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Research Article

# Enumerative checklist of pteridophytes from Satara district (MH), India

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Abstract

A checklist of pteridophytes from Satara Dt. (Maharashtra, India) presented 85 species of pteridophytes belonging to 39 genera under 26 families are listed. The most specious families found in Satara district are Pteridaceae, Ophioglossaceae, Adiantaceae, Lomariopsidaceae and Woodsiaceae followed by Polypodiaceae, Dryopteridaceae, and Davalliaceae. The most common species are *Adiantum philippense*, *Actiniopteris radiata*, *Aleuritopteris bicolor*, *Pteridium revolutum*, *Pityrogramma calomelanos*, *Pteris biaurita*, *P. vittata*, and *Tectaria coadunata*.

Keywords

Pteridophyte flora, Satara district, checklist, ecology, distribution

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## Introduction

Satara district, nestled in Sahyadri ranges of Western Ghats, encircles a vast plateau comprising of Mahabaleshwar, Kaas, and Panchagani, measuring 150 km<sup>2</sup>, bound by valleys on all sides. The Western Ghat mountains reach a maximum height of 1,438 m (4,718 ft) above sea level, known as Wilson/Sunrise Point, Tableland to the famine prone regions like Mann and Khatav tehsils. The average annual rainfall of the district is 1426 mm, and average temperature ranges between 11.0°C to 37.5°C, which determines the variety of vegetation, from the typical monsoon forest in the western parts to scrub and poor grasses in the eastern parts. With this diversified topography and environment one should know the pteridophyte composition from this region. As compared to the study of angiospermic plants, basic information on pteridophytes from this region is less understood.

Recently, Jadhav *et al.* (2011) studied the pteridophytes of Koyna Wildlife Sanctuary. They listed 25 species belonging to 19 genera. Patil *et al.* (2012; 2013; 2014; 2016) studied the diversity of pteridophytes from some hills in Northern Western Ghats. However, is no authentic documentation was found on the pteridophytes of Satara district. Thus the present work was undertaken to enumerate the pteridophytes from Satara district.

## Materials and Methods

Frequent field tours were organized from July 2011 to September 2013 to collect the plant materials. Collected materials were then treated in the laboratory to make herbarium Specimens. Pteridophyte species were identified by using different pteridophyte floras and monographs *viz.* Beddome (1884); Baltter and Almeida (1922); Manickum & Irudayaraj (1992); Ghosh *et al.* (2004)

and Fraser – Jenkins (2008). The identified species are confirmed by observing the herbaria of the BSI Western Circle, Pune, BSI Southern Circle, Coimbatore, Blatter herbarium Mumbai and online herbaria CAL, RBG etc. The checklist is given according to the classification system given by Frazer- Jenkins (2009).

### Result and Discussion

The present investigation could collect 85 species of pteridophytes from the studied area out of which 11 belong to the group fern allies. The Pteridaceae (15 species), Ophioglossaceae (07 species) Adiantaceae (06 species), Lomariopsidaceae (06 species) and Woodsiaceae (06 species) showed maximum diversity. The species like *Adiantum philippense*, *Actiniopteris radiata*, *Aleuritopteris bicolor*, *Pteridium revolutum*, *Pityrogramma calomelanos*, *Pteris biaurita*, *P. vittata*, and *Tectaria coadunata* were collected from throughout the district and were supposed to be abundant in the district while some species like *Adiantum poiretii*, *Asplenium polyodon*, *Athyrium pectinatum*, *Bolbitis x prolifera*, *Botrychium lanuginosum*, *Crepidomanes latealatum*, *Ceratopteris thalictroides*, *Deparia petersenii*, *Dryopteris sparsa*, *Equisetum ramosissimum*, *Isoetes sahyadriensis*, *I. panchganensis*, *Leucostegia truncate*, *Pteris heteromorpha*, and *Selaginella repanda* were collected from a single locality and they are presumably rare in the district. In addition to this, some economically important species, viz. *Actiniopteris radiata*, *Diplazium esculentum*, *Lycopodium flexuosum*, *Ophioglossum nudicaule*, *Osmunda huegeliana*, *Pteris biaurita* and *Tectaria coadunata* have also been collected. The earlier reported 9 species, viz. *Adiantum hispidulum*, *Asplenium trichomanes*, *Ctenopteris subfalcata*, *Isoetes panchananii*, *Lycopodium japonicum*, *Pteris ensiformis*, *Selaginella brachystachya*, *S. involvens* and *S. panchghaniana*, were not collected during present investigation.

### Family: Lycopodiaceae

***Huparzia hamiltonii*** (Spreng. ex Grev. & Hook.) Trevis. Atti Soc. Ital. Sci. Nat., 17: 248 (1874); Manickum & Irudayaraj, Pterid. Fl. W. G. S. Ind., 24 – 25 (1992); Fraser – Jenkins, Taxo. Rev. Three Hund. Ind. Subcont. Pterid., 518 (2008).

**DISTRIBUTION: India** – West Bengal, Sikkim, Assam, Arunachal Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala, Andaman & Nicobar Islands.

**Maharashtra** – Kolhapur, Satara and Pune.

**Satara** – Patan, Karad, Mahabaleshwar.

**ECOLOGY:** Epiphytes on old trees (*Ficus*, *Mangifera*, *Syzgium*) where on moss covered branches. Found at 600 - 1000 m. rare species collected from the deep forest of Mahabaleshwar, Koyna&Chandoli wildlife sanctuary.

### Family: Selaginellaceae

***Selaginella delicatula*** (Desv. ex Poir.) Alston., J. of Bot. Brit. Forg. 70 (838): 282. (1932). Panigrahi and Dixit, J. Ind. Bot. Soc. 46: 226 fig. 5 (1967); Dixit, Cens. I. Pterid., 12 (1984). Manickum & Irudayaraj, Pterid. Fl. W. G. S. Ind., 40 – 41 (1992); Fraser – Jenkins, Taxo. Rev. Three Hund. Ind. Subcont. Pterid., 522 (2008). **Type** – Thailand.

**India** – Sikkim, Assam, Tripura, Mizoram, Nagland, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala, Andaman and Nicobar Islands.

**Maharashtra** – Kolhapur, Sangli, Sindhudurg, Ratnagiri, Raigad, Nasik, Satara.

**Satara** – Patan, Mahabaleshwar, Wai, Panchgani, Karad, Kas, Sartara.

**ECOLOGY:** Common in Satara district, on rocks, walls and along the roadside between 0 – 1300m.

***Selaginella repanda*** (Desv. ex Poir.) Spring. Voy. Bonite, Bot. 1: 329 (1844); Das, Fern and Fern allies of Tripura, N. E. Ind., 111 – 113 (2007); Manickum & Irudayaraj, Pterid. Fl. S. I – W. G. 38 – 39 (1992); Fraser – Jenkins, Revi. Three Hund. Ind. Subcont. Pterid., 33 & 523 (2008). **Type** – China.

**DISTRIBUTION: India** - Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Maharashtra, Karnataka, Tamil Nadu, Kerala

**Maharashtra** – Kolhapur, Satara.

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** Occasionally, along the cutting edges of hills, especially in ghat sections at 900–1200 m.

***Selaginella ciliaris*** (Ritz.) Spring, Bull. Acad. Brux. 10: 231, (1843); Phillip, J. Sc. 58: 370, 135; Dixit. I.c. 79 f. 41 A – G, Pl. 40, 41, (1992); Fraser – Jenkins, Revi. Three Hund. Ind. Subcont. Pterid., 13 & 523 (2008). **Type** – India.

**DISTRIBUTION: India** - Uttar Pradesh, Bihar, West Bengal, Sikkim, Assam, Meghalaya, Tripura, Orissa, Madhya Pradesh, Maharashtra, Kerala, Tamil Nadu, Andamans, Nicobars, Kerala

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Satara

**Satara** – Patan, Mahabaleshwar, Panchgani.

**ECOLOGY:** Common terrestrial species, along the roadsides or slope of hills or on walls of the old pools at 500m – 1400m.

***Selaginella tenera*** (Hook & Grev.) Spring. Bull. Ac. Brux. 10 (144): 232 (1843); Alston, Proc. Natnl. Inst. Sci. Ind. 11 (3): 227 (1945); Dixit, cen. Ind. Pterid. 17 (1954); Manickum & Irudayaraj, Pterid. Fl. W. G – S. Ind., 41 (1992); Fraser – Jenkins, Revi. Three Hund. Ind. Subcont. Pterid., 523 (2008).

**DISTRIBUTION: India** – Maharashtra, Tamil Nadu, Karnataka, Kerala.

**Maharashtra** – Kolhapur, Satara.

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** It grows in under beneath of tall trees or along the road sides or slopes of hills at 600 - 1200 m.

***Selaginella crassipes*** Spring (= *S. tenera*) in Mem. Acad. Roy. Sci. Belgique 24: 243, no. 181 (1850).

*S. fergusonii* Hieron., Hedwigia 43: 59, no. 61 (1904); Singh *et al.*, Taiwania, 57(3): 283-287, 2012 Type - Sri Lanka (Ceylon).

**DISTRIBUTION:** India – Maharashtra.

**Maharashtra** – Kolhapur, Satara

**Satara**- Pratapgarh, Mahrola, Khambhil, Patan.

**ECOLOGY:** Grows in humus-rich, moist, shaded and sloppy floor of forest.

#### Family: Isoetaceae

***Isoetes sahyadriensis*** L. f. Suppl. Pl. 447 (1781); Anderwood, Bot. Gaz. 13 (4): 89-94 (1888); Takamine, Bot. Mag. Tokyo, 35: 184-90 (1921); Bharadwaj, Curr. Sci. 3: 300 (1933); Mccan, Journ. Bomb. Nat. Hist. Soc., 37: 501 – 502 (1934); Varma, Amer. fern Jour. 51 (2): 99 – 104; Sharma, Bhore, Suthar and Harsh, Ind. Fern J. 25: 167 – 201 (2008). **Type** – India.

**DISTRIBUTION:** India – Tamil Nadu, Bihar, Gujarat, Kerala, Maharashtra, Orissa, Andhra Pradesh, Madhya Pradesh.

**Maharashtra** – Kolhapur, Satara, Sindhudurg, Ratnagiri.

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** This species is a fern growing in wetland, lakes or temporary pools or ponds and also collected from plateaus or hill tops during rainy season.

***Isoetes sahyadrii*** Mahabale. ex L.N. Rao. Curr. Sci. 2: 62 – 63, (1938). **Type** – India.

**DISTRIBUTION:** India – Maharashtra, Satara – Panchagani.

**ECOLOGY:** Very rare plant usually occurs as submerged or along the periphery of the ditches or temporary streams on plateaus.

***Isoetes dixitii*** Shende J. Univ. Bombay. 14. 50 – 52 (1945). Pant and Srivastava, Proc. Natl. Inst. Sci. India, Pt. B. Biol. Sci. 28:242 – 280 (1962); Srivastava, Pant and Shukla, Amer. Fern. Jour. 83 (4): 105 – 119 (1993). **Type** – Panchagani, India.

**DISTRIBUTION:** India – Maharashtra,

**Maharashtra** – Kolhapur, Satara.

**Satara** – Panchagani, Patan, Mahabaleshwar.

**ECOLOGY:** It was collected from Table land Plateau, Panchagani, Panhala, Kas, Patan.

***Isoetes panchganesis*** Srivastava and Pant, Proc. Natl. Inst. Sci. India, Pt. B. Biol. Sci. 28:242 – 280 (1962); Srivastava, Pant and Shukla, Amer. Fern. Jour. 83 (4): 105 – 119 (1993). Chandra, Fraser Jenkins, Kumari and

Srivatava, Taiwania. 53(2): 170-209 (2008). **Type** – Panchgani, India.

**DISTRIBUTION:** India – Maharashtra.

**Maharashtra** – Kolhapur, Satara

**Satara** – Tableland Plateau, Panchagani.

**ECOLOGY:** it grows during the late rainy season along the edges of seasonal ponds, ditches and lakes.

#### Family: Equisetaceae

***Equisetum ramosissimum*** Desf. Pl. Atlant. 2: 398 (1799). **Type** - Tunisia.

**DISTRIBUTION:** India – Sikkim, Arunachal Pradesh, West Bengal, Assam, Maharashtra, Tamil Nadu, Kerala.

**Maharashtra** – Marathwada, Vidharb, Pandarpur, Pune, Satara.

**Satara** – Wai.

**ECOLOGY:** very rare species, collected from plane field near the Fishery Breeding Centre at Wai.

#### Family: Ophioglossaceae

***Ophioglossum gramineum*** Willd., Nov. Act. Acad. Erfurt. 2: 18. t. f. 1 (1802); Beddome, Handb. Suppl. Ferns Brit. India 108.1892; Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35: 250 (1969); Nayar and Kaur, Comp. Beddome, Handb. 106 91974); Dixit, Cens. Indian Pterid. 23. 1984; Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 20 & 526 (2008). **Type:** Angola.

**DISTRIBUTION:** India – Western Himalaya, West Bengal, Rajasthan, Madhya Pradesh, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Vidharbh, Melghat, Pune, Satara, Kolhapur, Ratnagiri, Sindhudurg.

**Satara** – Patan, Mahabaleshwar, Wai.

**ECOLOGY:** Very rare species, collected from grassy plateaus associate with *O. nudicaule*, *O. petiolatum* and *O. costatum*.

***Ophioglossum lusitanicum*** L. Sp. Pl., 2: 1063, 1753; Clausen, Mem. Torrey Bot. Club., 19 (2): 159, 1938; Mahable, Bull. Bot. Surv. India, 4: 71, 1962; Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35: 251, 1969.

**DISTRIBUTION:** India – Andhra Pradesh, Assam, Bihar, Goa, Jammu-Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh, West Bengal.

**Maharashtra** – Bhandara, Satara – Patan.

**ECOLOGY:** Very rare species, collected from grassy plateaus of Kolhapur Satara districts, associated with *O. nudicaule* and *O. costatum*.

***Ophioglossum nudicaule*** L. F. Suppl. Pl. Syst. 443 (1781); Beddome, Handb. Ferns Br. India, 464, t. 228 (1883); Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35.252 (1969); R.D. Dixit, Cens. Ind. Pterid. 23 (1984); Manickam & Irudayaraj, Pterid. Fl. West Ghats: 48-49. t. 27 (1992); Chandra, Ferns India 9 (2000). **Type** - South Africa.

**DISTRIBUTION:** **India:** Darjiling, Himachal Pradesh, Jammu-Kashmir, Jharkand, Karnataka, Kerala, Sikkim, Tamil Nadu.

**Maharashtra:** Meghats, Sahyadri hills, Pune, Kolhapur, Sindhudurg, Ratnagiri, Satara

**Satar** – Patan, Panchagani, Mahabaleshwar, Karad.

**ECOLOGY:** Grows in patches on fully exposed localities in open grassland.

**Ophioglossum costatum** R. Br. Prod. Fl. Nov. Holl. 163 (1810). Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35: 249 (1969); Frazer Jenkins Taxo. Rev. Three Hund. Ind. Pterido. 19 (2007). **Type** – Australia.

**DISTRIBUTION:** **India** – Madhya Pradesh, West Bengal, Maharashtra, S - India, to NE - India

**Maharashtra:** Sindhudurg, Kolhapur, Sangli, Satara, Raigad, Pune, Nasik.

**Satara:** Kas, Mahabaleshwar, Panchgani, Patan, Karad.

**ECOLOGY:** Very common, collected from grassy plateau. The population of the plants varies according to the water content of the soils.

**Ophioglossum petiolatum** Hook., Exot. Fl. 1: t. 56 (1823); Panigrahi & Dixit, Proc. Natl. Inst. Sci. 35. 260-61 (1969); Beddome Handb. 106 (1974); R.D. Dixit, Cens. Ind Pterid. 24 (1984); Manickam, Fern Fl. Palani Hills 14.1986; Manickam & Irudayaraj Pterid. Fl. W. G. 52. t. 30(1992).

**DISTRIBUTION:** **India** – Arunachal Pradesh, Sikkim, Nagaland, Kumaon, Kashmir, Uttar Pradesh, Punjab, Madhya Pradesh Maharashtra.

**Maharashtra** – Bhandara, Satara.

**Satara** – Kasplatu.

**ECOLOGY:** Grows in moist exposed grassy areas.

**Ophioglossum reticulatum** L. Sp. Pl. 2: 1063 (1753); Beddome, Ferns. Southern India 23. t. 70. 1863; Beddome, Handb. Ferns. Bri. India, 465. t. 290 (1883); Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35. 257 (1969); R.D. Dixit, Cens. Ind. Pterid. 24(1984); Manickam & Irudayaraj, Pterid. Fl. West Ghats: 51. t. 29 (1992). **Type** – Mauritius.

**DISTRIBUTION:** **India** – Andra Pradesh, Madya Pradesh, Kerala, Tamil Nadu, Maharashtra.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Pune, Bhandara, Satara, Kerala.

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** Very common, found in under beneath of tree in the forest or grassy plateaus.

**Botrychium lanuginosum** Wallich ex Hooker & Greville, Icon. Filic. 1: t. 79 (1828).

**Distribution:** **India**- West Bengal, Sikkim, Arunachal Pradesh, Assam, Meghalaya, Maharashtra, Kerala.

**Maharashtra** – Pune and Satara.

**Satara** – Mahabaleshwar, Panchagani.

**ECOLOGY:** Epiphyte, growing on angiospermic plants like *Mangifera indica* and *Terminalia* sp., at 3500 – 4000 ft. altitude.

#### Family – Marattiaceae

**Angiopteris helferiana** C. Presl. Suppl. Tent. Pterid. 22 (1845); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 23 - 25 (2008).

**DISTRIBUTION:** **India** – North India, Andra Pradesh, Maharashtra, Karnataka, Goa, Tamil Nadu, Kerala.

**Maharashtra** – Sindhudurg, Satara

**Satara** – Mahabaleshwar, Kas.

**ECOLOGY:** Terrestrial plant distributed in a variety of forest types, usually along well shaded stream banks of humid zones of evergreen forests above 700 m.

#### Family – Osmundaceae

**Osmunda hugeliana** C. Presl., Suppl. Tent. Pterid. 64 (1845); Beddome, Ferns S. Ind., 26 (1972); Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind. 59 (1992); Frazer Jenkins, Taxo. Rev. Three Hund. Ind. Subcont. Pterido. 30 (2008).

**DISTRIBUTION:** **India** – Maharashtra, Kerala, Tamil Nadu.

**Maharashtra** – Sindhudurg, Kolhapur, Satara.

**Satara** – Patan, Kas, Mahabaleshwar.

**ECOLOGY:** It is growing in marshy places in or along the streams on rocks or moist soils between 600 – 1400 m.

#### Family – Lygodiaceae

**Lygodium flexuosum** (Linn.) Sw., Jour. Bot. 1800(2): 106 (1801); Pichi – Sermolli, Webbia 12: 10 (1956); Manickum and Irudayaraj, Pterid. Fl. W. G – S. Ind. 61 (1992); Ghosh and Ghosh, Pterid. Fl. E. Ind. 219 (2005); Frazer Jenkins, Taxo. Rev. Three Hund. Ind. Subcont. Pterid. 32 – 33 (2008).

**DISTRIBUTION:** **India** – Northern India, Madya Pradesh, Maharashtra, Karnataka, Goa, Andra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Sindhudurg, Kolhapur, Ratnagiri, Pune, Raigad, Thane, Satara.

**Satara** – Patan.

**ECOLOGY:** Terrestrial climber, Collected along the roadside or partially exposed area, found below the altitudinal range of 500 – 800 m.

#### Family: Marsileaceae

**Marsilea minuta** L. Mant. Pl. Alt.: 308 (1771); Dixit, Cens. Ind. Pterido., 84 (1984); Manickum & Irudayaraj, Pterido. Fl. W. G. – S. Ind., 342 – 343 (1992); Frazer – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 531 – 532 (2008). **Type** – India.

**DISTRIBUTION:** **India** – All states of Eastern India, Karnataka, Maharashtra, Goa, Tamil Nadu, Kerala.

**Maharashtra** – Sundhudurg, Kolhapur, Ratnagiri, Pune, Satara.

**Satara** – Mahabaleshwar, Panchagani, Wai, Patan, Karad, Khatav.

**ECOLOGY:** It is a common aquatic or semiaquatic fern collected from shallow pools, or on the edges of lakes, often forming large and dense colonies. The species was also collected in the open grassy plateau along the edges of seasonal ponds at Satara district.

#### Family: Polypodiaceae

**Leptochilus decurrens** Blume., Enum. Pl. Javae 2: 206 (1828); Manickum and Irudayaraj, Pterid. Fl. W. G. – S. Ind., 307 (1992); Nymphy and Madhoosudnan, Fern Fl. S. Ind. 61 – 66 (1998); Frazer Jenkins, Rev. Taxo. Ind. Subcont. Pterid., 60 (2008). **Type** – Indonesia, Java.

**DISTRIBUTION:** **India** – Tamil Nadu, Kerala, Karnataka, Goa, Maharashtra.

**Maharashtra** – Satara

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** Epiphytes or Lithophytic on moist rocks along the streams.

**Pyrosia lanceolata** (Wall.) Farw. Amer. Midl. Naturalist 12: 245 (1930); Ching, Bull. Chin. Bot. Soc. 1:70 (1935); Dixit, Cens. Ind. Pterid. 54 (1984); Manickum and Irudayaraj, Pterid. Fl. W. G. – S. Ind., 320 (1992); Nymphy and Madhoosudnan, Fern Fl. S. Ind. 106 – 117 (1998); Frazer Jenkins, Rev. Taxo. Ind. Subcont. Pterid., 72 (2008).

**DISTRIBUTION:** **India** – Himalayas, Kerala, Tamil Nadu, Maharashtra.

**Maharashtra** – Sindhudurg, Kolhapur, Ratnagiri, Satara, Pune, Nasik.

**Satara** – Patan, Kas, Panchagani, Mahabaleshwar, Jaoli, Pratapgad.

**ECOLOGY:** Occasional at Patan and Mahabaleshwar hills between 500 – 1200 m growing on moist rocks or on tree trunks of *Ficus*, *Samanea*, and *Terminalia*.

**Microsorium membranaceum** (D. Don) Ching., Bull. Fan. Mem. Inst. Biol. 4: 309 (1933); Manickum and Irudayaraj, Pterid. Fl. W. G. – S. Ind., 327 - 228 (1992); Nymphy and Madhoosudnan, Fern Fl. S. Ind. 78 – 79 (1998); Frazer-Jenkins, Rev. Taxo. Three Hund. Ind. Subcont. Pterid. 69 (2007).

**DISTRIBUTION:** **India** – Mizorsm, Tripura, West Bengal, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland, Assam, Manipur, Madya Pradesh, Maharashtra, Goa, Karnataka, Andra Pradesh, Kerala, Tamil Nadu.

**Maharashtra** – Sindhudurg, Kolhapur, Ratnagiri, Satara, Sangli, Pune, Raigad, Nasik.

**Satara** – Karad, Patan, Kas, Mahabaleshwar, Panchagani, Wai, Jaoli, Khandala.

**ECOLOGY:** Very common, either epiphytic or Lithophytic, between 300 – 1400 m.

**Microsorium punctatum** (L.) Copel., Univ. Calif. Publ. Bot. 16: 111 (1929); Pic. Serm. in B.J.B.B. 53: 208 (1983); Bir and Vasudeva, J. Bomb. Nat. Hist. Soc. 68: 193 (1971); Beddome, Handb. 87 (1974); Dixit, Cens. Ind. Pterido., 46 (1984); Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind., 328 – 329 (1992). **Type:** China.

**DISTRIBUTION:** **India** – Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, West Bengal, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Ratnagiri, Satara.

**Satara** – Patan, Mahabaleshwar, Panchagani.

**ECOLOGY:** Common and cultivated species collected from gardens in Patan, Mahabaleshwar and Panchagani.

**Lepisorus nudus** (Hook) Ching., Bull. Fan Mem. Inst. Biol. 4(3): 83 (1933); Manickum & Irudayaraj, Pterid. F. W. Ghats S. Ind. 332 – 333 (1992); Nymphy and Madhoosudnan, Fern Fl. S. Ind. 54 – 55 (1998); Fraser – Jnkns, Tax. Rev. threeHund. Ind. Subcont. Pterid. 39 – 41, 538 (2008). **Type** – China.

**DISTRIBUTION:** **India** – Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir, Assam, Meghalaya, Arunachal Pradesh, West Bengal, Sikkim, Maharashtra, Goa, Karnataka, Andra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Sindhudurg, Kolhapur, Ratnagiri, Raigad, Pune, Nasik, Satara

**Satara** – Patan, Mahabaleshwar, Wai, Panchagani, Pratapgad, Jaoli.

**ECOLOGY:** very common epiphyte found on tree trunks of *Ficus*, *Samanea*, *Albizia*, *Cassia* and *Terminalia*.

#### Family: Dennstaedtiaceae

**Pteridium revolutum** (Blume) Nakai, Bot. Mag. (Tokyo). 39: 109 (1925); Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind., 91 (1992); Frazer – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 88 – 89 (2007). **Type:** Europe.

**DISTRIBUTION:** **India** – Assam, Arunachal Pradesh, Manipur, Tripura, West Bengal, Bihar, Uttar Pradesh, Maharashtra, Karnataka, Kerala, Tamil Nadu.

**Maharashtra** – Throughout Western Ghats in Maharashtra.

**Satara** – Throughout the district.

**ECOLOGY:** It is growing like a weed.

#### Family: Pteridaceae

**Cratopteris thalictroides** (L.) Brongn. Bull. Sci. Soc. Philom. Ser. 3, 8: 186 (1821); Pic. Serm. In Webbia 12: 648, t. 1 (1957); Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind., 91 (1992); Frazer – Jenkins, Tax. Rev. Three

Hund. Ind. Subcont. Pterid., 88 – 89 (2007). **Type:** Sri Lanka.

**DISTRIBUTION:** **India** – Assam, Arunachal Pradesh, Manipur, Tripura, West Bengal, Bihar, Uttar Pradesh, Maharashtra, Karnataka, Kerala, Tamil Nadu.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Pune, Satara.

**Satara** – Patan.

**ECOLOGY:** It was collected from the marshy place in Patan only.

**Actiniopteris radiata (Sw.) Link.**, Fil.Sp. Hot Ref. Bot. Berol. 80 (1841); Hook., Ic. Pl. 10: t. 975 (1854); Beddome, Hand. Ferns Brit. Ind., 197 – 198, (1892); Blatter and d'Almedia, Ferns Bomb., 122 – 123 (1922); Manickum & Irudayaraj, S. Ind. Pterido., 81 (1992). **Type:** India.

**DISTRIBUTION:** **India** – Southern, Western, Eastern, Central Part of India.

**Maharashtra** – Throughout.

**Satara** – Karad, Patan, Jaoli, Mahabaleshwar, Wai, Khandala, Man, Khatav, Phaltan.

**ECOLOGY:** Common terrestrial or Lithophytic fern collected between 400 – 900 m grows in rock crevices or moist soils along roadsides.

**Anogramma leptophylla (L.) Link.**, Fil. Sp.: 137 (1841); Beddome, Handb. Ferns Brit. India: 382 (1883); PichiSermoli, Webbia 21: 497, t. 1, map 1 (1966); Hope J. Bombay Nat. Hist. Soc. 15: 101(1903); Blatter and d' Almeida, Feers of Bombay: 175 – 176 (1922). **Type:** Spain.

**DISTRIBUTION:** **India** - Western Ghats, S-India, Himachal Pradesh, Uttar Pradesh.

**Maharashtra** – Kolhapur, Satara.

**Satara** – Panchagani, Mahabaleshwar.

**ECOLOGY:** Very rare Lithophytic fern collected from roadside walls at Mahabaleshwar, Panchagani at 1000 – 1400 m.

**Pteris heteromorpha** Fee, Mem. Foug., 5. Gen. Filic.: 127. 1852; Tardieu & C. Chr., Fl. Indo-Chine 7(2): 147. 1940; Holttum, Dansk Bot. Ark. 23: 235. 1965. **Type** - Malaysia

**Pteris cretica** var. **heteromorpha** (Fée) Bedd., Handb. Ferns Brit. India: 106. 1883.

**DISTRIBUTION:** **India** - Orissa, Arunachal Pradesh, Karnataka, Maharashtra.

**Maharashtra** – Satara, Kolhapur.

**Satara** – Patan.

**ECOLOGY:** Terrestrial, Rare species, Found at altitude 700 – 1200 m.

**Pteris vittata** L., Sp. Pl.: 1074. 1753; Beddome, Ferns S. Ind., 11 (1970); Dixit, Cens. Ind., Pterid. 71 (1984); Holttum, Rev. Fl. Malaya ed. 1, 2: 396, f. 230. 1955 [1954]; Manickum & Irudayaraj, S. Ind. Pterido., 95, 1994; Nayer & Kaur, Comp. Beddome Handb., 29 (1974); Tagawa & K.Iwats., Fl. Thailand 3: 233. 1985. **Type** - China

**DISTRIBUTION:** **India** – Andhra Pradesh, Assam, Darjiling, Goa, Himachal Pradesh, Jammu-Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Sikkim, Tamil Nadu, Tripura.

**Maharashtra** – Throughout Maharashtra.

**Satara** – Mahabaleshwar, Satara, Patan, Panchgani, Wai, Khatav, Man, Karad, Khandala.

**ECOLOGY:** Very commonly found in all over the district where the rainfall is 200mm per year hence called as xerophytic fern. It was collected on the old walls, rocks, and along the roadside.

**Pteris venusta** Kunze, Bot. Zeit. 6: 195. (1848); Tardieu & C. Chr., Fl. Indo-Chine 7(2): 145. 1940; Holttum, Dansk Bot. Ark. 23: 236. (1965); Tagawa & K. Iwats., Fl. Thailand 3: 256. (1985); Newman *et al.*, Checkl. Vasc. Pl. Lao PDR: 31. (2007).

**DISTRIBUTION:** **World** – Nepal, Bhutan, Bangladesh, Myanmar, Indochina, Taiwan, Malaya Island, Java.

**India** – Eastern India, Maharashtra, Southern India, Andaman and Nicobar Island.

**Maharashtra** – Kolhapur, Satara.

**Satara** – Patan, Kas.

**ECOLOGY:** Usually found on mountain slopes in deep shade or in humus-rich ground in very dense forest between 500 – 1200m. The species is associated with *Tectaria*, *Athyrium* and *Pteris* species like *P. biaurita* and *P. vittata*.

**Pteris pellucida** C. Presl. Reliq. Haenk. 1. 55. 1825. HB. 154. (1825); Beddome, Ferns S. Ind., 11 – 13 (1862); Manickum & Irudayaraj, S. Ind. Pterido., 95 (1992); Ghosh Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 103 – 104, 574 (2008).

**DISTRIBUTION:** **India** - S-India, C-India, Kumaon, West Bengal, Sikkim, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Tripura.

**Maharashtra** – Sindhudurg, Ratnagiri, Kolhapur, Raigad, Pune, Satara, Nasik, Bhandar.

**Satara** – Karad, Patan, Kas, Jaoli, Mahabaleshwar, Panchagani, Pratapgad, Wai, Khandala.

**ECOLOGY:** Common terrestrial fern collected from Western Ghats regions of Satara District at low altitude 500 – 1100m. Normally growing on hill – slopes under thick shade of tree.

**Pteris linearis** Poir. Encycl. [J. Lamarck & al.] 5: 723 (1804); Manickum & Irudayaraj, Pterid. Fl. W. Ghats S. Ind. 80 (1992); Manickum & Irudayaraj, Fern Fl. Nilgiris S. Ind., 86 (2003); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 114 -115 (2008). **Type** – Mauritius.

**DISTRIBUTION:** **India** – Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala, Madhya Pradesh.

**Maharashtra** – Satara

**Satara** – Mahabaleshwar, Patan, Jaoli.

**ECOLOGY:** Rare species collected from Patan hills, Mahabaleshwar Hills, Wai Hills and Kas Plateau. It

was associated with *Tectaria*, *Cheilanthes*, *Athyrium*, *Adiantum* and *Pteris*.

***Pteris blumeana*** J. Agardh, Recens. Spec. Pter.: 22 (1839); Tardieu & C.Chr., Fl. Indo-Chine 7(2): 157. 1940; Ghosh *et al.*, Pterido.Fl.Est. Ind. Vol. 1: 353 (2004); Jenkins, Taxo. Rev. Three Hund. Ind. Subco.Pteri.Revis.Cens. 106 – 107 (2008). **Type** – China, Yunnan.

**DISTRIBUTION: India** – West Bengal, Rajasthan, Karnataka, Maharashtra, Kerala, Tamil Nadu.

**Maharashtra** – Kolhapur, Satara.

**Satara**- Patan, Panchgani, Mahabaleshwar, Jaoli.

**ECOLOGY:** Usually found on mountain slopes in deep shade or on humus-rich ground in very dense forest between 500 – 1200m. The species is associated with *Tectaria*, *Athyrium*, *Pteris* species like *P. biaurita*, *P. paluocida*, and *P. vittata*.

***Pteris biaurita*** L. Sp. Pl. 2: 1076 (1753); Clarke in Trans. Linn. Soc. Lond. II Bot. 1: 469 (1880); Manickum & Irudayaraj, Pterid. Fl. W. Ghats – S. Ind. (1992); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid. (2008).

**DISTRIBUTION: India** – Throughout.

**Maharashtra** – Sindhudurg, Ratnagiri, Kolhapur, Satara, Pune, Mumbai, Nasik, Thane.

**Satara** – Karad, Patan, Khandala, Wai, Jaoli, Mahabaleshwar, Pratapgad.

**ECOLOGY:** It is the common fern, found in almost all the hilly region of Satara district. It is usually associated with *Pteris linearis* from which it can hardly identify in the field.

***Cheilanthes tenuifolia* (Burm. f.) Sw.**, Syn. Fili. 129, 332 (1806); Manickum & Irudayaraj, Pterid. Fl. W. Ghats – S. Ind. (1992); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid. (2008).

**DISTRIBUTION: India** – West Bengal, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland, Mizoram, Manipur, Tripura, Assam, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Throughout Western Ghats of Maharashtra.

**Satara** – Patan, Mahabaleshwar, Panchagani.

**ECOLOGY:** Occasional on the hills slopes of Patan, Mahabaleshwar and Panchagani.

***Aleuritopteris rufa*** (D.Don) Ching. Hong Kong Naturalist 10: 200. (1941); Ghosh *et al.*, Pterid. Fl. E. Ind. 393 (2004); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont.Pterid., 566 (2008).

**DISTRIBUTION:World** – China, Nepal, India.

**India** – West Bengal, Manipur, Sikkim, Meghalaya, Arunachal Pradesh, Maharashtra.

**Maharashtra** – Thane, Satara.

**Satara** –Wai, Panchagani, Jaoli, Kas.

**ECOLOGY:** Uncommon species collected on old walls or along the roadsides between 800–1400 m.

***Aleuritopteris albomarginata*** (C.B.Clarke) Ching. Hong Kong Naturalist 10: 109 (1941). Ghosh *et al.*, Pterid. Fl. E. Ind., 401 – 402 (2004); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 126 (2008). **Type** – India.

**DISTRIBUTION: World** - Meghalaya, Nagaland, Manipur, Arunachal Pradesh, West Bengal, Sikkim, Manipur, Mizoram, Maharashtra, Karnataka, Kerala.

**Maharashtra** – Sahyadri, Melghats, Kolhapur, Satara.

**Satara** – Kas, Panchagani, Mahabaleshwar.

**ECOLOGY:** Common terrestrial or lithophytic fern collected between 500 -1200 m.

***Aleuritopteris anceps*** Blanford, J. Simla Naturalists Soc. 1 (2): 21 (1886); Hope in J. Bombay Nat. Hist. Soc., 13(2): 249 (1900); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont.Pterid., 526 (2008). **Type** - India

**DISTRIBUTION: India** – Sikkim, Meghalaya, Arunachal Pradesh, Assam, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Satara, Kolhapur, Pune.

**Satara** – Patan, Mahabaleshwar, Jaoli.

**ECOLOGY:** Occasionally on Jaoli hills along the roadside between 800 – 1200 m.

***Aleuritopteris bicolor*** (Roxb.) Fraser-Jenk. Fern Gaz. 18(5): 223 (2009); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Pterid.565 (2008).

**DISTRIBUTION: India** – Arunachal Pradesh, Nagaland, Sikkim, Meghalaya, Mizoram, West Bengal, Manipur, Tripura, Assam, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Throughout Maharashtra.

**Satara** – Patan, Mahabaleshwar, Wai, Karad, Satara, Khandal, Jaoli.

**ECOLOGY:** Very common throughout the area collected along the roadsides between 300 – 1400 m.

## Family – Hemionitidaceae

***Pityrogramma calomelanos*** (L.) Link, Handbuch 3: 20. 1833; Holttum, Rev. Fl. Malaya ed. 1, 2: 593, f. 348.1955 [‘1954’]; Tagawa & K. Iwats., South E. Asian Stud. 3(3): 88. 1965; Manickum & Irudayaraj, Pterid. Fl. W. Ghats – S. Ind., 94 (1992); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid.361, 571 (2008).

**DISTRIBUTION: India** – Meghalaya, Sikkim, West Bengal, Arunachal Pradesh, Nagaland, Mizoram, Manipur, Madhya Pradesh, Tripura, Assam, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Throughout Maharashtra.

**Satara** – Patan, Mahabaleshwar, Wai, Karad, Satara, Khandal, Jaoli, Khatav, Phaltan, Man.

**ECOLOGY:** Very common throughout the area collected along the roadsides between 300–1400 m.

### Family – Adiantaceae

***Adiantum incisum*** Forssk., Fl. Aegypt.-Arab. 187 (1775); Beddome, Ferns S. Ind., 1 (1970); Almedia, Cont. Stu. Vas. Pl. Mah. Rev. Pterido., 140, 1972; Manickum & Irudayaraj, S. Ind. Pterido., 95, 1994. **Type** - Yemen.

**DISTRIBUTION: India** – West Bengal, Sikkim, Meghalaya, Arunachal Pradesh, Nagaland, Mizoram, Manipur, Tripura, Assam, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Throughout Maharashtra.

**Satara** – Patan, Mahabaleshwar, Wai, Karad, Satara, Khandal, Jaoli.

**ECOLOGY:** Common fern found in Khandal Ghats, Karad, Patan, Wai, Mahabaleshwar on roadside wetted rocks between 400 – 1300m.

***Adiantum caudatum*** L. Mant. 308 (1771). Beddome, Ferns S. Ind., 1 (1970); Almedia, Cont. Stu. Vas. Pl. Mah. Rev. Pterido., 140, 1972; Manickum & Irudayaraj, S. Ind. Pterido., 95 (1994). **Type** – India.

**DISTRIBUTION: World** – India, Nepal, China, Sri Lanka, Malesia, Africa.

**India** – Throughout.

**Maharashtra** – Marathwada, Vidharb, Konkan, Kolhapur, Satara.

**Satara** – Patan, Mahabaleswar, Wai, Panchgani.

**ECOLOGY:** Common fern found on wet rocks, walls or soil along the roadsides between 400–1000m.

***Adiantum philippense*** L., Sp. Pl. 2: 1094. 1753; Beddome, Ferns S. Ind., 1 (1970); Almedia, Cont. Stu. Vas. Pl. Mah. Rev. Pterido., 140, 1972; Manickum & Irudayaraj, S. Ind. Pterido., 95 (1994). **Type** – Phillipines.

**DISTRIBUTION: India** - Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, E-India, S-India, C-India, Rajasthan, Andamans.

**Maharashtra** – throughout.

**Satara** – throughout.

**ECOLOGY:** this is a common monsoon fern, found all over Western Ghats of Maharashtra.

***Adiantum poiretii*** Wikstr. Kongl. Vetensk. Acad. Handl. 1825. 443 (1826); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid. 578 (2008). **Type** – Tristan Da Cunha.

**DISTRIBUTION: India**- Maharashtra, Southern India.

**Maharashtra** – Satara.

**Satara** – Panchgani.

**ECOLOGY:** Rare fern found on wet rocks or wall near road side at altitude 1000m. It is associated with *Cheilanthes rufa* D. Don., *Microsorium membranaceum* (D. Don) Ching., *Hypodematium crenatum* (Forsk.) Kuhn.

***Adiantum raddianum*** C. Presl. Tent. Pterid. 158. 1836; Beddome, Ferns S. Ind., 1 (1970); Almedia, Cont. Stu. Vas. Pl. Mah. Rev. Pterido., 140, 1972; Manickum & Irudayaraj, S. Ind. Pterido., 95, 1994.

**Type** – Brazil.

**DISTRIBUTION: India** - Darjeeling, Tamil Nadu, Kerala, Assam, Karnataka, Maharashtra.

**Maharashtra** – Kolhapur, Sindudurg, Ratnagiri, Satara, Pune.

**Satara** – Patan, Mahabaleshwar, Panchgani.

**ECOLOGY:** Common fern, growing in wet soil or rocks, rarely on walls. The altitude range varies from 600 – 1000 m.

***Adiantum capillus-veneris*** L. Sp. Pl. 2: 1096, 1753; Beddome, Ferns S. Ind., 1 (1970); Almedia, Cont. Stu. Vas. Pl. Mah. Rev. Pterido., 140, 1972; Manickum & Irudayaraj, S. Ind. Pterido., 95, 1994. **Type** - **United States**, Holmiea.

**DISTRIBUTION: India** – Sikkim, Assam, Arunachal Pradesh, Meghalaya, West Bengal, Manipur, Mizoram, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Poona, Satara, Kolhapur.

**Satara** – Patan, Mahabaleshwar, Panchgani.

**ECOLOGY:** It is common fern, found on wet or sleepy calcareous rock, rarely found on wet soil. The altitude range varies from 700 -1400m.

### Family – Hymenophyllaceae

***Crepidomanes latealatum*** (Bosch) Copel. Philipp. J. Sci. 67: 60. 1938;

**Distribution: India** – North India viz. Manipur, Meghalaya, Assam, West Bengal, Maharashtra, Kolli hills, Shevaroy hills.

**Maharashtra** – Satara

**Satara** - Patan

**Ecology:** Rare, an epiphytic fern found on mossy tree trunks or on mossy rocks in moist dense forest at an altitude 1050 m.

### Family - Lindsaceae

***Lindsaea ensifolia*** Sw., Schrad. J. Bot. 1800 (2): 77 (1801); Clarke, Linn. Soc. II Bot. 1: 452 (1880); Almedia, M. R., Rev. Pterid. Bomb., 187 – 189 (1972); Dixit, Cens. Ind. Pterid. 99 (1984); Manickum & Irudayaraj 124 – 125 (1992). **Type** - Mauritius.

**DISTRIBUTION: India** – Sikkim, Assam, Arunachal Pradesh, Meghalaya, Manipur, West Bengal, Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Sindhudurg, Ratnagiri, Kolhapur, Satara, Pune, Nasik.

**Satara** – Patan, Mahabaleshwar, Pratapgad.

**ECOLOGY:** it is growing along the hills slopes or cutting edges of slopes or hills.



***Lendsia heterophylla*** Dryand. Trans. Linn. Soc. London 3: 41, t. 8, f. 1 (1797)4); Beddome, Ferns S. Ind., 70 t. 206 (1864); Handb. Fern Br. Ind. 77 (1883); Almedia, M. R., Rev. Pterid. Bomb., 187 – 189 (1972). **Type** - Malacca

**DISTRIBUTION:** **India** – Arunachal Pradesh, Sikkim, Assam, Maharashtra, Karnataka, Goa, Tamil Nadu, Kerala.

**Maharashtra** – Sindhudurg, Kolhapur, Satara, Pune.

**Satara** – Patan, Kas, Mahabaleshwar.

**ECOLOGY:** It was collected from Hills between 800 – 1200 m.

### Family – Thelypteridaceae

***Christella dentata*** (Forssk.) Brownsey & Jermy., Brit. Fern Gaz. 10: 338 (1973); Brownsey & Jermy, Brit. Fern Gaz. 10: 338 (1973); Holttum in J.S. Afr. Bot. 40: 143 (1974) & in K.B. 31: 314 (1976); Schelpe & Diniz, Fl. Moçamb. Pterid. 209 (1979); **Type:** Yemen.

**DISTRIBUTION:** **World** – Australia, New Guinea, China, Taiwan, Japan, Korea, Philippines, Vietnam, Burma, Sri Lanka, Thailand, Laos, India, Nepal, Malaysia, Singapore.

**India** - Arunachal Pradesh, Assam, Manipur, Mizoram, West Bengal, Maharashtra, Goa, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Pune, Satara, Sangli, Nasik, Thane.

**Satara** – Karad, Patan, Kas, Panchagani, Jaoli, Mahabaleshwar, Pratapgad, Khandala.

**ECOLOGY:** It is a very common fern found along the roadside at an altitude 400 – 1300 m.

***Christella parasitica*** (L.) Holttum., Kew Bull. 31(2): 309 309 (1975); Manickum & Irudayaraj, Pterid. Fl. W. Ghats. S. Ind., 195 – 196 (1992); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 192 (2008).

**DISTRIBUTION:** **India** - West Bengal, Arunachal Pradesh, Mizoram, Goa, Karnataka, Manipur, Maharashtra, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Pune Satara, Sangali, Nasik, Thane.

**Satara** – Karad, Patan, Kas, Mahabaleshwar, Khandala.

**ECOLOGY:** Common fern collected at an altitude 500 – 1300 m and associated with ferns like *Pteris biaurita*, *Pityrogramma calomelanos* and *Cheilanthe bicolor*.

### Family – Aspleniaceae

***Asplenium inaequilaterale*** Willd in L., Sp. Pl., ed. 4, 5: 322.1810; Sledge, Bull. Brit. Mus. Nat. Hist. (Bot.) 3, 6: 252. 1965;

**DISTRIBUTION:** **World** - S. Africa, Mascarenes, S. India and Sri Lanka.

**India** – Maharashtra, Karnataka, Kerala.

**Maharashtra** – Satara.

**Satara** – Patan.

**ECOLOGY:** On rocks in streams at 1000 m altitude.

***Asplenium polyodon*** G. Forst., Fl. Ins. Austr.: 80. 1786; Parris & Latiff, Malayan Nat. J. 50: 241. 1997; Manickum & Irudayaraj, Pterid. Fl. W. Ghats – S. Ind., (1992); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., (2008).

**DISTRIBUTION:** **India:** – Arunachal Pradesh, Manipur, Maharashtra, Tamil Nadu, Kerala.

**Maharashtra** – Satara.

**Satara** – Jaoli.

**ECOLOGY:** epiphytic on mossy tree-trunks or lithophytic on moist rocks in dense forests at altitudes above 900 m, sometimes lithophytic in moss on rocks.

***Asplenium yoshinagae*** Makino, Phan. Pterid. Jap. Icon. 1: pl. 64. 1900;

**DISTRIBUTION:** **India** – Assam, Arunachal Pradesh, Manipur, Maharashtra, Karnataka, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Satara, Pune, Nasik.

**Satara** – Patan, Mahabaleshwar, Wai, Mahabaleshwar, Jaoli, Khandala, Kas.

**ECOLOGY:** Usually epiphytic on mossy tree-trunks in dense forests at altitudes above 800 m, sometimes lithophytic in moss on rocks.

***Asplenium decrescens*** Kunze Linnaea 24: 261 (1851); Dixit Cens. Ind. Pterido., (1984); Manickam and Irudayaraj, Pterid. Fl. W. G. – S. Ind., (1992); Fraser – Jenkins, Tax. Rev. thr. Hund. Ind. Subcont. Pterid. Revi. Cens. (2008).

**DISTRIBUTION:** **India** – Assam, Arunachal Pradesh, Manipur, Maharashtra, Karnataka, Tamil Nadu, Kerala.

**Maharashtra**– Satara, Pune.

**Satara** – Patan, Mahabaleshwar, Wai, Mahabaleshwar, Jaoli, Khandala, Kas.

**ECOLOGY:** Epiphytic on mossy tree-trunks in dense forests or along the roadsides at altitudes above 800 m, sometimes lithophytic in moss on rocks.

### Family – Woodsiaceae

***Hypodematium crenatum*** subsp. ***crenatum*** (Forssk.) Kuhn., Disk. Reis. Bot. 3(3): 37, f. a 37 (1879); Beddome, Hand b. 62 (1974); Dixit Cens. Ind. Pterido.137 (1984); Manickam and Irudayaraj, Pterid. Fl. W. G. – S. Ind., 254 – 255 (1992); Fraser – Jenkins, Tax. Rev. thr. Hund. Ind. Subcont. Pterid. Revi. Cens. (2008). **Type** – Egypt.

**DISTRIBUTION:** **India** - Jammu & Kashmir, Himachal Pradesh, Meghalaya Uttar Pradesh, Sikkim, Darjeeling, Arunachal Pradesh, Rajasthan, Maharashtra, Karnataka, Kerala, Tamil Nadu.

**ECOLOGY:** Globally it is in threatened category but in Satara district it is common species on the hill slopes, along the roadsides and also collected on old walls in between 600 – 1500 m.

*Hypodematium crenatum* subsp. *loylii* Fras. – Jenk & Khullar, Bot. Helvetica 102 (2): 146 (1992); Kumar *et al.* Ind. Fern Jour. 26: 192 – 195 (2009).  
**Type** – India.

**DISTRIBUTION:** **India** – Jammu & Kashmir, Arunachal Pradesh, Sikkim, Himachal Pradesh, West Bengal, Rajasthan, Madhya Pradesh, Kerala, Tamil Nadu, Maharashtra.

**Maharashtra** – Satara.

**Satara** – Satara city, Kas road.

**ECOLOGY**– very rare species, growing on rock crevices at 800 – 900 m.

*Athyrium falcatum* Bedd. Ferns S. Ind. t. 151 (1863); Manickam and Irudayaraj, Pterid. Fl. W. Ghats – S. Ind., 4 (1992); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid. 601 (2008). **Type** – India.

**DISTRIBUTION:** **India** – Uttar Pradesh, Meghalaya, Tripura, Mizoram, Orissa, Parasnath Hills, Madhya Pradesh, Rajasthan, Western Ghats, Mahabaleswar, Kerala.

**Maharashtra** – Satara, Khandala, Matheran, Lonavala, Purandar.

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** Terrestrial or lithophytes growing on rocks along the shaded roadsides collected between 400 to 1300 m.

*Athyrium anisopterum* Christ, Bull. Herb. Boiss. 6: 962.1898; Tagawa & K. Iwats., Acta Phytotax. Geobot. 23: 116, f. 12.1968; Boonkerd & Pollawatn, Pterid. Thailand: 188. 2000; Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid.601 (2008). **Type** - China: Yunnan.

**DISTRIBUTION:** **India** –Himachal Pradesh, Uttar Pradesh, Sikkim, Darjeeling, Arunachal Pradesh, Assam, Maharashtra, Tamil Nadu, Kerala.

**Maharashtra** – Satara.

**Satara** – Patan, Mahabaleshwar, Panchgani.

**ECOLOGY:** It was collected along the roadside or hilly slope.

*Athyrium hohenackerianum* (Kunze) T. Moore., Index Fil. XLIX (1857); Manickam and Irudayaraj, Pterid. Fl. W. Ghats, 233 – 234. 1992.

**DISTRIBUTION:** **World** – India and Sri Lanka.

**India** – Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Satara, Pune.

**Satara** – Patan, Karad, Kas, Panchgani, Wai, Mahabaleshwar, Khandala, Jaoli.

**ECOLOGY:** Terrestrial or Lithophytes on rocks along the shaded roadsides at low to high altitude species.

*Athyrium pectinatum* (Wall. ex Mett.) T. Moore, Index Fil. (T. Moore) 2: 186 (1860); Beddome, Handb. Ferns Brit. Ind. 169 (1883); Blatterd' Almedia, Ferns Bomb. 114 (1922); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont.Pterid.602 (2008).

**Distribution:** **India** – Maharashtra, Kerala.

**Maharashtra** – Satara, Pune.

Satara – Patan, Wai, Panchgani, Mahabaleshwar, Kas, Jaoli.

**ECOLOGY:** It was collected from Kats Point Mahabaleshwar at an altitude of 1200– 1300 m.

*Athyrium solenopteris* (Kunze) T. Moore, Ind. Fil.187 (1857); Sledge, Bull. Br. Mus. Nat. Hist. Bot. 2: 287 (1962); Dixit, Cens. Ind. Pterid. 129 (1984); Manickum, fern Fl. Palni. Hills, 112 (1986); Frezer Jenkins, Taxa. Rev. Ind. Subcont. Pterid. 208 – 209 (2008).

**DISTRIBUTION:** **India** – Tamil Nadu, Kerala, Maharashtra.

**Maharashtra** – Satara.

**Satara** – Patan and Mahabaleshwar.

**ECOLOGY:** Terrestrial fern found along the roadside or along the water channel in between 700 – 1200 m.

#### Family – Dryopteridaceae

*Dryopteris cochleata* (Buch. Ham. ex D. Don) C. Chr. Index Filic. 5: 258.1905; Manickum & Irudayaraj, Pterid. Fl. W. Ghats – S. Ind., 280 (1992); Pullaiah *et al.* pterid. A. P. Ind., 136 – 137 (2003); Manickum & Irudayaraj, Pterid. Fl. Nili. S. Ind., 149 (2003); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid.302 (2008).

**DISTRIBUTION:** **World** – India, Sri Lanka.

**India** – Tamil Nadu, Kerala, Maharashtra.

**Maharashtra** – Satara.

**Satara** – Patan and Mahabaleshwar.

**ECOLOGY:** Terrestrial fern found along the roadside or along the water channel in between 700 – 1200 m.

*Dryopteris sparsa* (Buch. Ham. ex D. Don) Kuntze; Manickum & Irudayaraj, Pterid. Fl. Nili. S. Ind., 149 (2003); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid. 302 (2008).

**DISTRIBUTION:** **India** – Tamil Nadu, Kerala, Maharashtra.

**Maharashtra** – Satara.

**Satara** – Mahabaleshwar.

**ECOLOGY:** Terrestrial fern found along the water channel in between 700 – 1200 m.

*Tectaria paradoxa* (Fee) Sledge, Kew Bull. 27:413. 1972 (1972); Manickum & Irudayaraj, Pterid. Fl. W. G. S. Ind., 255 – 257 (1992); Fraser – Jenkins, Rev. Three Hund. Ind. Subcont. Pterid. 626 (2008).

**DISTRIBUTION:** **India** – Kerala and Maharashtra.  
**Maharashtra** – Satara.  
**Satara** – Patan.

**ECOLOGY:** Terrestrial plant collected between altitudes ranges from 1000 – 1300 m growing along the roadside.

**Tectaria coadunata** (Wall. ex Hook. & Grev.) C. Chr., Contr. U.S. Natl. Herb., 26(6): 331. (1931). Manickum & Irudayaraj, Pterid. Fl. W. G. S. Ind., 255 – 257 (1992); Fraser – Jenkins, Rev. Three Hund. Ind. Subcont. Pterid. 626 (2008).

**DISTRIBUTION:** **India** – Maharashtra, Goa, Karnataka, Andra Pradesh, Tamil Nadu, Kerala.

**ECOLOGY:** Common fern, frequently found along the roadside or in the forest floor at above 200 m.

### Family – Lomariopsidaceae

**Bolbitis appendiculata var. asplenifolia** (Bory) Sledge, Bot. J. Linn. Soc. 84: 19 (1982); Hennipman, Leiden Bot. Ser. 2: 202, f. 53 & 54.1977; Holttum, Fl. Males., Ser. II, Pterid.1: 325, f. 27h. 1978; Manickam & Irudayaraj, Pterid. Fl. West Ghats 293 (1992); Fraser Jenkins, Tax. Rev. three Hund. Ind. Subcont. Pterid. 629 (2008).

**DISTRIBUTION** – **India** – Arunachal Pradesh, Assam, Nagaland, Maharashtra, Karnataka, Kerala, Tamil Nadu.

**Maharashtra** – Kolhapur, Sindhudurg, Satara, Pune.

**Satara** – Patan, Mahabaleshwar, Pratapgad.

**ECOLOGY:** it is a lithophytes or occasionally terrestrial fern, along the rocks present in streams at altitude between 800 – 1500 m.

**Bolbitis presliana** (Fee) Ching. Ind. Fil. Suppl. 3: 49 (1934); Copel., Fern. Fl. Philip. 260 pp. (1960); Hennipm., Leiden Bot. & er 2: 272 (1977); Dixit, Census 162 (1984); Nayar & Geevarghese, Fern Fl. Malbar 237 (1993); Irudayaraj & Bir., Indian Fern J. 14: 114 (1997). **Type** – India.

**DISTRIBUTION:** **World** – India.

**India** – South India.

**Maharashtra** – Patan.

**ECOLOGY:** Found on the stream rocks or river edge rock beds at above 500m, submerged during rainy season.

**Bolbitis X prolifera** (Bory) C. Chr. & Tardieu-Blot, Not. Syst. 7: 120 (1938); Hennipman, Mpnprgr. Fern. Gen. *Bolbitis*, 295, fig. 84 j-m (1977); Chandra & Kaur, Nom., Guide Beddome F. S. I. & F. B. I, 24 (1987); Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind.295 – 296 (1992); Fraser – Jenkins, Rev. Three Hund. Ind. Subcont. Pterido. (2007).

**DISTRIBUTION:** **World** – India.

**India** – South India, Maharashtra

**Maharashtra** – Patan.

**ECOLOGY:** Found on the stream rocks or river edge rock beds at above 500m.

**Bolbitis semicordata** Ching in C. Chr. Nat. Bot. Gard. Index Filic., Suppl. 3: 50 (1934); Nayar & Kaur, Bull. Nat. Bot. Gard. Lucknow, 88: 57 fig. 22, 36, 90 (1964); Hennipman, Mongr. Fern Genus *Bolbitis* 167, fig. 43 e – j (1977); Manickum & Irudayaraj, Pterid. Fl. W. G. S. Ind. 296 – 297 (1992).

**DISTRIBUTION:** **World** – India.

**India** – South India, Maharashtra.

**Maharashtra** – Patan.

**ECOLOGY:** Found along the stream or river edge rock beds at above 500m,

**Bolbitis virens** (Wall. ex Hook. & Grev.) Schott, Gen. Fil.: ad t. 14 (1834); Hennipman, Blumea 18: 149 (1970); Hennipman, Leiden Bot. Ser. 2: 180, f. 47 & 48 (1977); Fraser – Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid. 630 (2008).

**DISTRIBUTION:** **India** – Arunachal Pradesh, Assam, Meghalaya, Maharashtra, Kerala.

**Maharashtra** – Kolhapur, Satara, Sindhudurg, Pune.

**Bolbitis subcrenatooides** Fras. – Jenk., Tax. Rev. Three Hund. Ind. Subcont. Pterid., 346 (2008).

**Type** – India.

**Distribution:** World – India.

**India** – Maharashtra, Kerala, Karnataka.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Satara, Pune.

**Satara** – Patan, Mahabaleshwar.

### Family: Davalliaceae

**Araiostegia pulchra** (D. Don) Copel. Philipp. J. Sci. 34: 241 (1927); Mehra & Bir, Res. Bull. Panjab Univ., (n. s.), 15, 119 (1964); Manickum, Fern Fl. Palni Hills, 55 (1986); Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind. 135 – 136 (1992); Fraser Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 348 (2008). **Type** – China.

**DISTRIBUTION:** **India** - Himachal Pradesh, Uttar Pradesh, Arunachal Pradesh, Meghalaya, Jammu & Kashmir, Sikkim, Assam, Maharashtra, Karnataka, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Sindhudurg, Ratnagiri, Satara, Pune, Nasik.

**ECOLOGY:** Very common epiphyte, collected in deep forest regions in Patan, Kas, Mahabaleshwar and Jaoli.

**Leucostegia truncata** Frazer Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 348 – 357 (2007). **Type:** Nepal.

**DISTRIBUTION:** **India** – North East Himalaya, Maharashtra, Karnataka, Kerala, Tamil Nadu.

**Maharashtra** – Pune, Satara.

**Satara** – Mahabaleshwar.

**ECOLOGY:** Rare, an epiphytic fern collected from the deep forest of Mahabaleshwar between 1200 – 1400 m altitude range only.

#### Family – Oleandraceae

*Nephrolepis cordifolia* (L.) Presl., Tent. Pterid., 79 (1836) & in Abh. Königl. Böhm. Ges. Wiss., ser. 4, 5: 79 (1836); Beddome, S. Ind. Fern, 32 – 33 (1970).

**Type:** Hispaniola.

**DISTRIBUTION:** India - Uttar Pradesh, NE-India, S-India.

**ECOLOGY:** Very common terrestrial fern collected along the roadside.

*Nephrolepis exaltata* (L.) Schott. Gen. Fil. [Schott] t. 3 (1834); HB. 301. Chr. 289. NPfl. 207 (1834).

**Type:** Sloane.

**DISTRIBUTION:** India – North East Himalaya, Maharashtra, Karnataka, Tamil Nadu, Kerala.

Maharashtra – Cultivated as garden fern.

**ECOLOGY:** Common terrestrial fern collected from at an altitude 600 m.

*Nephrolepis undulata* (Afzel.) J.Sm., Bot. Mag. 72: 35 (1845); Frazer Jenkins, Taxa. Rev. Three Hund. Ind Subcont. Pterid., (2007). **Type:** Sierra Leone.

**DISTRIBUTION:** India – Maharashtra, Karnataka.

**Maharashtra** – Kolhapur, Satara, Sindhudurg, Ratnagiri.

**Satara** – Patan, Mahabaleshwar.

**ECOLOGY:** common epiphyte on the trees like *Ficus* sp., *Mangifera indica*. and *Terminalia* sp.

#### Family: Blachnaceae

*Blechnum orientale* L., Sp. Pl. 1077. 1753; Bedd., Handb. Ferns Brit. India: 132, f. 66. 1883; Christ, Bot. Tardieu & C.Chr., Fl. Indo-Chine 7(2): 207, f. 26.1 & 26.2 1940; Tagawa & K.Iwats., Fl. Thailand 3: 298. 1988; Manickum & Irudayaraj, Pterid. Fl. W. G. – S. Ind., (1992); Frazer Jenkins, Taxa. Rev. Three Hund. Ind Subcont. Pterid., 356 (2007). **Type** – America.

**DISTRIBUTION:** India – Himachal Pradesh, Uttar Pradesh, Sikkim, Darjeeling, Meghalaya, Arunachal Pradesh, C-India, S-India, Nicobars, Andamans.

**Maharashtra** – Kolhapur, Satara, Bhandara, Sindhudurg, Ratnagiri, Pune, Nasik.

**Satara** – Patan, Mahabaleshwar, Kas, Pratapgad.

**ECOLOGY:** Pteridophytes, collected from roadside or along the edges of streams or in deep forest between 800 – 1300 m altitude range.

#### Family: Azollaceae

*Azolla pinnata* subsp. *asiatica* R.M.K. Saunders & K. Fowler. Bot. Jour. Linn. Soc. 109(3): 349–351 (1992); Ghosh *et al.*, Pterido. Fl. E. Ind. 1: 184 – 185

(2004); Frazer – Jenkins, Tax. Rev. Three Ind. Sub. Pterid. 358 – 359 (2008). **Type** – Australia.

**DISTRIBUTION:** India – West Bengal, Assam, Sikkim, Arunachal Pradesh, Meghalaya, Nagaland, Mizorum, Manipur, Tripura, Madya Pradesh, Andra Pradesh, Maharashtra, Goa, Karnataka, Tamil Nadu, Kerala.

**Maharashtra** – Sindhudurg, Kolhapur, Ratnagiri, Pune, Satara.

**Satara** – Patan, Khatav, Karad.

**ECOLOGY:** Free floating aquatic fern, collected from rice fields in Satara district. It was also collected from lakes during the rainy season along with submerged macrophytes. Used as biofertilizer in paddy fields.

#### Family: Salviniaceae

*Salvinia molesta* D. Mitch. Brit. Fern Gaz. 10: 251. (1972); Manickam and Irudayaraj. Pterid. Fl. W. G. – S. Ind., 343 – 44 (1994); Ghosh *et al.*, Pterido. Fl. E. Ind. 1: 179 (2004); Frazer Jenkins, Tax. Rev. Three Hund. Ind. Subcont. Pterid., 366 (2007). **Type** – Rhodesia.

**DISTRIBUTION:** India – Jammu & Kashmir, Himachal Pradesh, Uttar Pradesh, Agra, Bengal, Tripura, Maharashtra, Tamil Nadu, Kerala.

**Maharashtra** – Kolhapur, Pune, Satara.

**Satara** – Karad, Kas, Dahiwadi, Khatav.

**ECOLOGY:** It is one of the pollution indicator plants found mostly in polluted lakes. It was collected from small ponds in Khatav and Kirshna Rivier basin at Karad. Generally it was observed in higher content of Nitrogen and Phosphorous in water.

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#### Conflict of Interest

The authors have declared that there is no conflict of interest.

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