

# Status of Grassland Habitats and Their Ecological Impact on Biodiversity in Purandar Tehsil, Dist. Pune, M.S., India

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**Abstract**—Plants are the important components of many ecosystems on an earth, forming their productive bases and physical structures, and producing resources which support a diversity of other organisms. Plant communities play a vital role in sustainable development as well as management by balancing biodiversity and maintaining the environment. Grasses, cereals, millets belong to family Poaceae (Graminae). They perform a key role in every habitat they grow. Grasses are the important primary producers of terrestrial (grassland) food chains and food webs (Ecosystem). The role of herbivores in controlling plant species richness is a critical issue in the conservation and management of grassland biodiversity. It has been observed that the major parts of the Purandar tehsil are enclosed by agricultural land. Forest shelters very little area in the western part on the slopes of hills, while most of the hilly terrain is barren wasteland. Purandhar tehsil receives average annual rainfall of 556.4 mm. as per IMD report. The entire tehsil including fort region is rich in diverse flora except the east region. During the rainy season Purandar is a magnificent sight; the slopes are covered with *Thalictrum*, *Impatiens dalzellii*, and a crowd of grasses. The number of grass species documented by the present Investigator in Purandar tehsil were sixty. The flagship species reported were *Oplismenus burmanii*, *O. Compositus*, *Heteropogon contortus*, *Aristida finiculata*, *Lophopogon tridentatus* etc. Investigator has documented 1352 flowering plant species of the Purandar tehsil, also performed phytosociological studies for which he has laid down 300 quadrats for herbaceous species and 170 quadrats for woody vegetation. He has documented various animal species sighted in the tehsil includes Bird species, Butterflies, Mammals, Aquatics etc. The present research work was undertaken during the year 2014 to 2022. Threats in the study area recorded during the study :1) Habitat Destruction.2) Wire compounds on open grasslands.3) Predation by stray dogs. 4) Unauthorized excavation of grassland using. 5)Earth movers and trenching conversion of grassland to agricultural. 6) Use of

insecticides and pesticides in adjacent croplands. 7) Agricultural habitats grazing. 8) Urbanization. 9) Proposed industrialization.

**Index Terms**—Grasslands, Biodiversity, Poaceae, Grazing, Forest-fire, Ecosystem, Food web.

## I. INTRODUCTION

Plant communities play a central role in the sustainable development as well as management by balancing biodiversity and safeguarding the environment. The floristic and phyto-sociological study is a prerequisite for major research in tropical community ecology, such as understanding species diversity and distribution.

Biological ‘hotspots’ have attracted substantial public attention since conservation biologists first proposed the concept. The Western Ghats, or Sahyadri mountains, which represent the edge of Deccan Plateau of western India, are among the well-known global hotspots recognized for exceptional biotic diversity and endemism (Bhattarai, et al., 2012). India is known for its rich diversity of medicinal plants and hence called as botanical garden of the world (Vedavathy, 1997).

Plants are the important components of many ecosystems on an earth, forming their productive bases and physical structures, and producing resources which support a diversity of other organisms. In total, there are around 300,000 species of plants, excluding lichens and fungi (Hamilton, 2006). Floristic researches in India started on the arrival of external invaders and remain in progress even after the independence of the country (Patil and Tayade, 2012). Subsequently a large number of workers (Almeida, 1996 & 1998; Singh and Kartikeyan, 2000) have

contributed in inventorying the diversity of this biologically rich country. Floristic and phytosociological studies acquire increasing importance in recent years in response to the needs of developing and under developing countries to assess their plant wealth (Ganorkar, et.al. 2013).

The pattern of vegetation distribution on ground is always associated with particular topographic features (Mahajan, 2006). In Maharashtra the vegetation of Western Ghats (Sahyadri mountain range) is flourishing. The Eastern and Western Ghats consisting 10% of country's land area are expected to harbor about 55% of India's terrestrial and fresh water diversity (Venu, 1998).

Out of the total 3,700 higher plants (wild and naturalized) reported from Maharashtra state, about 687 are known to be endemic (Tetali, et al., 2000). Assessment of the diversity status is a main objective of the conservation organizations at international, national and regional levels.

#### A Geographical Profile of the Study Region:

The Pune district has categorized into five divisions by the forest department of the state. They are Pune (Haveli), Bhore, Baramati, Shirur and Ambegaon. Purandhar tehsil is located in Pune district (Bhore Division) of Maharashtra state, India. It is one of fourteen talukas of Pune district. There are one

hundred eight prominent villages and town including Saswad town in Purandar tehsil.

Purandar fort is 10 k.m. away from Saswad. The climate of the fort is bracing. The rainfall is maximum in July August, about 80% of the total. The temperature at afternoon varies generally from 20.8 °C in May. December January are the coldest months; Winds are not heavy. Weather from October is dry but very dry in summer; in monsoons it is humid. Humidity is never so, low as in plains and nourishes the vegetation. The rains are unpredictable in the Purandar tehsil except fort and hilly regions. The Purandar fort is located at the center of the tehsil; overall drainage of the area is towards all directions except South side.

Rainfall: Purandar tehsil falls in the moderate intensity rainfall zone. The south west monsoon predominates, and extends from June to October. (India with mean annual average annual rainfall is 515 mm, from climate data). The rainfall at Purandar is considerably less heavy than the nearer places like Mahabaleshwar and Lonawala. Purandhar tehsil receives average annual rainfall of 556.4 mm. The highest average annual rainfall was recorded 1476 mm in 2006, while the lowest average annual rainfall was recorded 215 mm in 2003. The Annual rainfall for the last ten years ranges from 550 mm to 1124.6 mm. (India Water Portal, 2018) Table 1

Table 1 Annual Rainfall Data of 10 Years in mm: Purandar Taluka, Pune District

| 2006 | 2007 | 2008 | 2009 | 2010 | 2011  | 2012 | 2013  | 2014  | 2015  | 2016 | Avg    |
|------|------|------|------|------|-------|------|-------|-------|-------|------|--------|
| 1476 | 519  | 497  | 806  | 602  | 609.4 | 371  | 574.3 | 371.3 | 388.8 | 70.2 | 621.48 |

Relative Humidity: Purandar is often enveloped in dense clouds of mist that make the life very hard during monsoon months. During the dry months, in the early hours of the morning humidity may rise to 60–70%, but during the noon and afternoon hours it comes down to about 30%.

Edaphic factor: Soils are of three types, on the basis of color, i.e. black, red and brown. In some planes, one class of soil blends with another in varying proportion and in turn modified by sand, gravel, lime salts and other ingredients. It has been observed that the major part of the area is occupied by clayey soil and clayey loam, especially around the drainage lines, followed by sandy loam. Gravelly sandy clay type of soils

occupies mainly the high hill slopes of forts and barren wasteland of the area of the proposed airport.

Land Use: It has been observed that the major parts of the region are enclosed by agricultural land. Forest shelters very little area in the western part on the slopes of hills, while most of the hilly terrain is barren wasteland. The built-up area is revealed wherever settlements have come up Table 2, Fig. 1

Table 2 Land use / cover, Purandar Tehsil (Ha.)

|                                          |        |
|------------------------------------------|--------|
| Total Geographical Area                  | 110313 |
| Area under Forest                        | 2221   |
| Non-Agri. Land                           | 2641   |
| Barren un-Cultivable Land                | 5567   |
| Uncultivable land other than Barren Land | 9499   |

|                          |       |
|--------------------------|-------|
| Cultivable Land          | 89068 |
| Fallow Land              | 4620  |
| Gross Area Sown          | 85765 |
| Area sown more than once | 3335  |
| Gross Cropped Area       | 89100 |
| Ground Water             | 7152  |
| Surface water            | 5853  |

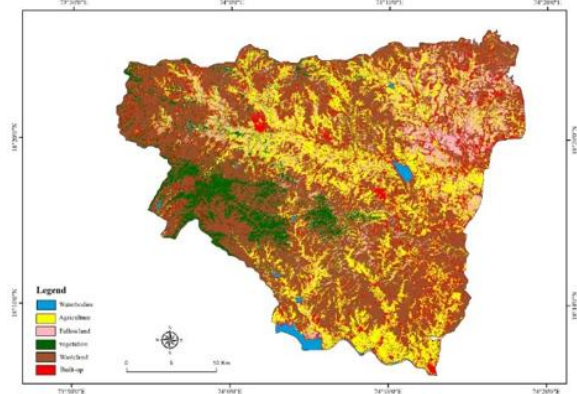


Fig. 1 Land use / cover, Purandar Tehsil

## II. MATERIAL AND METHODS

GPS Model GARMIN 72H (Geographical Position System) along with cells, Camera (SONY 20.4 Megapixels, 50X digital zoom, CORP DSC –HX300, 3.6 V, 4517842), Ecofriendly bags, Oil Paint to mark quadrats, Brush, Cloth, Rope, String, Nails, P.V.C. Rods locked in a single frame of 1m X 1m size, (04), Notebook, Field Diary, Pen, Pencil, Eraser, Ruler, Paper sheets, Secateurs, Sickle, Diggers, Stick, Scale-Tape, Special Folders, Field Press, Old Newspapers /Blotting Papers, Transparent Cellophane tape, Tags, Dissecting and Compound Microscopes, Dissection box, Big lenses, Floras, Field guide book, Herbarium sheets, Computerized plant list (alphabetical), Compiled photographs of plants etc.

The coordinates for rare, endangered and threatened plants were noted by using GPS Instrument. Such plant species were observed at frequent intervals and photographed for e-herbaria. Plant diversity and ecological assessments, investigations were performed by consistent visits to the Purandar fort and tehsil during the year 2014 to 2022. Fig. 2 Initially The identification of plants was practiced by the random walk method and simultaneous listing of plants was done. Accomplishment of keen observations was a result of these visits.



Fig. 2 Habitats representing various Grasslands of Purandar Tehsil

## III. OBSERVATIONS

Grasses play key role in every habitat they grow. The herbivores are on a great extent responsible for the non-existence of the grass cover. The grasslands are highly exposed due to grazing animals especially sheep. The role of herbivores in controlling plant species richness is a critical issue in the conservation and management of grassland biodiversity. The early research on determinants of species richness in grasslands was focused on mechanisms enhancing resource partitioning and coexistence of plant species (Olf, h., and Ritchie Mark E., 1998)

Grasses are the important primary producers of terrestrial (grassland) food chains and food webs (Ecosystem). The entire tehsil receives average annual rainfall of about 350 to 600mm since 2006, (exceptional rainfall in 2006 was 1476 mm) as per Central Ground Water Board, Ministry of Water Resources, River Development and Ganga Rejuvenation, Government of India, Aquifer Mapping Report, Purandhar and Baramati Talukas, Pune District, Maharashtra. India.

Vegetation has treasured ability, nature has provided to meet the needed resources for the human in the form of food, fodder, fibre, fuel, medicine, timber, resin, oil, dyes etc. A vegetation cover on the soil provides confrontation to the movement of running water and guards the soil from its erosion (Mansour J., and Efe R., 2010). Plant communities play a vital role in sustainable development as well as management by balancing biodiversity and maintaining the environment. During the rainy season Purandar is a magnificent sight; the slopes are covered with *Thalictrum*, *Impatiens dalzellii*, and a crowd of grasses.

Phytosociological studies are necessary for protecting the biodiversity and natural plant communities (Rao, S.D., Murthy P.P., et. al. 2015). The entire tehsil including fort region is rich in diverse flora except the east region. The Simpson and Shannon diversity indices were calculated for the entire tehsil. Typical values are generally between 1.5 and 3.5 in most ecological studies, and the index is rarely greater than 4. The Shannon index increases as both the richness and evenness of the community increase. The fact that the index incorporates both components of biodiversity can be seen as both in strength and weakness. It is strength because it provides a simple, synthetic summary, but it is weakness because it makes it difficult to compare communities that differ greatly in richness. Simpsons index is based on the probability of any two individuals drawn at the random from an infinitely large community belonging to same species. It varies between zero and one. The highest Simpson species diversity for woody

vegetation reported was 0.94 and Shannon's 3.27; thus, illustrating the rich plant diversity.

Poaceae is a very important family of Purandar; It represents about 60 different species belonging to 30 genera. Bamboos are at the foot of the hill on the western side; on the northern side at the hill is a village Bairavwadi, where extensive collections were done by C. Mc. Cann in 1917 and beginning of 1918. During the monsoon and in the cold season the hill of Purandar is covered with grasses which disappear in the summer season (Santapau, 1958).

Sacred grooves (Pagewadi and Nishnai) are the remnants of pristine forest patches of our past, locally called as 'Dev-rahasti', or 'Devache Ban'. It has immense global significance for conservation of biodiversity (Bhagat, R.B., 2018). Sacred grove/ Devrai is located at Pagewadi in Purandar tehsil of Pune district. Due to the presence of sacred groves (Nishnai and Lachurdi) around flora, grasslands are very well preserved. Grass species documented at various locations are listed below Table 3

Table 3: List of Grasses, Cereals, Millets belongs to Purandar Tehsil:

| Sr. | Botanical name                                 | Vernacular name         | Origin                  | Phenology  |
|-----|------------------------------------------------|-------------------------|-------------------------|------------|
| 1   | <i>Andropogon pumilus</i> Roxb.                | Lalgavat/Tabadgota      | Asia                    | Oct.-May   |
| 2   | <i>Apluda mutika</i> L.                        | Ghagra/Phulia           | Asia C.                 | Oct.-May   |
| 3   | <i>Aristida redacta</i> Stapf.                 | Kusal                   | Tropics                 | Unknown    |
| 4   | <i>Arthraxon inermis</i> Hook.f.               | Vanguuria               | Asia E.                 | Sept.-Oct. |
| 5   | <i>Arthraxon meeboldii</i> Stapf.              |                         | Asia E.                 | Sept.-Oct. |
| 6   | <i>Arthraxon santapau</i> Bor. in Kew. Bull.   |                         | India                   | Sept.-Oct. |
| 7   | <i>Arthraxon hispidus</i> (Thunb.) Makino.     | Vangurin                | Asia E.                 | Sept.-Nov. |
| 8   | <i>Arundinella pumila</i> Steud.               |                         | India                   | Sept.-Nov. |
| 9   | <i>Nastus borbonicus</i> J.F.Gmel.             | Kalak                   | Asia SE.                | Sept.-May  |
| 10  | <i>Bambusa vulgaris</i> Schard.                | Udha bans/Golden bamboo | China                   | Sept.-Feb. |
| 11  | <i>Brachiaria eruciformis</i> Griseb.          | Shimpli/Waghast         | Asia                    | Sept.-Jan. |
| 12  | <i>Brachiaria ramosa</i> (L.) Stapf.           |                         | Asia                    | Unknown    |
| 13  | <i>Capillipedium filiculme</i> Stapf.          |                         | Asia, Africa, Australia | Sept.-Dec. |
| 14  | <i>Capillipedium hugelii</i> Stapf.            | Tam/Padra/Kullus        | Asia, Africa, Australia | July-Dec.  |
| 15  | <i>Chionachne gigantea</i> (J.Koenig) Veldkamp | Varival/Kantakarvel     | India                   | Sept.-Dec. |
| 16  | <i>Chrysopogon fulvus</i> (Spr.) Chiov.        | Gogar/Kahandol          | Asia                    | Sept.-Dec. |
| 17  | <i>Coix lacryma-jobi</i> Linn.                 | Jondhla/Kachura/Maka    | Asia SE.                | Sept.-Nov. |
| 18  | <i>Cymbopogon martini</i> (Roxb.) Watts.       | Rosha                   | Asia                    | Sept.-Dec. |
| 19  | <i>Cynodon dactylon</i> (Linn.) Pers.          | Harli/ Durva/Darb       | Asia                    | Aug.-Nov.  |
| 20  | <i>Dactyloctenium aegypticum</i> (L.) Willd.   |                         | Pantropical             | Aug.-Feb.  |
| 21  | <i>Dendrocalamus giganteus</i> Munro.          | Giant bamboo            | Malaysia                | Oct.-Apl.  |
| 22  | <i>Dendrocalamus strictus</i> Linn.            | Bamboo                  | Asia                    | Oct.-Apl.  |
| 23  | <i>Dichanthium annulatum</i> (Forsk.) Stapf.   | Marvel/Paunava/Jinjva   | Asia T.                 | Oct.-Mar.  |
| 24  | <i>Dichanthium caricosum</i> (Linn.) A. Camus. | Jetare/ Marvel          | Asia                    | Sept.-Dec. |

|    |                                                   |                    |                           |             |
|----|---------------------------------------------------|--------------------|---------------------------|-------------|
| 25 | <i>Dichanthium caricosum</i> (Linn.) Camus.       | Jetare             | Asia                      | Sept.-Dec.  |
| 26 | <i>Digitaria bicornis</i> (Lam.) R & S EX.Loud.   |                    | Asia                      | Aug.-Dec.   |
| 27 | <i>Digitaria retroflexa</i> (Vahl.) Panzer.       |                    | Asia T., Africa           | Unknown     |
| 28 | <i>Digitaria</i> sp.                              |                    | Tropical regions          | Unknown     |
| 29 | <i>Echinochloa colona</i> (Linn.) Link.           | Samak/Barat        | Palaeotropics             | July-Feb.   |
| 30 | <i>Eragrostis unioides</i> (Retz.) Nees.          | Chimandara/Chidsi  | Asia SE.                  | Aug.-Feb.   |
| 31 | <i>Eragrostis viscosa</i> (Retz.) Trin.           |                    | Pantropical               | July-Dec.   |
| 32 | <i>Hackelochloa granularis</i> (L.) O.Ktze.       | Kangri/Dalura ghas | India                     | Aug.-Oct.   |
| 33 | <i>Heteropogon contortus</i> (Linn.) Beauv.       | Pandhri-sukal      | Asia SE., Afr., Aus.      | Aug.-Feb.   |
| 34 | <i>Isachne pulchella</i> Roth.                    |                    | China                     | Sept.-Oct.  |
| 35 | <i>Ischaemum impressum</i> Hack.                  |                    | India                     | Sept.-Jan.  |
| 36 | <i>Ischaemum indicum</i> (Houtt.) Merr.           | Bherda/Putena      | India                     | Sept.-Feb.  |
| 37 | <i>Ischaemum polystachyum</i> J. Presl.           | Kunda/Nuth         | Asia                      | Sept.-Mar.  |
| 38 | <i>Iseilema prostratum</i> (L.) Andersson         | Mus/Mashi/Tambit   | India, Srilanka           | Aug.-Dec.   |
| 39 | <i>Lophopogon tridentatus</i> Roxb. Hook.         |                    | India                     | Aug.-Dec.   |
| 40 | <i>Melanocenchris jacquemontii</i> Jaub. & Spach. | Ghula gavat        | India                     | Aug.-Dec.   |
| 41 | <i>Oplismenus burmannii</i> Retz. P. Beauv.       | Yerwa/Kudak        | Burma                     | July-Feb.   |
| 42 | <i>Oryza grandiglumis</i> (Döll) Prodoehl         | Tandul/ Rice       | Asia                      | Sept.-Jan.  |
| 43 | <i>Panicum sumatrense</i> Roth.                   | Saga               | India, Pakistan, Srilanka | Aug.-Oct.   |
| 44 | <i>Pennisetum hohenackeri</i> Hochst.             | Mohl               | Asia                      | Sept.-Feb.  |
| 45 | <i>Cenchrus americanus</i> (L.) Morrone           | Bajara             | India, Kenya, Madagascar  | Sept.-Nov.  |
| 46 | <i>Pseudodichanthium serrafalcoides</i> Bor.      |                    | India, Oman               | Unknown     |
| 47 | <i>Rhynchelytrum repens</i> (Willd.) Hubb.        | Chota kaglu        | Tropics                   | Sept.-Dec.  |
| 48 | <i>Saccharum officinarum</i> Linn.                | Sherdi/Us          | Asia SE.                  | Sept.-Mar.  |
| 49 | <i>Saccharum spontaneum</i> L.                    | Kamis/Bagberi      | Asia                      | Sept.-Mar.  |
| 50 | <i>Shima nervosum</i> (Rottl.) Stapf.             | Sheda/Pavna/Paunat | Asia, Africa, Yemen       | Sept.-Oct.  |
| 51 | <i>Setaria intermedia</i> R & Sch.                | Pandar/Landgar     | Asia                      | Aug.-Jan.   |
| 52 | <i>Sorghum glabrescens</i> (Steud.) Schwienf.     | Jawar              | India                     | Unknown     |
| 53 | <i>Themeda quadrivalvis</i> (Linn.) O. Kuntze.    | Bhati/Fulora       | India, Nepal, Malaysia    | Sept.-Jan.  |
| 54 | <i>Themeda subglobosa</i> Stapf.                  |                    | Asia, Africa, Australia   | Unknown     |
| 55 | <i>Themeda triandra</i> Forssk.                   | Bunden/Batani      | India                     | Sept.Feb.   |
| 56 | <i>Tripogon bromoides</i> Roth.                   |                    | Asia                      | July-Dec.   |
| 57 | <i>Tripogon jacquemontii</i> Stapf.               |                    | India                     | Aug.-Nov.   |
| 58 | <i>Tripogon lisboae</i> Stapf.                    |                    | Korea                     | Oct.-Nov.   |
| 59 | <i>Triticum</i> spec.                             | Gahu/ Wheat        | Asia SW., Syria           | Nov. & Feb. |
| 60 | <i>Vetiveria zizanioides</i> (Linn.) Nash.        | Wala               | Asia                      | Sept.-Oct.  |

The grasses found at the Kaniphnath location were *Apluda aristata*, *Aristida funiculata*, *Brachiaria eruciformis*, *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Eragrostis japonica*, *Eragrostis viscosa*, *Heteropogon contortus*, *Melanocenchris jacquemontii*, *Shima nervosum*, *Setaria glauca*, *Setaria intermedia*, *Urochloa panicoides*. The entire belt is grassland with few tree species, naturally herbivores are found here in more number. The

flagship grass species reported in Purandar tehsil were *Oplismenus burmannii*, *O. Compositus*, *Heteropogon contortus*, *Aristida finiculata*, *Lophopogon tridentatus* etc. Fig. 3



Fig. 3 Various grass species belong to Purandar



Fig. 5 Bird Diversity of Purandar

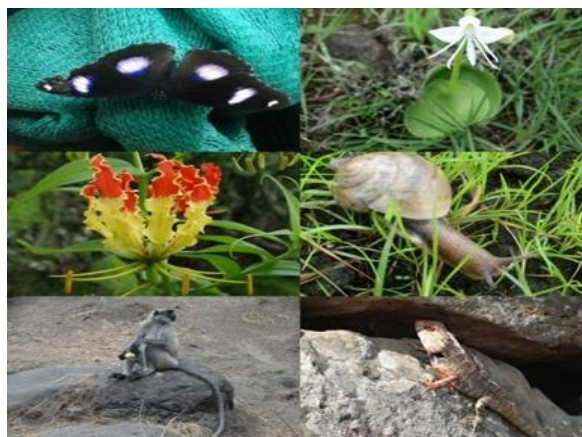


Fig. 4 Biodiversity of Purandar



Fig. 6 Butterfly Diversity of Purandar

Table 4: Showing Coordinates for Butterflies at Purandar tehsil, Pune, M.S., India.

| Sr. | Butterfly Species                                              | Locality    | Coordinates                  |
|-----|----------------------------------------------------------------|-------------|------------------------------|
| 1.  | Black Rajah: (Krish-naresh) <i>Charaxes solon</i>              | Kodit Bk.   | N 18° 21.258' E0 73° 58.615' |
| 2.  | Blue Mormon (Rani Pakoli) <i>Papilio polymnestor</i>           | Bhivari     | N18° 22.156' E0 73° 55.555'  |
| 3.  | Blue pansy male: (Nil Bhir-bhiri) <i>Junoniya orithya</i>      | Chivhewadi  | N 18° 16.863' E0 73° 57.271' |
| 4.  | Blue tiger: (Neel-Ruikar) <i>Tirumala limniace</i>             | Diveghat    | N18° 24.911' E0 74° 00.225'  |
| 5.  | Chocolate pansy: (Tapkiri Bhirbhiri) <i>Junonia iphita</i>     | Wagh dongar | N18° 21.530' E0 74° 00.891'  |
| 6.  | Common emigrant: (Chatteri Bhatakya) <i>Catopsilia Pomona</i>  | Pingori     | N 18° 12.680' E0 74° 07.865' |
| 7.  | Common grass yellow : (Trun Pilati) <i>Eurema hecabe</i>       | Kaldari     | N18° 15.182' E0 74° 00.135'  |
| 8.  | Common Jezebel: (Haladi-kunku) <i>Deli's eucharis</i>          | Kumbhoshi   | N 18° 17.884' E0 73° 56.885' |
| 9.  | Common Leopard: (Bitti) <i>Phalanta phalantha</i>              | Bopgaon     | N18° 23.856' E0 73° 54.884'  |
| 10. | Common Rose: (Gulabi Madalsa) <i>Pachliopta arstlochia</i>     | Garade      | N18° 22.003' E0 73° 55.266'  |
| 11. | Common Sailer: (Tarang) <i>Neptis hylas varmona</i>            | Narayanpur  | N18° 16.849' E0 73° 58.790'  |
| 12. | Common wanderer male: (Vimukta) <i>Pareronia valeria</i>       | Ketkawale   | N18° 15.646' E0 73° 56.237'  |
| 13. | Common/Lemon emigrant: (Kirma/Kadbar) <i>Catopsilia Pomona</i> | Bhairavwadi | N18° 16.199' E0 73° 58.976'  |
| 14. | Danaid eggfly: (Chhota chandva) <i>Hypolamnas misippus</i>     | Devadi      | N 18° 17.280' E0 73° 56.414' |
| 15. | Dark Pierrot: (Gadad Kavada) <i>Taracus Ananda</i>             | Panwadi     | N 18° 16.749' E0 74° 01.508' |
| 16. | Indian pioneer: (Bhamai) <i>Belenois aurota aurota</i>         | Hivare      | N 18° 21.375' E0 74° 00.285' |
| 17. | Lemon pansy: (Pitnetri Bhir-bhiri) <i>Junonia lemonias</i>     | Supe        | N 18° 17.727' E0 74° 01.526' |
| 18. | Lime Butterfly: (Limbali)- <i>Papilio demoleus</i>             | Kaniphnath  | N 18° 18.556' E0 73° 58.829' |
| 19. | Peacock Pansy: (Mayur Bhir-bhiri) <i>Junonia lmanac</i>        | Misalwadi   | N 18° 15.646' E0 73° 56.237' |
| 20. | Plain tiger: (Ruikar) <i>Danaus chrysippus</i>                 | Pokhar      | N 18° 18.353' E0 73° 58.040' |

#### IV. RESULT AND CONCLUSION

Investigator has documented 1352 flowering plant species of the Purandar tehsil, also performed phytosociological studies for which he has laid down 300 quadrats for herbaceous species and 170 quadrats for woody vegetation. He has documented various animal species sighted in the tehsil includes Bird species, Butterflies, Mammals, Aquatics etc. The present research work was undertaken during the year 2014 to 2022 Figures 4, 5 and 6, Table 4.

This research article will help to produce a digital document on such valuable Biodiversity. Moreover, the study has the following outcome and opportunities: A recent data on Biodiversity will be helpful for various purposes to researchers, academicians, industries, corporations, NGO's and the government. The change in diversity with the changing human interferences will help the forest department to suggest corrective measures. A comparison of change in vegetation will help us to understand the human impact on the diversity and such studies could be carried out for other areas. The data will be an addition to the biodiversity of Maharashtra and subsequently to India.

Threats in the study area recorded during the study are: 1) Habitat Destruction. 2) Need wire compounds on open grasslands. 3) Predation by stray dogs. 4) Unauthorized excavation of grassland 5) Earth movers and trenching conversion of grassland to agricultural. 6) Use of insecticides and pesticides in adjacent croplands. 7) Over grazing. 8) Urbanization. 9) Proposed industrialization. 10) Forest fire.

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