

Genus *Ophioglossum* L., from Western Part of India with Special Reference to Gujarat State

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Abstract

The genus *Ophioglossum* L. is revised for the Gujarat state and there were reported eight species viz. *Ophioglossum costatum* R. Br., *O. gramineum* Willd., *O. gujaratense* SM Patil, RN Kachhiyapatel, R Patel and KS Rajput, *O. lusitanicum* L., *O. reticulatum* L., *O. parvifolium* Grev. & Hook., *O. nudicaule* L. f. and *O. thermale* Kom., from different parts of the state. Amongst these, *Ophioglossum thermale* Kom. and *O. lusitanicum* L. were collected for the first time from Jambughoda Wildlife Sanctuary and this result is documented as a new distributional record for Gujarat state.

Keywords: eusporangiate; Gujarat state; Jambughoda wildlife sanctuary; pteridophytes

Introduction

Ophioglossum L. is a cosmopolitan genus of eusporangiate family Ophioglossaceae, which is mainly distributed in tropical and subtropics region of the world. About 45 species are reported from different region of the world, of which 13 species are reported from India (Patil and Dongare, 2014; Fraser-Jenkins *et al.*, 2017). Among these species, *Ophioglossum eliminatum* Khand. and Goswami and *O. indicum* B. L. Yadav and Goswami are endemic to India (Khandelwal and Goswami, 1984; Yadav and Goswami, 2010). Pteridophyte diversity including the taxonomy of genus *Ophioglossum* L., from Gujarat is poorly studied. About six species viz. *Ophioglossum costatum* R. Br., (*O. fibrosum* Schumach.), *O. gramineum* Willd., *O. nudicaule* L.f., *O. reticulatum* L., *O. valgatum* L. and *O. nudicaule* var. *macrorrhizum* (Kunze) R.T. Clausen were reported by Phatak *et al.* (1953), Chavan and Mehta (1956), Inamdar and Shah (1967), Panigrahi and Dixit (1969), Inamdar (1970) and Dixit (1984) and one unidentified species (most probably *Ophioglossum costatum* because its wide occurrence in Gujarat. However, recently Kachhiyapatel *et al.* (2015) and Rajput *et al.* (2016a, b) revised the pteridophytes flora of Gujarat state and confirmed 05 species viz. *Ophioglossum costatum* R. Br., *O. gramineum* Willd., *O. nudicaule* L. f., *O. parvifolium* Grev. & Hook. and *O. reticulatum* L., for state (excluding dubious species). Recently, Patil *et al.* (2018) published a new species

of *Ophioglossum*, *Ophioglossum gujaratense* from Gujarat.

During the study of genus *Ophioglossum* from different regions including forest areas of Gujarat authors have collected an interesting population of *Ophioglossum* L. from Jambughoda wild life sanctuary and its adjoining areas which is identified as *Ophioglossum lusitanicum* L. and *O. thermale* Kom. Therefore, both the species stand as new distribution records for Gujarat state.

Materials and Methods

Field studies were carried out regularly to different regions of the state including forest areas to collect the species of *Ophioglossum* L. The collected plant materials were processed under laboratory for the preparation of herbarium specimens. The specimens were identified with the help of relevant literature (Panigrahi and Dixit, 1969; Manickam and Irudayaraj, 1992; Patil, 2014; Fraser-Jenkins *et al.*, 2017). Voucher specimens were deposited in BARO herbarium of the Department of Botany, The Maharaja Sayajirao University of Baroda, Vadodara (Gujarat).

Results

About eight species viz. *Ophioglossum costatum* R. Br., *O. gramineum* Willd., *O. gujaratense* SM Patil, RN Kachhiyapatel, R Patel and KS Rajput, *O. lusitanicum* L., *O. reticulatum* L., *O. parvifolium* Grev. & Hook., *O. nudicaule*

L. f. and *O. thermale* Kom. were collected from different regions of Gujarat State. Amongst these, *O. lusitanicum* L., and *O. thermale* Kom. were reported as new distributional record for Gujarat state. All these species are growing luxuriantly with more than 200-300 individuals per locality. Along with key to species of Gujarat state, detailed description, distribution, ecology and conservation of each species is given herewith for its easy identification.

Key to species of Ophioglossum from Gujarat

- 1a. Sheathing leaf base present *O. gujaratense*
 1b. Sheathing leaf base absent 2
 2a. Rhizomorph globose..... *O. costatum*
 2b. Rhizomorph globose-subglobose 3
 3a. Trophophylls linear-lanceolate 4
 3b. Trophophylls not linear-lanceolate 5
 4a. Trophophylls stalked, grass like *O. gramineum*
 4b. Trophophylls neither stalked, nor grass like ... *O. lusitanicum*
 5a. Trophophylls more than 2 per rhizomorph 6
 5b. Trophophyll only one per rhizomorph *O. reticulatum*
 6a. Common stalk strictly subterranean *O. parvifolium*
 6b. Common stalk present subterranean-above the ground ... 7
 7a. Trophophylls elliptic-ovate or oblong *O. nudicaule*
 7b. Trophophylls elliptic-lanceolate *O. thermal*

Ophioglossum costatum R. Br., Prod. Fl. Nov. Holl. 163. 1810. Panigrahi and Dixit, Proc. Nat. Inst. Sci. India 35: 249. 1969; Patil and Dongare, Indian Fern J., 31: 17-24. 2014. (Fig. 1 A,E)

Type: Australia, Queensland, Arnhem North Bay, Brown 118.

Ophioglossum pedunculatum Desv., Mag. Nat. Fr. Berlin 5: 306. 1811.

Ophioglossum brevipe Bedd., Ferns. Southern India 23. t. 72. 1863.

Plants have more than 10 cm, pale-green, terrestrial, herb; *rhizomorph* disc like or globose, bearing numerous yellow-brown, fleshy, without stoloniferous roots; *common stalk* 2-3 cm, base white, apex pale green; *trophophylls* 1-4 simple, erect, elliptic-lanceolate, ovate-round or spatulate, apex acute-apiculate or obtuse-round, base cuneate-cordate, margin entire, thick fleshy, green when fresh, glabrous on both sides, coriaceous, midrib prominent; *fertile segment* grooved, unbranched, inserted on adaxial position of leaf; *strobili* 20-35 sporangia in two alternate rows, pale yellow, unbranched (rarely branched); *spores* 20-40 µm in diameter, trilete, feveolate.

Distribution: World: India, Bangladesh, Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, Africa and Australia.

India: Throughout

Gujarat: Throughout Gujarat state

Phenology: sterile phase -June-August; fertile phase: July (end)-September (rarely in October).

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

Conservation status: *Ophioglossum costatum* R. Br. is collected from throughout Gujarat state. A population of about 300-400 individuals per km² were found and the area of occupancy (AOO) is 100-200 km². Therefore, as per IUCN categories and criteria (IUCN ver. 2017-1), it is assessed as least concerned (LR) species for Gujarat state.

Specimen examined: INDIA-TAMIL NADU, Tirunelveli, way to Thulukkamparair, alt. 300 m, 06/09/1969, B. V. Shetty (MH62410); Tiruchirappalli, Narthamalai, alt. 333 m, 12/09/1958, K. Sulenamanyam (MH17577); KERALA-Idukki Dt., Pindimedu Pooyamkutty, Bhargavan (MH87404).

Ophioglossum gramineum Willd. Nov. Act. Acad. Erfurt. 2: 18. t. f. 1 (1802); Beddome, Handb. Suppl. Ferns Brit. India 108. 1892; Balakrishnan et al., Bull. Bot. Surv. India 2: 337 (1960); Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35: 250 (1969); Patil and Dongare, Indian Fern Journal 31:17-24. 2014.(Fig. 1 B, F)

Type: West Africa, St. Thomae, De Friedland B.

Ophioglossum clietrichiae Prantl, Ber. Deut. Bot. Ges. 1: 352 (1883)

Plants are terrestrial herbs, 2 - 4 cm long; *rhizomorph* subglobose-tuberous, subterranean, with fleshy roots; *common stalk* terranean, white-green; *trophophylls* 1-2, linear grass-like, apex acuminate, margin entire; *veins* anastomosing, forming parallel areoles; *fertile segment* pale green, flat-round, arising from the base of the sterile blade; *strobili* 5-8 pairs of sporangia, arranged in two alternate rows, pale green-yellow; *spores* 25-40 µm diam, trilete, exine reticulate.

Distribution: World - India, Indonesia, Malaysia, Myanmar, Philippense, East Borneo, East Java, New Guinea, Vietnam, Africa and Sri Lanka.

India: Throughout

Gujarat: Throughout

Phenology: sterile phase -June-August; fertile phase: July (end)-September (rarely in October)

Ecology: Common fern collected from grassy plateaus associated with *O. nudicaule*, *O. petiolatum* and *O. costatum*.

Conservation status: *Ophioglossum gramineum* Willd. is collected from open grassland habitats situated in Gujarat state. A population of about more than 2,000 individuals was found. The area of occupancy (AOO) is 200-300 km². Therefore, as per IUCN categories and criteria (IUCN ver. 2017-1), it is assessed as least concerned (LR) species for Gujarat state.

Specimen examined: INDIA - MAHARASHTRA: Kolhapur Dt., Shivaji University, campus, alt. 700 m., Patil S. S. (SUK); KARNATAKA: Belgaum Dt., Adi, alt. 800 m, Mahamuni R. J. (SUK); ANDHRA PRADESH: Karimnagar Dt., Aklaspur, Subbarao (MH20238).

Ophioglossum gujaratense SM Patil, RN Kachhiyapatel, R Patel, KS Rajput, Phytotaxa 351(4):273-280 (Fig. 1K, O).

Type: India, Gujarat, Panchmahal dt, Dhanpuri.

Plants herbaceous, less than 10 cm, terrestrial; *rhizomorph* subterranean, sub-globose when young and tuberoso on maturity, yellow-brown, with numerous fleshy roots; *common stalk* 0.5-1.5 cm long, subterranean, white, glabrous, covered with leaf sheath (brown or white); *common stalk* subterranean, white, covered with brown-white leaf sheath; *trophophylls* horizontal, touching to the ground, slightly convex from above, 0.5-2 cm long, 0.5-1.2 cm broad, 1-5 per rhizomorph, ovate-elliptic or elliptic-lanceolate, apex acute-acuminate and cuneate at base, margins entire, glabrous, tough, horizontally attached to substratum; *fertile segment* 2-8 cm long, round-flat, pale green-green, arising from base of leaf; *strobili* 0.5-2 cm long, apex acute-acuminate, green (young)-yellow (mature); *sporangia* 5-15, arranged in two alternate rows; *spores* trilete, exine verrucose, measuring 30-40 μm in diameter.

Distribution: India

India: Gujarat

Gujarat: Dhanpuri, Zand Hanuman, Shivrajpur

Phenology: *sterile phase* June-July; *fertile phase:* August-September

Ecology: The species is growing on hill slopes at 200-300 m asl, associated with *Ophioglossum costatum*, *O. parvifolium* and *O. reticulatum*.

Conservation status: *Ophioglossum gujaratense* is collected from a grassy hill slopes and flat land. A population of about 500-700 individuals/km² was found at each locality. Furthermore, we assume that the species might be dispersed in similar ecological conditions. Hence, more floristic explorations are needed to define and document the full range of distribution of *O. gujaratense*. Therefore, according to IUCN (2017 ver.-1) criteria, at present this species is considered as data deficient (DD).

Specimen examined: India – Gujarat, Panchmahal district, Jambughoda, Dhanpuri, 22°21.486'N 73°42.871'E, 124 m, 30th July 2017, S.M. Patil, R.N. Kachhiyapatel & K.S.Rajput 215 (BARO) BARO0070041.

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; Patil & Dongare, Indian Fern Journal 31:17-24, 2014 (Fig. 1 D, H).

Type: Portugal, "Habitat in Lusitania", not designated.

Plant small, terrestrial herb; *rhizomorph* subterranean, subglobose-tuberoso without stoloniferous fleshy roots; *common stalk* subterranean, white-brownish green; *trophophylls* 1-2, erect, red-brown-green, spathulate, linear-lanceolate or elliptic-lanceolate, acute-acuminate apex, cuneate-attenuate base, entire margin; *venation* simple reticulate; *fertile segment* round, unbranched, green-yellow brown; *strobili* 8-12 sporangia in two rows; *spores* 20-25 μm diam, trilete, exine reticulate.

Distribution: World – India, Algeria, Morocco, Portugal (Azores), Spain (Canary Is.), Tanzania, United Republic of Tunisia; Uganda

India: Andhra Pradesh, Assam, Bihar, Goa, Jammu-Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Tamil Nadu, Uttar Pradesh,

West Bengal.

Gujarat: Jambughoda, Zand Hanuman

Phenology: *sterile phase* June-August; *fertile phase:* July (end)-August (rarely September)

Ecology: Uncommon species, collected from grassy plateaus at Jambughoda and Zand Hanuman, associated with *O. costatum*, *O. nudicaule*, *O. parvifolium* and *O. reticulatum*.

Conservation status: *Ophioglossum lusitanicum* L. is collected from plateaus of Jambughoda and Zand Hanuman. A population of about more than 100-200 individuals was found. However, the area is poorly explored for the *Ophioglossum lusitanicum*. Therefore, it was assumed that the other population might be distributed around this area and more floristic explorations are needed to determine its full range distribution. At present the species should be considered as Data Deficient for now.

Specimen examined: India – Kerala, Trivandrum, forest between Thura and Bonasore, alt. 525 m, J. Joseph (MH90512); Maharashtra, Kolhapur dt. near Doodhsagar Dam, Radhanagari, 10/09/2013. SMP (2002).

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); Beddome Handb. 106 (1974); R.D. Dixit, Cens. Ind. Pterid. 23 (1984); Manickam & Irudayaraj, Pterid. Fl. West Ghats: 48-49. t. 27 (1992) (Fig. 1 L, P).

Type - South Africa, Cape of Good Hope.

Ophioglossum capense Sw., Schard. Journ. 1801(2): 308 (1803).

Ophioglossum ellipticum Hook. & Grev. Icon. Filic. t. 40 A (1828).

Ophioglossum lineare Schlechter et Brause, Bot. Jerb., 49: 59, fig. 3F (1912).

Ophioglossum luersseni Prantl, Ber. deut. Bot. Ger. 1: 352 (1883).

Plant terrestrial, 4-8 cm height; *rhizomorph* subglobose, bearing many soft fibrous roots; *common stalk* 0.5-1.5 cm, terranean, white-green; *trophophylls* 1-2 (rarely 3), 0.5-2 x 1-2 cm, green, touft ovate or elliptic, apex obtuse, base cuneate; *veins* reticulate, with free veinlets at margins; *fertile segment* 2-6 cm x 0.1-0.4 mm broad, green at young, yellow at maturity; *strobili* 1.5-2.5 cm long, with 10-20 sporangia per strobilus; *spores* 30-40 μm diam, trilete, with reticulate ornamentation.

Distribution: World – India, China, Indonesia; Malaysia; Thailand

India: Andhra Pradesh, Himachal Pradesh, Jammu-Kashmir, Gujarat, Jharkhand, Karnataka, Kerala, Maharashtra, Sikkim, Tamil Nadu, West Bengal.

Gujarat: Jambughoda, Zand Hanuman, Dang forest, Vansda, Waghai, Mahal, Don.

Phenology: *sterile phase* – June-August; *fertile phase:* August-September.

Ecology: Very common species grows in patches on fully exposed localities of open grassland associated with *Ophioglossum costatum*, *O. gramineum*, *O. parvifolium*, *O. thermale* and *O. reticulatum*.

Conservation status: *Ophioglossum nudicaule* L. f. is collected from open grasslands of Gujarat State of India. A population of about 200-400 individuals are found. The area of occupancy (AOO) is 100-200 km². Therefore, as per IUCN categories and criteria (IUCN ver. 2017-1), it is assessed as least concerned (LR) species for Gujarat state.

Specimen examined: INDIA – Madhya Pradesh, Hoshangabad Dist. Kesla, alt. 500 m, 22/07/1961, J. Joseph (MH25305); Tamil Nadu, Ramnad Dist., Erani forest, alt. 100 m., 19/08/1964, R. D. Dixit (MH39459).

Ophioglossum parvifolium Grev. & Hook. Bot. Misc. 3: 218, 1833; Patil and Dongare, Indian Fern Journal 31:17-24. 2014. (Fig. 1 J, N).

Type: India, Negapatam, Tamil Nadu.

O. nudicaule var. *macrorrhizum* (Kunze) Clausen, mem. Torrey Bot. Club, 19 (2): 150, 1938.

Plant less than 10 cm, terrestrial herbs; *rhizomorph* subterranean, subglobose-tuberous, bearing few fertile and sterile leaves at the apex; *common stalk* subterranean, white, glabrous; *trophophylls* 1-2, ovate-lanceolate, apex acute-apiculate, margin entire, base cordate; *veins* simple reticulate, four or five veins passing up through the stalk of the blade; *fertile segment* 2-4 cm long, round, pale green-green; *strobili* 0.5-1 cm long, 5-10 sporangia, arranged in two alternate rows; *spores* 25-45 µm diam, trilete, exine reticulate.

Distribution: World – India, China, South America, Sumatra, Malaysia, Thailand.

India: Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Rajasthan, Kerala, Tamil Nadu.

Gujarat: Throughout (except Kutchh region).

Phenology: *sterile phase* – June-August; *fertile phase:* July (end)-September

Ecology: Very common species grows in patches on fully exposed areas from low land to high land areas.

Conservation status: *Ophioglossum parvifolium* Grev. & Hook., is collected from different regions of Gujarat state (excluding Kutchh). A population of about 1,500-2,000 individuals were found. The area of occupancy (AOO) is 100-200 km². Therefore, as per IUCN categories and criteria (IUCN ver. 2017-1), it is assessed as least concerned (LR) species for Gujarat state.

Specimen examined: India – Maharashtra, Kolhapur Dt. Near Radhanagri Dam, 10/09/2013. SMP (2002); Maharashtra, Satara Dt. Kas Platue, 05/08/2014. SMP (2003).

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); Bedd., Handb. 107. 1974; R.D. Dixit, Cens. Ind. Pterid. 24 (1984); Manickam & Irudayaraj, Pterid. Fl. West Ghats: 51. t. 29 (1992); Patil and Dongare, Indian Fern Journal 31:17-24. 2014. (Fig. 1 I, M)

Type – Mauritius.

Ophioglossum peruvianum Presl, Suppl. Tent. Pterid 52. 1845.

Ophioglossum petiolatum sensu Wieffering, Blumea, 12: 327. 1964.

Ophioglossum cordifolium Roxb., Hort. Bengal, 75. 1814;

Plant terrestrial, 10-25 cm long; *rhizomorph* 3-7 mm long, tuberous, bearing few long, thick fleshy unbranched roots, with 1-2 trophophylls; common stalk 2-5 cm, terranean, white at base, green above; *trophophylls* 1 (rarely 2), 8-15 cm long, subterranean, cordate, broadly ovate, rarely elliptic-oblong or broadly ovate, apex rounded, base cordate to broadly cuneate; *veins* reticulate, several lateral veins passing to the base of the blade, the ultimate areoles with or without included free veinlets; *fertile segment* 12-17 cm. long, linear, lanceolate; *strobili* 0.5-1.5 mm, 20-25 pairs of sporangia, globose, sunken sporangia arranged in two alternate compact rows; *spores* 30-45 µm dia., spherical, trilete, exine hemispherical.

Distribution: World – India, Malay Peninsula, Tropical America, Africa, Philippines and Sri Lanka.

India – Andhra Pradesh, Gujarat, Kerala, Karnataka, Maharashtra, Madhya Pradesh, Panjab, Tamil Nadu, West Bengal.

Gujarat: Throughout the state (excluding Kutchh).

Phenology: *sterile phase* – June-August; *fertile phase:* August-October.

Ecology: Very common, found under beneath of trees in the forest or grassy plateaus along with *Ophioglossum costatum*, *O. gramineum*, *O. nudicaule*, *O. lusitanicum* and *O. parvifolium*.

Conservation status: *Ophioglossum reticulatum* L., is collected from open grasslands of Gujarat state. A population of about 500-600 individuals are found. The area of occupancy (AOO) is 100-200 km². Therefore, as per IUCN categories and criteria (IUCN ver. 2017-1), it is assessed as least concerned (LR) species for Gujarat state.

Specimen examined: India – Tamil Nadu, Tirunelveli, near Kanni forest rest house, alt. 800 m, 28/08/1963, A. N. Henry (MH39280); Courtallum, Barber (MH). Tiruchirappalli Dt., Lalgudi, Kondaiampatti, Subramanyan (MH7780).

Ophioglossum thermale Kom., Repert. Spec. Nov. Regni Veg. 13: 85. 1914; Panigrahi & Dixit, Proc. Nat. Inst. Sci. India 35. 257 (1969); R.D. Dixit, Cens. Ind. Pterid. 24 (1984). (Fig. 1 C, G).

Type – Russia, Kamtchatka.

Ophioglossum angustatum Maxon, Proc. Biol. Soc. Washington 36:169. 1923.

O. japonicum Prantl., Ber. Deutsch. Bot. Ges.1: 353. 1883.

Plants terrestrial, 8-15 cm tall; *rhizomorph* 0.2-0.4 mm, tuberose, bearing a tuft of unbranched fleshy roots, stoloniferous; *common stalk* 1-4 cm, terranean, white at base, pale green above; *trophophylls* 1-2 x 0.2-0.7 cm, 1 (rarely 2), simple, sessile, brown at young, light green-pale green at maturity, oblanceolate-oblong, herbaceous, apex acute, base cuneate, margin entire; *veins* reticulate, indistinct; *fertile segment* 5-9 cm, pale green, linear lanceolate; *strobili* 2-3 cm x 0.1-0.2 cm, linear, acute at apex, with 10-18 pairs of sporangia; *spores* 30-40 µm dia., pale, sub-reticulate.

Distribution: World – India, China, Korea, Japan.

India – Gujarat, Maharashtra.

Gujarat: Jambughoda, Zand Hanuman.

Phenology: sterile phase – June-August; fertile phase: August-September (rarely in October).

Ecology: Uncommon species, found under beneath of trees in the forest or grassy plateaus along with *Ophioglossum costatum*, *O. gramineum*, *O. nudicaule*, *O. lusitanicum* and *O. parvifolium*.

Conservation status: *Ophioglossum thermale* Kom., is collected from grassy plateaus of Jambughoda and Zand Hanuman. A population of about more than 200-400

individuals was found. However, the area is poorly explored for the *O. thermale*. Therefore, an assumption that the other population might be distributed around this area and more floristic explorations are needed to determine its full range distribution, the species should be considered as Data Deficient for now.

Specimen examined: INDIA – Gujarat, Panchmahal district, Jambughoda, Dhanpuri, 22°21.61'N, 73°42.81'E, 128 m, 18th Aug 2014, S.M.Patil, R.N.Kachhiyapatel & K.S.Rajput 27, 28 (BARO) BARO 123450070029.

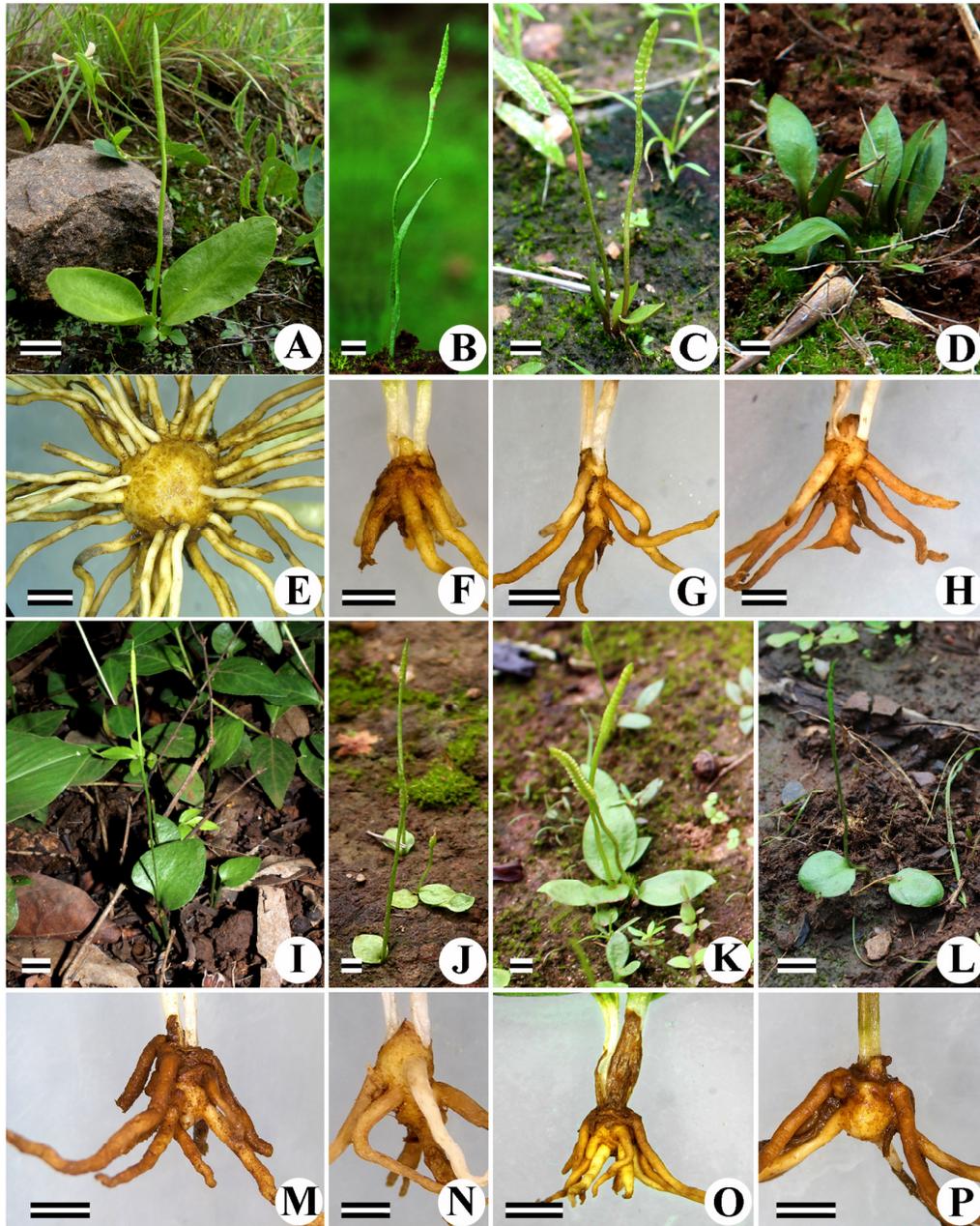


Fig. 1. A-D: Habit of *Ophioglossum costatum*, *O. gramineum*, *O. thermale* and *O. lusitanicum*, F-H: Rhizome of *O. costatum*, *O. gramineum*, *O. thermale*, *O. lusitanicum* respectively, I-L: Habit of *O. reticulatum*, *O. parvifolium*, *O. gujaratense*, *O. nudicaule*, M-P: Rhizome of *O. reticulatum*, *O. parvifolium*, *O. gujaratense*, *O. nudicaule* respectively. Scale bar: A, I, L: 10 mm, B-H, J,K, M-P: 5 mm.

Discussion

Recently, Fraser-Jenkins *et al.* (2017) published “An Annotated checklist of India pteridophytes – P” and reported 12 species of *Ophioglossum* in India. He mentioned that *O. thermale* Kom., has been reported by Indian authors in error for *O. lancifolium* C. Presl. However, The *Ophioglossum lancifolium* is more than 15 cm without stoloniferous roots, common stalk more than 4 cm above the ground; trophophylls acute to apiculate, elliptic-oblongate. Nevertheless, presence of stoloniferous roots, subterranean-to-above the ground, less than 4 cm common stalk, acute-round, elliptic-lanceolate trophophylls that differentiate *O. thermale* from *O. lancifolium*. Thus, present paper reports *O. thermale*, which is present in India and reported as new distributional record for Gujarat state whereas, occurrence of *O. lancifolium* in India is doubtful and need to explore for conformation. Similarly, *O. lusitanicum* is also reported as a new distributional record for Gujarat state. *O. lusitanicum* can be separated from *O. gramineum*, *O. thermale* and *O. lancifolium* by linear-lanceolate trophophylls that are not grass like and lacking above ground stalk. The most common species in Gujarat are *Ophioglossum costatum*, *O. gramineum*, *O. nudicaule*, *O. parvifolium* and *O. reticulatum*.

Conclusions

The present study documents occurrence of *O. thermale* and *O. lusitanicum* as a new distribution record from Gujarat. Though there is a controversy about occurrence of *O. thermale* in India; however, the presence of stoloniferous roots and subterranean-to-above the ground, acute-round, elliptic-lanceolate trophophylls with a common stalk differentiate this species from closely related taxa *O. lancifolium*. These entire features are shared by specimens collected from Gujarat. Recently, Patel and Reddy (2018) misidentified *Ophioglossum lusitanicum* (for juvenile *O. thermale*) and *O. thermale* (for juvenile *O. reticulatum* or *O. costatum*) from Gujarat state. Thus, the present paper deals with correct identification of *Ophioglossum lusitanicum* and *O. thermale* from Gujarat state.

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