| 55. | ***E. (Terias) b. silhetana*** (Wallace, 1867) | Three-spot Grass Yellow | R |
| ***E. drona*** (Stoll, [1780]) |
| 56. | ***E. d. rubella*** (Wallace, 1867) **LC** | Small Grass Yellow | C |
| ***E. (Terias) hecabe*** (Linnaeus, 1758)  |
| 57. | ***E. (Terias) h. hecabe*** (Linnaeus, 1758) | Common Grass Yellow | C |
| ***E. laeta*** (Boisduval, 1836)  |
| 58. | ***E. l. laeta*** (Boisduval, 1836) | Spotless Grass Yellow | C |
| * Subfamily: **PIERINAE**
* Tribe: **Leptosiaini**
1. Genus  ***Leptotes*** Hübner, 1818
 |
| ***L. nina*** (Fabricius, 1793)  |
| 59. | ***L. n. nina*** (Fabricius, 1793) | Psyche | C |
| * Tribe: **Teracolini**
1. Genus ***Ixias*** Hübner, [1819]
 |
| 60. | ***I. marianne*** (Cramer, [1779]) | White Orange Tip | C |
| ***I. pyrene*** (Linnaeus, 1764) |
| 61. | ***I. p. sesia*** (Fabricius,1777) | Yellow Orange Tip | R |
| 1. Genus ***Colotis*** Hübner, [1819]
 |
| ***C. etrida*** (Boisduval, 1836)  |
| 62. | ***C. e. etrida*** (Boisduval, 1836) | Small/Little Orange Tip | UC |
| * Tribe: **Pierini**
1. Genus ***Appias*** Hübner, [1819]
 |
| 63. | ***A. libythea*** (Fabricius,1775) |  Stripped Albatross | R |
| ***A. (Catophaga) albina*** Boisduval, 1836 |
| 64. | ***A. (Catophaga) a. swinhoei***(Moore, 1905) **II** | Common Albatross | C |
| ***A. lyncida*** (Cramer, [1777]) |
| 65. | ***A. l. latifasciata*** Moore, 1881 **II** | Chocolate Albatross | C |
| 1. Genus ***Belenois*** Hübner, [1819]
 |
| ***B. aurota*** (Fabricius, 1793) |
| 66. | ***B. a. aurota*** (Fabricius, 1793) **LC** | Pioneer | C |
| 1. Genus ***Cepora*** Billberg, 1820
 |
| ***C. nerissa*** (Fabricius, 1775)  |
| 67. | ***C. n. phryne*** (Fabricius, 1775) | Common Gull | C |
| 1. Genus ***Delias*** Hübner, [1819]
 |
| 68. | ***D. eucharis*** (Drury, 1773) | Common Jezebel | C |
| * Tribe: **Nepheroniini**
1. Genus ***Pareronia*** Bingham, 1907
 |
| 69. | ***P. hippia*** (Fabricius, 1787) | Common Wanderer | C |
| * Tribe: **Anthocharidini**
1. Genus ***Hebomoia*** Hübner, [1819]
 |
| ***H. glaucippe*** (Linnaeus, 1758)  |
| 70. | ***H. g. australis***  Butler, 1898 | Great Orange Tip | R |
| * Family: **RIODINIDAE**
* Subfamily: **Nemeobiinae**
* Tribe: **Nemeobiini**
1. Genus ***Abisara*** C. & R. Felder, 1860
 |
| ***A. bifasciata*** Moore, 1877  |
| 71. | ***A. b. suffusa*** Moore, 1882 | Double Banded Judy | C |
| * Family: **LYCAENIDAE**
* Subfamily: **CURETINAE**
1. Genus ***Curetis*** Hübner, [1819]
 |
| 72. | ***C. thetis*** (Drury, [1773]) | Indian Sunbeam | C |
| * Subfamily: **MILETINAE**
* Tribe: **Spalgini**
1. Genus  ***Spalgis*** Moore, 1879
 |
| ***S. epius*** (Westwood, 1852)  |
| 73. | ***S. e. epius*** (Westwood, [1851]) | Common Apefly | C |
| * Subfamily: **APHNAEINAE**
1. Genus ***Cigaritis*** Wallengren, 1857
 |
| 74. | ***C. schistacea*** (Moore, 1881) | Plumbeous Silverline | C |
| 75. | ***C. abnormis*** (Moore, [1884]) | Abnormal Silverline | R |
| ***C. elima*** (Moore, 1877) |
| 76. | ***C. e. elima*** (Moore, 1877) **II** | Scarce Shot Silverline | UC |
| ***C. ictis*** (Hewitson, 1865) |
| 77. | ***C. i. ictis*** (Hewitson, 1865) | Common Shot Silverline | R |
| ***C. lohita*** (Horsefield, [1829]) |
| 78. | ***C. l. lazularia*** (Moore, [1881]) **II** | Long Banded Silverline | UC |
| ***C. vulcanus*** (Fabricius, 1775) |
| 79. | ***C. v. vulcanus*** (Fabricius, 1775) | Common Silverline | C |
| * Subfamily: **THECLINAE**
* Tribe: **Arhopalini**
1. Genus ***Surendra*** Moore, 1879
 |
| ***S. quercetorum*** (Moore, [1858]) |
| 80. | ***S. q. biplagiata*** Butler, 1883 | Common Acacia Blue | C |
| 1. Genus ***Zinaspa*** de Nicéville, 1890
 |
| ***Z. todara*** (Moore, [1884]) |
| 81. | ***Z. t. todara*** (Moore, [1884]) **II** | Silver Streaked Acacia Blue | R |
| * Tribe: **Amblypodiini**
1. Genus ***Iraota*** Moore, [1881]
 |
| ***I. timoleon*** (Stoll, [1790]) |
| 82. | ***I. t. arsaces*** Fruhstorfer, 1907 | Silverstreak Blue | UC |
| * Tribe: **Horagini** Moore, 1881
1. Genus ***Rathinda*** Moore, 1881
 |
| 83. | ***R. amor*** (Fabricius, 1775) | Monkey Puzzle | UC |
| * Tribe: **Iolaini**
1. Genus ***Pratapa*** Moore, 1881
 |
| ***P. deva*** (Moore, 1858)  |
| 84. | ***P.d. deva*** (Moore, 1858) **II** | White Tufted/White Royal | UC |
| 1. Genus ***Tajuria*** Moore, 1881
 |
| ***T. jehana*** Moore, 1883 Plains Blue Royal |
| 85. | ***T. j. jehana*** Moore, [1884] | Plains Blue Royal | C |
| ***T. cippus*** (Fabricius, 1798) Peacock Royal |
| 86. | ***T. c. cippus*** (Fabricius, 1798) **II** | Peacock Royal | C |
| * Tribe: **Hypolycaenini**
1. Genus ***Hypolycaena*** Moore, 1884
 |
| ***H. othona*** (Hewitson, 1865) |
| 87. | ***H. o. othona*** Hewitson, [1865] **I** | Orchid Tit | R |
| * Tribe: **Deudorigini**
1. Genus ***Deudorix*** Hewitson, 1863
 |
| ***D. epijarbas*** (Moore, 1857) |
| 88. | ***D. e. epijarbas*** (Moore, 1857) | Cornelian | UC |
| 1. Genus ***Bindahara*** Moore, [1881]
 |
| 89 | ***B. moorei*** Fruhstorfer, 1904 **II** | Plane | R |
| 1. Genus ***Virachola*** Moore, 1881
 |
| 90. | ***V. isocrates*** (Fabricius, 1793) | Common Guava Blue | UC |
| ***V. perse*** (Hewitson,1863)  |
| 91. | ***V. p. ghela*** Fruhstorfer, 1912 | Large Guava Blue | C |
| 1. Genus ***Rapala*** Moore, 1881
 |
| ***R. iarbus*** (Fabricius, 1787)  |
| 92. | ***R. i. sorya*** (Kollar, [1844]) | Indian Common Red Flash | C |
| ***R. manea*** (Hewitson, 1863)  |
| 93. | ***R. m. schistacea*** (Moore, 1879) | Slate Flash | C |
| ***R. varuna*** (Horsfield, [1879]) |
| 94. | ***R.v. lazulina*** (Moore, 1879) **II** | Indigo Flash | UC |
| * Subfamily: **POLYOMMATINAE**
* Tribe: **Lycaenesthini**
1. Genus ***Anthene*** Doubleday, 1847
 |
| ***A.lycaenina*** (Felder, 1868)  |
| 95. | ***A. l. lycaenina*** (Felder, 1868) **II** | Pointed Ciliate Blue | C |
| * Tribe: **Polyommatini**
1. Genus ***Petrelaea*** Toxopeus, 1929
 |
| 96. | ***P. dana*** (de Nicéville, [1884]) | Dingy Lineblue  | UC |
| 1. Genus ***Nacaduba*** Moore, [1881]
 |
| ***N. beroe*** (C. & R. Felder, [1865]) |
| 97. | ***N. b. gythion*** Fruhstorfer, 1916 | Opaque Sixlineblue | C |
| ***N. kurava*** (Moore, [1858])  |
| 98. | ***N. k canaraica*** Toxopeus, 1927 | Transperent Sixlineblue | C |
| 1. Genus  ***Prosotas*** Druce, 1891
 |
| ***P. dubiosa*** (Semper, [1879]) |
| 99. | ***P. d. indica*** (Evans, [1925]) **II** | Tailless Lineblue | C |
| ***P. nora*** (C. Felder, 1860)  |
| 100. | ***P. n. ardates*** (Moore, [1875]) | Common Lineblue | C |
| ***P. noreia*** (R. Felder, 1860)  |
| 101. | ***P. n. hampsonii*** (de Nicéville, 1885) **II** | White-tipped Lineblue | R |
| 1. Genus ***Caleta*** Fruhstorfer, 1922
 |
| 102. | ***C. decidia*** (Hewitson, 1876) | Angled Pierrot | C |
| 1. Genus ***Jamides*** Hübner, [1819]
 |
| ***J. bochus*** (Stoll, [1782])  |
| 103. | ***J. b. bochus*** (Stoll, [1782]) | Dark Cerulean | C |
| ***J. celeno*** (Crammer, [1775]) |
| 104. | ***J. c. celeno*** (Crammer, [1775]) | Common Cerulean | C |
| 1. Genus ***Catochrysops*** Boisduval, 1832
 |
| ***C. strabo*** (Fabricius, 1793)  |
| 105. | ***C. s. strabo*** (Fabricius, 1793) | Forgetmenot | C |
| 1. Genus ***Lampides*** Hübner, [1819]
 |
| 106. | ***L. boeticus*** (Linnaeus, 1767) | Peablue | C |
| 1. Genus ***Leptotes*** Scudder, 1876
 |
| ***L. plinius*** (Fabricius, 1793) |
| 107. | ***L. p. plinius*** (Fabricius, 1793) | Zebra Blue | C |
| 1. Genus ***Castalius*** Hübner, [1819]
 |
| ***C. rosimon*** (Fabricius, 1775) |
| 108. | ***C. r. rosimon*** (Fabricius, 1775) | Common Pierrot | C |
| 1. Genus ***Tarucus*** Moore, [1881]
 |
| 109. | ***T. nara*** (Kollar, 1848) |  Stripped Pierrot | C |
| ***T. balkanica*** (Freyer, 1844)  |
| 110. | ***T. b. nigra*** Bethune-Baker, [1918] | Black-spotted Pierrot | UC |
| 1. Genus ***Zizeeria*** Chapman, 1910
 |
| 111. | ***Z. karsandra*** (Moore, 1865) | Dark Grass Blue | C |
| 1. Genus ***Pseudozizeeria*** Bueret, 1955
 |
| ***P. maha*** (Kollar, [1844]) |
| 112. | ***P. m. ossa*** (Swinhoe, 1885) | Pale Grass Blue | C |
| 1. Genus  ***Zizina*** Chapman, 1910
 |
| ***Z. otis*** (Fabricius, 1787)  |
| 113. | ***Z. o. indica*** (Murray, 1874) | Lesser Grass Blue | C |
| 1. Genus ***Zizula*** Chapman, 1910
 |
| ***Z. hylax*** (Fabricius, 1775)  |
| 114. | ***Z. h. hylax*** (Fabricius, 1775) **LC** | Tiny Grass Blue | C |
| 1. Genus  ***Cupido*** Hübner, [1819]
 |
| ***C. lacturnus*** (Godart, [1824]) |
| 115. | ***C. l. syntala*** (Cantlie, 1963) | Indian Cupid | C |
| 1. Genus ***Talicada*** Moore, [1881]
 |
| ***T. nyseus*** (Guérin- Méneville, 1843)  |
| 116. | ***T.n nyseus*** (Guérin- Méneville, 1843) | Red Pierrot | C |
| 1. Genus ***Azanus*** Moore, [1881]
 |
| 117. | ***A. uranus*** Butler, 1886 | Dull Babul Blue | C |
| 118. | ***A. ubaldus*** (Stoll, [1782]) | Bright Babul Blue | C |
| ***A. jesous*** (Guérin- Méneville, 1843) |
| 118. | ***A. j. gamra*** (Lederer, 1855)**LC** | African Babul Blue | C |
| 1. Genus  ***Neopithecops*** Distant, 1884
 |
| ***N. zalmora*** (Butler, [1870]) |
| 120. | ***N. z. dharma*** (Moore, [1881]) | Quaker | UC |
| 1. Genus  ***Megisba*** Moore, [1881]
 |
| ***M. malaya*** (Horsfield, [1828]) |
| 121. | ***M. m. thwaitesi*** Moore, [1881] **II** | Malayan | UC |
| 1. Genus  ***Acytolepis*** Toxopeus, 1927
 |
| ***A. puspa*** (Horsfield, [1828]) |
| 122. | ***A. p. felderi*** Toxopeus, 1927 | Common Hedge Blue | C |
| 1. Genus ***Euchrysops*** Butler, 1900
 |
| ***E. cnejus*** (Fabricius, 1798) |
| 123. | ***E. c. cnejus*** (Fabricius, 1798) | Gram Blue | C |
| 1. Genus ***Freyeria*** Courvoisier, 1920
 |
| 124. | ***F. putli*** (Kollar, [1844]) | Black Spotted Grass Jewel | C |
| ***F. trochylus*** (Freyer, 1845) |
| 125. | ***F. t. orientalis***  Forster, 1980 | Orange Spotted Grass Jewel | C |
| 1. Genus ***Luthrodes*** Druce, 1895
 |
| ***L. pandava*** (Horsfield, [1829]) |
| 126. | ***L. p. pandava*** (Horsfield, [1829]) | Plains Cupid | R |
| 1. Genus ***Chilades*** Moore, 1881
 |
| ***C. lajus*** (Stoll, [1780]) |
| 127. | ***C. l. lajus*** (Stoll, [1780]) | Lime Blue | C |
| ***C. parrhasius*** (Fabricius, 1793) |
| 128. | ***C. p. parrhasius*** (Fabricius, 1793) | Small Cupid | C |
| * Family: **NYMPHALIDAE**
* Subfamily: **DANAINAE**
* Tribe: **Danaini**
1. Genus ***Danaus*** Kluk, 1780
 |
| ***D. chrysippus*** (Linnaeus, 1758)  |
| 129. | ***D. c. chrysippus*** (Linnaeus, 1758) | Plain Tiger | C |
| ***D. genutia*** (Cramer, [1779]) |
| 130. | ***D. g. genutia*** (Crammer, [1779]) | Common/Stripped Tiger | C |
| 1. Genus ***Parantica***  Moore, [1880]
 |
| ***P. aglea*** (Stoll, [1782]) |
| 131. | ***P. a. aglea*** (Stoll, [1782]) | Glassy Tiger | C |
| 1. Genus  ***Tirumala*** Moore, [1880]
 |
| ***T. limniace*** (Cramer, [1775]) |
| 132. | ***T. l. exoticus*** (Gmélin, 1790)  | Blue Tiger | C |
| 1. Genus ***Euploea***  Fabricius, 1807
 |
| ***E. core*** (Crammer, 1780) |
| 133. | ***E. c. core*** (Crammer, 1780)**LC** | Common Crow | C |
| ***E. klugii*** Moore, [1858] |
| 134. | ***E. k. kollari*** Felder & Felder, [1865] | Brown King Crow | UC |
| ***E. sylvester*** (Fabricius, 1793) |
| 135. | ***E. s. coreta*** (Godart, 1819) | Double Banded Crow | UC |
| * Subfamily: **CHARAXINAE**
* Tribe: **Charaxini**
1. Genus ***Charaxes*** Ochsenheimer, 1816
 |
| 136. | ***Ch. agrarius*** Swinhoe, [1887] | Anomalous Nawab | C |
| 137. | ***Ch. bharata*** Felder & Felder, [1867] **II** | Common Nawab | C |
| ***Ch. psaphon*** Westwood, 1847  |
| 138. | ***Ch. p. imna*** Butler, 1870 **II** | Plain Tawny Rajah | UC |
| ***Ch. solon*** (Fabricius, 1793)  |
| 139. | ***Ch. s. solon*** (Fabricius, 1793) **II** | Black Rajah | C |
| * Subfamily: **SATYRINAE**
* Tribe: **Elymniini**
1. Genus ***Elymnias*** Hübner, 1818
 |
| 140. | ***E. caudata*** Butler, 1871**EN** | Tamil Palmfly | C |
| ***E. hypermnestra*** (Linnaeus 1763)  |
| 141. | ***E. h. undularis*** (Drury, 1773) | Common Palmfly  | C |
| * Tribe: **Melanitini**
1. Genus ***Melanitis*** Fabricius, 1807
 |
| ***M. leda*** (Linnaeus, 1758)  |
| 142. | ***M. l. leda*** (Linnaeus, 1758)**LC** | Common Evening Brown | C |
| ***M. phedima*** (Cramer, [1780]) |
| 143. | ***M. ph.varaha*** Moore,1857 | Dark Evening Brown | C |
| * Tribe: **Satyrini**
1. Genus  ***Lethe*** Hübner, [1819]
 |
| ***L. drypetis*** (Hewitson, 1863)  |
| 144. | ***L. d. todara*** Moore, 1881 | Tamil Treebrown | C |
| ***L. europa*** (Fabricius, 1775)  |
| 145. | ***L. e. europa*** (Fabricius, 1775) **I** | Bamboo Treebrown | UC |
| ***L. rohria*** (Fabricius, 1787)  |
| 146. | ***L. r. neelgheriensis*** (Guérin-Méneville, 1843) | Common Treebrown | UC |
| 1. Genus ***Mycalesis*** Hübner, 1818
 |
| 147. | ***M. mercea*** Evans 1920 | Pachmarhi Bushbrown | R |
| 148. | ***M. orcha*** Evans, 1912 | Pale Brand Bushbrown |  |
| ***M. mineus*** (Linnaeus, 1758)  |
| 149. | ***M. m. polydecta*** (Cramer, [1777]) | Dark-brand Bushbrown | C |
| ***M. perseus*** (Fabricius, 1775)  |
| 150. | ***M. p. tabitha*** (Fabricius, 1793) | Common Bushbrown | C |
| ***M. visala*** Moore, [1858]  |
| 151. | ***M. v. visala*** Moore, [1858] | Long Brand Bushbrown | UC |
| 1. Genus ***Ypthima*** Hübner, 1818
 |
| 152. | ***Y. tabella*** Marshall,1883 **EN** | Baby Fivering | UC |
| 153. | ***Y. huebneri*** Kirby, 1871 | Common Fourring | UC |
| 154. | ***Y. inica*** Hewitson, [1865] | Lesser Threering | C |
| ***Y. asterope*** (Klug, 1832)  |
| 155. | ***Y. a. mahratta*** Moore, 1884 | Common Threering | C |
| ***Y. baldus*** (Fabricius, 1775)  |
| 156. | ***Y. b. madrasa*** Evans, 1923 | Common Fivering | C |
| * Subfamily: **LIMENITIDINAE**
* Tribe: **Neptini**
1. Genus ***Neptis*** Fabricius, 1807
 |
| ***N. hylas*** (Linnaeus, 1758)  |
| 157. | ***N. h. varmona*** Moore, 1872 | Common Sailer | C |
| ***N. jumbah*** Moore, [1858]  |
| 158. | ***N. j. nalanda*** Fruhstorfer, 1908 **II** | Chestnut-streaked Sailer | C |
| 1. Genus ***Phaedyma*** C. Felder, 1861
 |
| ***Ph. columella*** (Cramer, [1780]) |
| 159. | ***Ph. c. nilgirica*** (Moore, [1889]) **II** | Short-banded Sailer | UC |
| 1. Genus  ***Pantoporia*** Hübner, [1819]
 |
| ***P. hordonia*** (Stoll, [1790]) |
| 160. | ***P. h. hordonia*** (Stoll, [1790]) | Common Lascar | UC |
| ***P. sandaka*** (Butler, 1892) |
| 161. | ***P. s. davidsoni*** Eliot, 1969 | Extra Lascar | UC |
| * Tribe: **Limenitidini**
1. Genus ***Athyma*** Westwood, 1850
 |
| ***A. inara***  Westwood,1850 |
| 162. | ***A. i. inara*** Westwood,1850 | Color Sergeant | R |
| ***A. perius*** (Linnaeus, 1758)  |
| 163. | ***A. p. perius*** (Linnaeus, 1758) | Common Sergeant | UC |
| 1. Genus ***Moduza*** Moore, [1881]
 |
| ***M. procris*** (Cramer, 1777) |
| 164. | ***M. p. undifragus*** Fruhstorfer, 1906 | Commander | UC |
| * Tribe: **Adoliadini**
1. Genus  ***Euthalia*** Hübner, [1819]
 |
| ***E. aconthea*** (Cramer, [1777]) |
| 165. | ***E. a. meridionalis*** Fruhstorfer, 1906 **II** | Common Baron | C |
| ***E. lubentina*** (Cramer, [1777]) |
| 166. | ***E. l. arasada*** Fruhstorfer, 1913 | Gaudy Baron | C |
| 1. Genus ***Symphaedra*** Hübner, 1818
 |
| 167. | ***S. nais*** (Forster, 1771) | Baronet | UC |
| * Subfamily:  **HELICONIINAE**
* Tribe:  **Vagrantini**
1. Genus  ***Phalanta*** Horsfield, [1829]
 |
| ***P. phalantha*** (Drury, [1773]) |
| 168. | ***P. p. phalantha*** (Drury, [1773]) | Common Leopard | C |
| 1. Genus ***Cupha*** Billberg, 1820
 |
| ***C. erymanthis*** (Drury, [1773]) |
| 169. | ***C. e. maja*** Fruhstorfer, 1898 | Rustic | UC |
| * Subfamily: **BIBLIDINAE**
* Tribe: **Biblidini**
1. Genus ***Ariadne*** Horsfield, [1829]
 |
| ***A. ariadne*** (Linnaeus, 1763)  |
| 170. | ***A. a. indica*** (Moore, 1884) | Angled Castor | C |
| ***A. merione*** (Cramer, [1777]) |
| 171. | ***A. m. merione*** (Cramer, [1777]) | Common Castor | C |
| 1. Genus ***Byblia*** Hübner, [1819]
 |
| 172. | ***B. ilithyia*** (Drury, [1773])**LC** | Joker | UC |
| * Subfamily: **CYRESTINAE**
1. Genus  ***Cyrestis*** Boisduval, 1832
 |
| ***C. thyodamas*** Boisduval, 1846  |
| 173. | ***C. t. indica*** Evans, 1924 | Common Map | C |
| * Subfamily: **NYMPHALINAE**
* Tribe: **Nymphalini**
1. Genus ***Vanessa*** Fabricius, 1807
 |
| 174. | ***V. cardui*** (Linnaeus, 1758)**LC** | Painted Lady | C |
| * Tribe: **Junoniini**
1. Genus ***Junonia*** Hübner, [1819]
 |
| ***J. almana*** Hübner, [1819] |
| 175. | ***J. a. almana*** (Linnaeus, 1758)**LC** | Peacock Pansy | C |
| ***J. atlites*** (Linnaeus, 1763) |
| 176. | ***J. a. atlites*** (Linnaeus, 1763) | Grey Pansy | C |
| ***J. hierta*** (Fabricius, 1798) |
| 177. | ***J. h. hierta*** (Fabricius, 1798)**LC** | Yellow Pansy | C |
| ***J. iphita*** (Cramer, [1779]) |
| 178. | ***J. i. iphita*** (Cramer, [1779]) | Chocolate Pansy | C |
| ***J. lemonias*** (Linnaeus, 1758) |
| 179. | ***J. l. lemonias*** (Linnaeus, 1758) | Lemon Pansy | C |
| J***. orithya*** (Linnaeus, 1758) |
| 180. | ***J. o. swinhoei*** Butler, 1885 | Blue Pansy | C |
| 1. Genus ***Hypolimnas*** Hübner, [1819]
 |
| 181 | ***H. misippus*** (Linnaeus, 1764) **II** | Danaid Eggfly | C |
| ***H. bolina*** (Linnaeus, 1758) |
| 182. | ***H. b. jacintha*** (Drury, 1773) | Great Eggfly | C |
| * Tribe: **Kallimini**
1. Genus  ***Kallima*** Doubleday, [1849]
 |
| 183. | ***K. horsefieldii*** Kollar, [1844] **EN, II** | Southern Blue Oakleaf | R |
| * Subfamily: **HELICONIINAE**
1. Genus ***Acraea*** (Fabricius, 1793)
 |
| 184. | ***A. terpsicore*** (Linnaeus, 1758) | Tawny Coster  | C |

S.A. – Study Area, EN – Endemic species to Western Ghats, LC- Least Concern IUCN Red list,

C – Common, UC- Uncommon, R- Rare

I- Schedule I, II- Schedule II, Indian Wildlife (Protection) Act, 1972 (WPA) and amendments till 2022

|  |
| --- |
| **Table. 2 Taxonomic account and relative dominance of butterfly species in MCR** |
| Sr. No. | Family | Sub Family | Tribe | Genera | Species Count (SA) | Relative Dominance (%) |
| 1. | Papipionidae | 1 | 3 | 4 | 12 | 6.52 |
| 2. | Hesperiidae | 4 | 10 | 30 | 40 | 21.74 |
| 3. | Pieridae | 2 | 5 | 11 | 18 | 09.78 |
| 4. | Riodinidae | 1 | 1 | 1 | 1 | 0.54 |
| 5. | Lycaenidae | 5 | 9 | 39 | 57 | 30.99 |
| 6. | Nmyphalidae | 9 | 13 | 27 | 56 | 30.43 |
| **Total** | **6** | **22** | **41** | **112** | **184** | **100** |

**Result and Discussion:**

 A total of 184 butterflies from 112 genera belonging to six different families were recorded in this study (Table 1). The family Lycaenidae (57) has the highest species count from 5 subfamilies, 10 tribes, and 39 genera in MCR, followed by family Nymphalidae (56) with 9 subfamilies, 13 tribes, and 27 genera, family Hesperiidae (40) with 4 subfamilies, 10 tribes, and 30 genera, family Pieridae (18) with 2 subfamilies, 5 tribes, and 11 genera, family Papilionidae (12) with 1 subfamilies, 3 tribes, and 4 genera, and family Riodinidae (1) with 1 subfamily, 1 tribe, and 1 genera. The relative dominance (Table no. 2) of family Lycaenidae is 30.99%, 30.43% for family Nymphalidae, 21.74% for family Hesperiidae, 9.78% for family Pieridae, 6.52% for family Papilionidae, and 0.54% for family Riodinidae. The relative dominance index provides quantitative data, which gives an idea about the species distribution and ecological structure of the butterfly community in the study area. In this study, we recorded 7 species endemics to Western Ghats, 14 species listed in IUCN Red list with Least Concern status, and 28 butterfly species that are listed in the Wildlife Protection Act, 1972 and amendments till 2022, out of which 2 species are listed in Schedule I, and 26 species are listed in Schedule II.

Fig. 2. Species representation of butterflies from Mahadare Conservation Reserve

The MCR is enriched with various flora, the flora is distributed in various patches such as grasslands, paddy fields, bamboo patches. Acacia patches, especially Acacia ferruginea, host species like the White-tipped Lineblue and other species from Lycaenidae family abundantly. The Forest containing the population of *Pongamia pinnata* and *Hiptage benghalensis*, attracting Orange tail awl, Common Hedge Blue, Brown Awl, Orange Awlet, Sunbeam, etc. From June to September, grasslands and rice cultivation in forest provides food for caterpillars, attracting species from family Nymphalidae genera *Mycalesis* and *Melanitis* such as Common Evening Brown, Dark Evening Brown, Common Bushbrown, Pachmarhi Bushbrown, and from family Hesperiidae species such as Vindyan Bob, Bevan’s Swift, Rice Swift, Ceylon Swift, Obscure Branded Swift, etc. Bamboo plants attract butterfly species like the Bamboo Treebrown, Common Treebrown, Tamil Treebrown, and Skipper like Chestnut bob.  The forest shows abundance of some trees such *as Dalburgia* *lanceolaria*, *Dalburgia latifolia* *Bredelia retusa*, *Grewia tiliifolia* which support butterflies like Tri-color Pied Flat, Common Sailor, Golden Angle, Black Angle, Short-banded Sailor, etc. Also, climbers like *Dioscorea alata, Dioscorea pentaphylla, Dioscorea wallichii* are food plants of butterfly water snow flat, milkweed climbers such as *Wattakaka volubilis, Tylophora indica and Ceropegia* speciessustains butterflies like Glassy Tiger, Blue Tiger, Common Crow, etc. The areas rich in *Asystasia* sp. serve as food sources for butterflies of the Genus *Junonia*.

 During January to March, we noted the migration of brush footed butterflies notably Common Crow, Blue Tiger, Striped Tiger, Plain Tiger, Glassy Tiger and Lime butterfly. In MCR, streams persist year-round, facilitating mud-puddling behavior in butterflies, mainly during post-monsoon and summer season. However, we also observed "dew puddling" in winter, where butterflies ingest dew that is accumulated on the grasses that are adjacent to the ground, especially in the early morning. This behavior, primarily seen in Lycaenidae and Nymphalidae families. MCR have an area of about 107 hectares, which harbors unique flora. This vegetation isolates and traps certain butterfly populations within the forest. Butterfly populations typically found at higher altitudes and in dry regions both were observed within Mahadare due to its specialized character i.e. ecotone.

 Species such as the Common Lascar, Extra Lascar, Orchid Tit, Pale Brand Bushbrown, and Pachmarhi Bushbrown inhabit Mahadare Forest. Butterfly species found in higher elevations of the Western Ghats have been documented in MCR, such as Tawny Rajah, Little/Small Orange Tip, Yellow Orange Tip, Chestnut-streaked Sailor, Chocolate Albatross, Stripped Albatross, and Anomalous Nawab. Butterflies from arid regions mainly belonging to the Pieridae family, encompassing species like Psyche, Yellow Orange Tip, Small Orange Tip, Common Emigrant, Mottled Emigrant, etc., are also documented in MCR. These observations suggest that the Mahadare forest provides a diverse range of habitats and ecological niches, supporting butterfly species from various elevational zones like Western Ghats and the Deccan plateau. In this study, we have documented several butterfly species for the first time within the area, Malabar Banded Peacock (*Papilio buddha*), Common Lascar (*Pantoporia hordonia hordonia*), Extra Lascar (*Pantoporia sandaca davidsoni*), Pale Brand Bushbrown (*Mycalesis orcha*), Rounded Palm Redeye/ Banana Skippe (*Erionota torus*), Colour sergeant (*Athyma inara inara*), Pachmarhi Bushbrown (*Mycalesis mercea*), and Plumbeous Silverline (*Cigaritis schistacea*)*.*

**Conclusion:**

 The supportive ecological conditions in MCR sustains butterfly diversity. The richness of butterfly diversity along with unique forest composition and abundant host and nectar plants contribute to an ideal ecosystem. However, due to the forest proximity to urban areas, it had several threats to its delicate ecosystem, such as tree-cutting, forest fires, development projects, improper disposal of hotel waste and sewage water, as well as pollution from noise and air, endangering the flora and fauna of Mahadare Forest. Therefore, it's crucial to identify and conserve such areas before they are lost.

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