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Research Article

CONTRIBUTION TO THE KNOWLEDGE OF *OEDOGONIALES* FROM JALGAON DISTRICT, MAHARASHTRA

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ABSTRACT
In the present communication 15 taxa of Oedogoniales including two new species and one new variety are described. Of these *Oedogonium jalgaonii, O. thanaense* var. *faizpurensis* and *Bulbochaete sarmii* are new to science, *Oedogonium brunelii O. franklinianum* var. *polyspora, O. murense, O. paloense, Bulbochaete doliiformis,* and *B. kosmoceps* are new to India and *Oedogonium catenatum, O. cryptoporum* var. *szechwanense, O. kunmingense, O. multisporum* var. *multisporum, Bulbochaete affinis* var. *affinis* and *B. congolensis* are reported for the first time from Maharashtra.

Keywords: *Oedogoniales, Maharashtra*

INTRODUCTION
58 taxa of Oedogoniales, 52 taxa of *Oedogonium* and 6 of *Bulbochaete* have been encountered from Jalgaon district during an extensive study of biodiversity in freshwater Chlorophyceae from North Maharashtra. In this paper 15 taxa have been described of which *Oedogonium jalgaonii, O. thanaense* var. *faizpurensis* and *Bulbochaete sarmii* are new taxa, *Oedogonium brunelii, O. franklinianum* var. *polyspora, O. murens, O. paloense, Bulbochaete doliiformis* and *B. kosmoceps* are new to India and *Oedogonium catenatum, O. cryptoporum* var. *szechwanense, O. kunmingense, O. multisporum* var. *multisporum, Bulbochaete affinis* var. *affinis* and *B. congolensis* are additions to the Oedogoniales of Maharashtra. Oedogoniales from Maharashtra are known through Kamat (1963, 1974), Patel (1966), Gonzalves and Jain (1968, 1970), Ashtekar and Kamat (1978), Gonzalves (1981), Barhate and Tarar (1985), Pingle (1988, 2005), Kumawat and Jawale (2004), Jawale and Dhande (2005) and Dhande and Jawale (2006, 2008).

MATERIALS AND METHODS
Algal samples for the present study were collected during 1-4-07 to 31-3-10 from different localities of Jalgaon district. The materials were studied fresh as far as possible and preserved in 4 % formalin for further studies. The taxa are identified following the monograph by Gonzalves (1981).

Systematic Account

***Oedogonium brunelii* Gonz.& Jain** **Plate 1, Figure 1.**
Gonzalves, E. A. 1981, p. 560-561, figs. 9.498, 499.
Macrandrous, homothallic; vegetative cells cylindric, 6-7 µm in diameter, 28-30 µm long; oogonium single, oblong, 21 µm in diameter, 30 µm long, poriferous, pore supreme; oospore ovoid, 19 µm in diameter, 26.4 µm long; spore wall smooth; antheridia single or in twos, subepigynous, 5.4µm in diameter, 5.4 µm long; spermatozoids two, division horizontal.
Habitat: Road-side ditch, near Sairam Auto, Faizpur-Savda road. Coll.No.Chl.393,2-10-2008.

***Oedogonium catenatum* Zhu** **Plate 1, Figure 2.**
Gonzalves, E. A. 1981, p. 564, figure 9.507.
Macrandrous, heterothallic, vegetative cells cylindric, those of female filaments 12-14 µm in diameter, 95-115 µm long; oogonium single, ellipsoid, 39.2 µm in diameter, 72 µm long, poriferous, pore superior; oospore oblong-globose, 34.2 µm in diameter, 43 µm long, not filling the oogonium longitudinally, spore wall smooth; male plants not seen.

Habitat: Rain-water pool, near Swami Samarth Kendra, Vidyanagar, Faizpur, Coll. No. Chl. 26, 12-7-2007.

***Oedogonium cryptoporum* (Wittr.) Hirn var *szechwanense* Jao** **Plate 1, Figure 3.**

Gonzalves, E. A. 1981, p. 161.

Macrandrous, homothallic; vegetative cells cylindric, 6-7 µm in diameter, 17-29 µm long; oogonium single, globose, 17.3 µm in diameter, 18.5 µm long, poriferous, pore supramedian or nearly superior; oospore filling the oogonium14.6 µm in diameter; antheridia upto 3 seriate, 3.45 µm in diameter, 5.4 µm long; spermatozoid single.

Habitat: Rain-water pool, near Swami Samarth Kendra, Vidyanagar, Faizpur, Coll.No.Chl.32, 15-7-2007.

***Oedogonium franklinianum* (Wittr.) Hirn var. *polyspora* Randh.** **Plate 1, Figures 4,5.**

Gonzalves, E. A. 1981, p. 270, figure 9.148C.

Macrandrous, heterothallic; vegetative cells distinctly capitellate, those of female filaments 13-14 µm in diameter, 27-36 µm long; those of male filaments 12-14 µm in diameter, 33.6 -46 µm long; suffulatory cells slightly inflated; oogonia single, ellipsoidglobose or globose, 32.7 µm in diameter, 34-38 µm long, poriferous, pore superior; oospore globose, filling the oogonium, 27 µm in diameter; antheridia 3-4-seriate, 13.6 µm in diameter, 9 µm long; spermatozoids 2, division horizontal.

Habitat: Puddle, Industrial Estate, Faizpur-Savda road, Coll.No.Chl.99,10-10-2007.

***Oedogonium jalgaonii* sp. nov** **Plate 1 Figures 6,7.**

Plants small,8-10 celled; macrandrous, heterothallic; vegetative cells of female filaments very short, rounded or cylindrical with a thick brown wall and a conspicuous pyrenoid in the centre of the cells,8- 9 µm in diameter, 9-19 µm long; a long hyaline seta is present above the oogonium; oogonium single,terminal ellipsoid-globose, 21.8 µm in diameter, 26.5 µm long, opening not seen, oospore ellipsoid-globose, 20 µm in diameter, 20-23.6 µm long, completely filling the oogonium, male plant not observed. This form is close to *O. punjabense* (Randh.) Gonz. in having a conspicuous pyrenoid in the centre of each cell but differs from it in plants few celled, 10-15 celled; cells, oogonia and oospores are smaller in size hence it is treated as a new species.

Habitat: Road-side ditch, near Hariom colony, Faizpur, Coll.No.Chl.62, 25-8-2007; puddle, Industrial Estate, Faizpur-Savda road, Coll.No.Chl.99, 10-10-2007.

Plantarum parva, cellulis 8-10; macrandrous, heterothallic; cellulis a femina filamentis brevissimis, rotundatis vel cylindrici murum et celebri crassa brunnea pyrenoid in medio cellularum, 8- 9 µm in diametro, 9-19 µm diu; seta longa est super oogonium hyalinis; oogonium unius, ut Pedius terminatio - globosis, µm in diameter 21.8, 26.5 multo µm, et non est qui aperiat videtur, ut Pedius oospore - globosis, XX µm in diameter, 20-23.6 µm diu, totum implet oogonium, Mas non servari. Haec forma est prope punjabense O. (Randh) Gonz . et in celebri pyrenoid habens centrum in singulis cellam, sed differt ab ea in cellulis paucis plantis, 10-15 cellularibus; cellulis, oogonia oospores sunt minoris quantitatis et inde est quod, ut tamquam species.

Habitat: in latus lacum Road, iuxta Hariom coloniam, Faizpur, Coll.No.Chl.62, 25-8-2007; conlectus, Industrial Estate, Faizpur Savda - iter, Coll.No.Chl.99, 10-10-2007.

***Oedogonium kunmingense* Zhu** **Plate 1, Figure 8.**

Gonzalves, E.A. 1981, p. 566, figure 9.511.

Macrandrous, heterothallic; vegetative cells cylindric or slightly capitellate, 18-20 µm in diameter, 80-91 µm long; oogonia single or in twos, subovoid or subellipsoid, 36.4 µm in diameter, 51.8 – 54.5 µm long, poriferous, pore superior; oospore identical in shape to the oogonium filling or not filling the oogonium which, 34.5 µm in diameter, 45.5 µm long, outer layer of spore wall irregularly reticulate, median and inner layers smooth; male filaments not seen.

Habitat: Road-side ditch, Shrikrishna Colony, Faizpur, Coll.No.Chl.47, 18-1-2007.

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***Oedogonium multisporum* var. *multisporum* (Wood) Hirn** **Plate 1, Figure 9.**
Gonzalves, E. A. 1981, p. 408-410, figure 9.302A.
Nannandrous, gynandrosporous; vegetative cells cylindric, 12-15 µm in diameter, 22-45 µm long; oogonia single or in twos, subovoid or subglobose, 30-35.5 µm in diameter, 30-36 µm long, poriferous, pore superior; oospore globose filling, the oogonium, 28-31 µm in diameter, brown in colour; androsporangia single or in tows, 11-14.5 µm in diameter, 8-13.5 µm long; dwarf males a little curved or nearly erect, situated on or near the oogonia, stipe 9-11 µm in diameter, 16-20 µm long; antheridia single or up to 3-seriate, exterior, 7 µm in diameter,4.5 -10 µm long.
Habitat: Puddle, Industrial Estate, Faizpur-Savda road, Coll.No.Chl.99, 10-10-2007; rainwater pool, Industrial Estate, Faizpur-Savda road, Coll.No.Chl.668, 5-5-2009.

***Oedogonium murense* Laz.** **Plate 1, Figure 10.**
Gonzalves, E. A. 1981, p. 561, figs. 9.500, 501.
Macrandrous, homothallic; vegetative cells cylindric, 14-16 µm in diameter, 30-52 µm long; oogonium single, shortly ovoid, 30 µm in diameter, 39 µm long, poriferous, pore supramedian; oospore shortly ovoid, 26.5 µm in diameter, 33 µm long, antheridia 2 to 4–seriate, 13.6 µm in diameter, 9 µm long; spermatozoids 2, division horizontal.
Habitat: Rain-water pool, near Swami Samarth Kendra, Vidyanagar, Faizpur,
Coll.No.Chl.26, 12-7-2007.

***Oedogonium paloense* Britt.** **Plate 1, Figure 11.**
Gonzalves, E. A. 1981, p. 238, figure 9.116.
Macrandrous, homothallic; vegetative cells cylindric, 17-21 µm in diameter, 55-84 µm long; oogonium single, oboviform, globose to ellipsoid, 49 µm in diameter, 63 µm long, operculate, division superior; oospore obovoid to obovoid -globose, not filling the oogonium, 35.4-37 µm in diameter, 45.5 µm long; spore wall three layered, outer and inner layer smooth, median layer reticulate and often thick; antheridia single or upto 6-seriate, subepigyynous or subhypogynous, 16-20 µm in diameter, 9-13 µm long.
Habitat: Rain-water pool, near Swami Samarth Kendra, Vidyanagar, Faizpur,
Coll.No.Chl.35, 15-7-2007.

***Oedogonium thanaense* var. *faizpurensis* var. nov.** **Plate 1, Figures 12, 13.**
Macrandrous, heterothallic; vegetative cells cylindric,those of female filaments 13-18 µm broad, 77-103 µm long; oogonium 52-55 µm broad, 62-66 µm long, operculate, division supreme; oospore 46- 48 µm in diameter, 55-57 µm long; vegetative cells of male filaments 14-15 µm broad, 75-80 µm long; antheridia 17-20 µm broad, 20-25 µm long; spermatozoids 2, division horizontal. In this form oogonia, oospore and antheridia are larger in size, hence this form is treated as a new variety.
Habitat: Road side ditch, near Hariom Colony, Faizpur, Coll.No.Chl.90,7-10-2007.
Macrandrous, heterothallic; cellulis cylindris, qui feminam filamentis 13-18 µm lata, longa 77-103 µm; 52-55 oogonium µm lata, longa µm 62-66, operculate, summa divisio, XLVIII oospore 46- µm in diametro 55-57 µm diu; cellulis masculis ex filamentis 14-15 µm lata, longa µm 75-80; 17-20 antheridia µm lata, longa µm 20-25; spermatozoids II, divisioeros .In hac forma oogonia, et oospore antheridia sunt magnitudine, forma, ideo hic agitur,quod sit novum genus .
Habitat: latere lacum Road, iuxta Hariom coloniam, Faizpur, Coll.No.Chl.90,7-10-2007 .

***Bulbochaete affinis* f. *affinis* Hirn** **Plate 2, Figure 1.**
Gonzalves, E. A. 1981, p. 609, figure 10.31A.
Nannandrous, gynandrosporous; vegetative cells 23-30 µm in diameter, 35-46 µm long; oogonium ellipsoid, patent or erect, situated below a terminal seta or an androsporangium, setae very long, upto 1225 µm long; 42.3 µm in diameter, 73 µm long; oospore 35 µm in diameter, 70 µm long; outer layer of spore wall longitudinally costate; androsporangia single, epigynous, 19 µm in diameter, 23 µm long; dwarf males situated near the oogonia, stipe 27 µm in diameter, 35 µm long; antheridia single or in twos, exterior, 11.5 µm in diameter, 15-19 µm long.
Habitat: Tapi river, Idgaon,, Coll.No.JKP 83, 13-4-2008.

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PLATE I

Figures 1-13
1. *Oedogonium brunelii* Gonz.& Jain
2. *Oedogonium catenatum* Zhu
3. *Oedogonium cryptoporum* (Wittr.) Hirn var. *szechwanense* Jao
4,5. *Oedogonium franklinianum* (Wittr.) Hirn var. *polyspora* Randh.
6,7. *Oedogonium jalgaonii* sp. nov
8. *Oedogonium kunmingense* Zhu
9. *Oedogonium multisporum* var. *multisporum* (Wood) Hirn
10. *Oedogonium murense* Laz.
11. *Oedogonium paloense* Britt.
12,13. *Oedogonium thanaense* var. *faizpurensis* var. nov

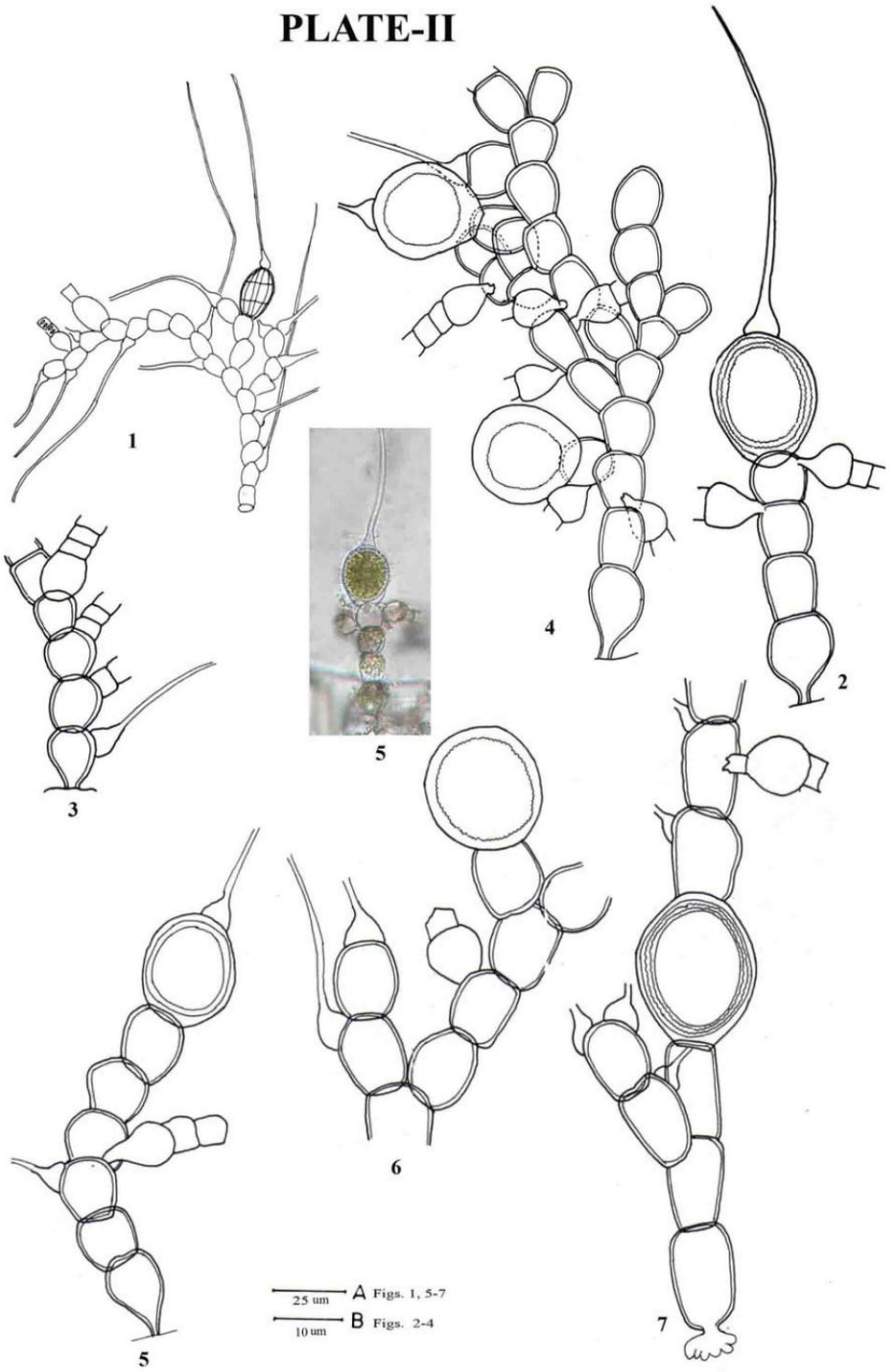

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PLATE II

Figures 1-7
1. *Bulbochaete affinis* f. *affinis* Hirn
2-4. *Bulbochaete congolensis* Gauth-Liev.
5. *Bulbochaete doliiformis* Borge
6. *Bulbochaete kosmoceps* Skuja
7. *Bulbochaete sarmii* sp. nov

***Bulbochaete congolensis* Gauth-Liev.** **Plate 2, Figures 2-4**

Gonzalves, E. A. 1981, p. 639, figure 10.62.

Nannandrous, idioandrosporous; plants generally small, 5-6 celled, rarely long and branched; vegetative cell short, doliform, 14-17 µm in diameter, 12-19 µm long; basal cell 14.5-18.2 µm in diameter, 17-30 µm long; division of suffultory cell lacking, oogonium spherical or ellipsoid, erect or patent, situated below a seta, 31-34 µm in diameter, 37-39 µm long; oospore similar in shape to the oogonium, 23-27 µm diameter; 29 µm long; outer spore wall delicate, smooth, median layer thick, with longitudinal sometimes anastomosing rows of annular scrobiculations, and occasionally with delicate undulate costae in the furrows; androsporangia single or up to 3-seriate, erect or patent, 9 µm in diameter, 4.5 µm long; dwarf males numerous, long, situated anywhere on the female plant, stipe straight, 12.7 - 14.5 µm in diameter, 17.2 –18.1 µm long; antheridia up to 3-seriate, exterior, 8 µm in diameter 5.5 µm long.

Habitat: Road-side ditch, Shrikrishna Colony, Faizpur,, Coll.No.Chl. 390,30-9-2008.

***Bulbochaete doliiformis* Borge** **Plate 2, Figure 5.**

Gonzalves, E. A. 1981, p. 601-602, figure 10.20.

Nannandrous, plants few celled; vegetative cells with convex lateral walls, 16-18 µm in diameter,18-20 µm long; basal cell 17.3 µm in diameter, 25.5 µm long; division of suffultory cell lacking; oogonium ellipsoid, erect, situated below a terminal seta, 25.6 µm in diameter, 32 µm long; oospore somewhat globose, 23.6 µm in diameter, 27 µm long; spore wall smooth; dwarf males on the vegetative cells, stipe 13.6 µm in diameter, 21 µm long; antheridia in twos, exterior; 7.3 -10 µm in diameter, 7.3 – 9 µm long.

Habitat: Puddle, Industrial Estate, Faizpur-Savda road, Coll.No.Chl. 99,10-10-2007.

***Bulbochaete kosmoceps* Skuja** **Plate 2, Figure 6.**

Gonzalves, E. A. 1981, p. 665-666, figure 10.95.

Nannandrous, idioandrosporous; female plants upto 15 celled, rarely branched, branches short, 2-3 celled; vegetative cells globose to globose-dolioform, as long as or slightly longer than broad, 19-22 µm long; oogonium subterminal or patent, situated below a seta, globose, 36.4-41 µm in diameter; oospore globose, filling the oogonium, 33 µm in diameter; outer layer of spore wall delicate and smooth, median layer brown, areolatefoveolate, areoles 5-6 angled; dwarf males situated on a vegetative cell, stipe 16.3 µm in diameter, 21 µm long; antheridia one or two– celled, exterior, 9 µm in diameter, 6 µm long.

Habitat: Puddle, Industrial Estate, Faizpur-Savda road, Coll.No.Chl. 99,10-10-2007.

***Bulbochaete sarmii* sp. nov.** **Plate 2, Figure 7.**

Nannandrous, idioandrosporous; vegetative cells 12-19 µm in diameter,23-39 µm long; oogonium erect, ellipsoid, situated below a vegetative cells, 36.6 µm in diameter, 44.5 µm long; oospore similar in shape to the oogonium, 32 µm in diameter, 39 µm long; dwarf males situated on vegetative cells; stipe 16.6 µm in diameter, 23.6 µm long; antheridia single or in twos, 9 µm in diameter, 7.3 µm long; androsporangial plants not seen. This form is somewhat close to *B.minuta* West & West but differs as the plants are idioandrosporous; broader vegetative cells, longer oogonia and oospores; lamellose wall, dwarf males broad and situated on vegetative cells, hence this plant is treated as a new species.

Habitat: Puddle, Industrial Estate, Faizpur-Savda road, Coll.No.Chl. 99,10-10-2007.

Nannandrous, idioandrosporous; cellulis µm in diameter 12-19, 23-39 µm diu, oogonium erecti ellipsoideae subiaceat cellulis, µm in diameter 36.6, 44.5 multo µm; oospore simile in specie ad oogonium, XXXII µm in diameter, XXXIX µm diu; sialbuginem habens situm in cellulis masculis, Stipes in diameter 16.6 µm, 23,6 µm diu; bina antheridia in uno vel, IX µm in diameter, 7.3 µm diu; androsporangial plantis non vidit.

Haec forma est aliquid propinquum B.minuta West & West, differt autem in plantis sunt idioandrosporous; latius cellulis, et amplius oogonia oospores; lamellose murum, sialbuginem habens in latitudine et masculi, quod positum est in cellulis, hoc est, inter haec planta novum genus.

Habitat: conlectus, Industrial Estate, Faizpur Savda - iter, Coll.No.Chl. 99,10-10-2007.

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REFERENCES

Ashtekar PV and Kamat ND (1978). Oedogoniaceae and Zygnemataceae of Aurangabad, Maharashtra. *Phykos* **17**(1&2) 35-38.
Barhate VP and Tarar JL (1985). Additions to algal flora of Maharashtra: Chlorophyceae from Khandesh-I. *Phykos* **24** (1&2) 180-183.
Dhande JS and Jawale AK (2006). On *Oedogonium* (Link) Hirn. from Jalgaon district, Maharashtra. *Geobios* **33** 321-322.
Dhande JS and Jawale AK (2008). *Oedogonium* (Chlorophyceae, Oedogoniales) from Jalgaon District. *Indian Hydrobiology* **11**(1) 43-46.
Gonzalves EA (1981). *Oedogoniales*. I.C.A.R. New Delhi 1-757.
Gonzalves EA and Jain SC (1968). Some Oedogoniaceae from Tungar Hill and surrounding areas. *Phykos* **7**(1&2) 9-22.
Gonzalves EA and Jain SC (1970). Some Oedogoniaceae from Thana district. *Ibid* **9**(1&2) 1-16.
Jawale AK and Dhande JS (2005). Some species of *Oedogonium* from Hartala lake, district Jalgaon, Maharashtra. *Journal of Aquatic Biology* **20**(2) 17-20.
Kamat ND (1963). The algae of Kolhapur, India. *Hydrobiologia* **22**(3-4) 209-305.
Kamat ND (1974). Algae of Marathwada, Maharashtra. *Phykos* **13**(1) 22-32.
Kumawat DA and Jawale AK (2004). Contributions to the Indian algal flora. *Trends in Life Sciences (India)* **19**(2) 123-125.
Patel RJ (1966). Occurrence of the alga *Oedogonium itzigsohnii* var. *minus* from Mahabaleshwar, India. *Journal of the Bombay Natural History Society* **63**(1) 224-226.
Pingle SD (1988). Algae of Khadakwasla Lake. *Indian bot. Reptr*. **7**(1&2) 91-92.
Pingle SD (2005). Algae of Pashan Lake- The Oedogoniales. *Proceedings of the National Conference Plant Science Pravaranagar* 11-15.