International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2013): 6.14 | Impact Factor (2014): 5.611

Occurrence of Freshwater Algae in Vena River in Hinganghat area of Dist. Wardha

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Abstract: ***The present study reports on community structure of freshwater algal taxa of Vena river in Hinganghat area of Wardha District. Total 4 different stations were sampled from June 2011 to May 2013. One hundred eighteen algal taxa were identified of which 73 taxa belonged to Chlorophyceae, 24 to Bacillariophyceae, 13 to Cyanophyceae and 8 to Euglenophyceae. Maximum number of species was recorded in 104 to Underbridge (SW_1) followed by 79 to Shahalangadi (SW_4), 72 to Smashanbhumi (SW_3) and 68 to Kawalghat (SW_2).***

Keywords: Algae; Aquatic ecosystem; Eutrophication; Vena river

1. Introduction

The present research enables a comprehensive and systematic analysis of the algal flora of the Vena river in Hinganghat area of Wardha district, which is a part of Vidarbha, Maharashtra state for two years of intensive study i.e. June 2011 to May 2013. Algae occurs in sufficient quantities to render its commercial applications, it has been investigated by Marathe, (1969) and Jawale and Chaudhari, (2010).

Hinganghat is one of the tehsils of Wardha District situated in $20^0 18'$ to $20^0 49'$ N and $78^0 32'$ to $79^0 14'$ E latitude. The town is located on the bank of river Vena, a tributary of the Wardha river which joins the big river Pranhita ahead at a distance place, which ultimately merges into the Godavari river later. In British India, Hinganghat was the centre of India, but after the partition of Hindusthan into India and Pakistan, Nagpur is considered as the center (heart place) of India. At Vena river pump house, there is a historical old stone, on which it was mentioned that Hinganghat is the centre of India.

Major portion of the total annual rainfall is received from the months of June to September of every year. The average rainfall of Hinganghat Tahsil is 1071.7 mm, and has a dry tropical weather climate. The climate is hot, and dry. Max temp. in °C were noted as 47.9 °C and Min. temp. in °C were noted as 10.2 °C. The seasons of a year were divided according climates into three namely cold, hot and monsoon. The land scape of the city faces towards the south with fast running streams. Vena River borders the north, west, and south sides of the city. The city is rich in fauna, and flora and water sources.

In Hinganghat area, Vena river is a fresh water body, and is one of the prominent river of Vidarbha, Maharashtra. It. is Perennial River of this area. It is supposed to be the life line of the Wardha district, but due to expanding needs of growing population, it is faces many adversities or changes.

The river Vena has received little attention from botanists, ecologists and specially phycologist as such and moreover, the scientific approach was not holistic. The study of the algal flora of this river is of great importance can be known to the peoples, and may be the heritage of future generation. Hence, it is a need of hour to know each and every thing of this plant world. For this purpose the research has made an attempt to gather the information reported by researcher in past.

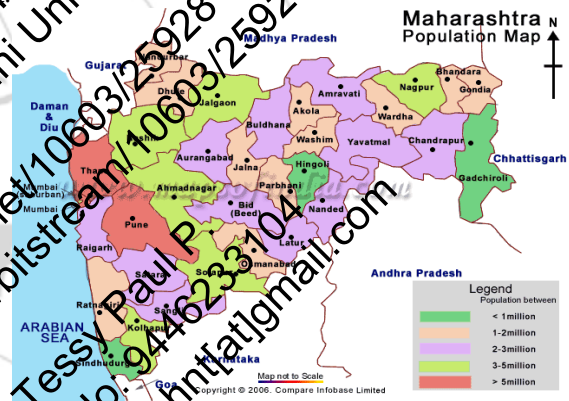


Figure 1.1: Area of Study: Map of Maharashtra state.

Figure 1.2: Area of Study: Map of Wardha district.

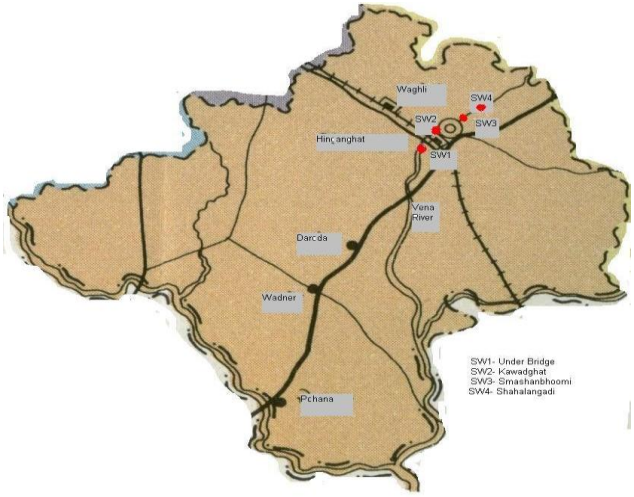


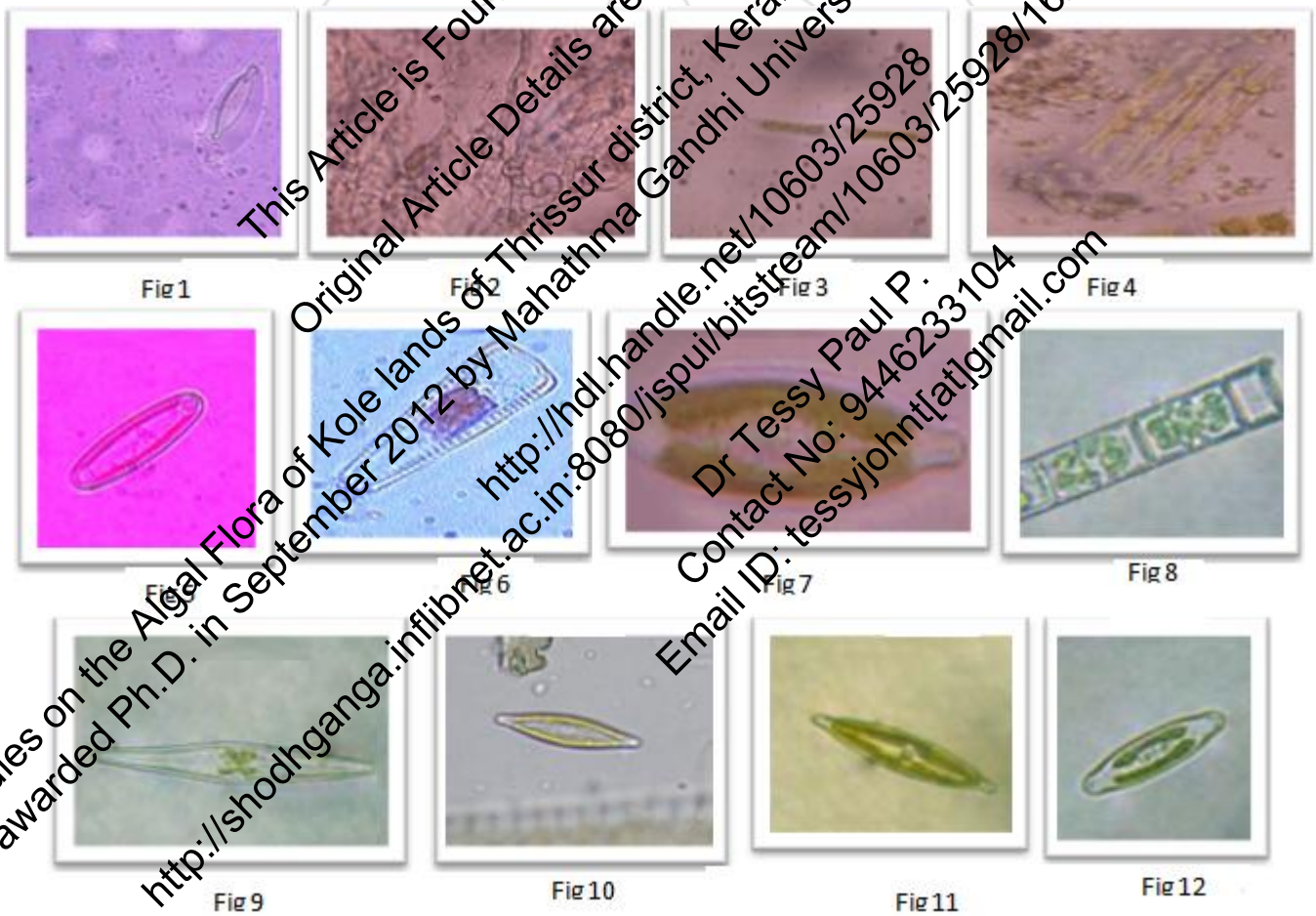
Figure 1.3: Area of Study: Map of Hinganghat Tahsil showing study area

2. Materials and Methods

Vena River is one of the major water bodies of Hinganghat region of Wardha District, Vidarbha. Stations SW_1(Underbridge), SW_2 (Kawalghat), SW_3 (Smashanbhoomi), and SW_4 (Shahalangadi) were selected near Hinganghat area. Water samples were collected from June 2011 to May 2013. These samples were analysed for determining the algal taxa. The macroscopic algae were manually picked with forceps and microscopic algae with the help of a planktonic net (pore size less than 40 µm). The samples were immediately brought to the laboratory for the taxonomical documentation of algal taxa and preserved in 4% formalin for reference purpose. Preserved samples were studied after the proper settlement of the algal debris. The samples were examined under binocular microscope with attached MIPS for the identification of algal groups and photographs were taken. Algal identification was carried out with the help of available taxonomic literature.

3. Observations

Photographs of Algal Forms Indentified



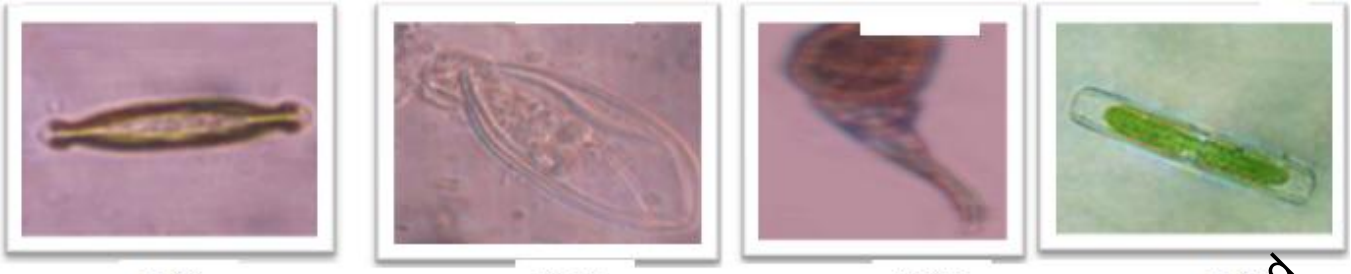


Fig 13 Fig 14 Fig 15 Fig 16

Baccilariophyceae: Fig. 1. *Cymbella cistula* (Hemprich) Grun. var. *woosangisis*Virget Fig. 2 *Dinobryon sertularia* Ehrenberg Fig. 3 *Eunotia camelus* Ehr. var. *karveerensis* Gandhi Fig. 4 *Fragilaria virescens* Ralfs Fig. 5 *Frustulia rhomboides* (Ehr) De Toni var. *saxonica* (Rabenhorst) DeToni Fig. 6 *Gomphonema elegans* Grun Fig. 7 *Gomphonema vidarbhensis* Kamath Fig. 8 *Melosira granulata* (Ehr.) Ralfs. Fig. 9 *Navicula cari* Ehr. *fa. indica* Sarode et Kamat. Fig. 10 *Navicula cryptocephala* Kuetz Fig. 11 *Navicula cuspidata* Kuetz. var.*ambigua* (Ehr.) Cleve. Fig. 12 *Navicula pupula* Kuetz. var. *capitata* Hustedt. Fig. 13 *Navicula viridula* Kuetzing Fig. 14 *Peridinium cinctum* (Muller) Ehrenberg Swirenko Fig. 15 *Phacus caudatus* var. *tenuis* Fig. 16 *Pinnularia acrosphaeria* (Breb.)W.Smith

Fig 17 Fig 18 Fig 19 Fig 20

Fig 21 Fig 22 Fig 23 Fig 24

Fig. 17 *Pinnularia brevicostata* Cleve var. *indica* Gandhi. Fig. 18 *Pinnularia gibba* Her Fig. 19 *Pinnularia major* (Kuetz.) Cleve var. *linearis* Cleve. Fig. 20 *Rhodomonas lacica* Karst Fig. 21 *Stauroneis anceps* var. *gracilis* Fig. 22 *Stauroneis phoenicenteron* (Nitzsch) Ehr. var. *intermidia* Dippel Fig. 23 *Synura uvella* Ehrenberg Fig. 24 *Tabellaria fenestrata* (Lyngbye) Kuetzing

Fig 25 Fig 26 Fig 27 Fig 28

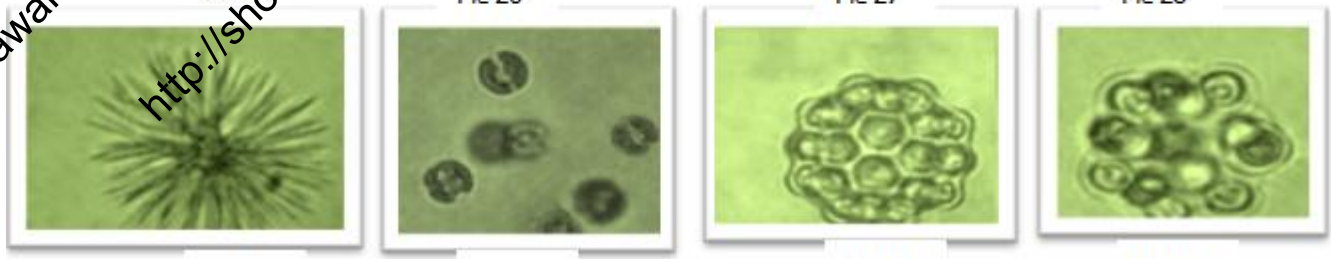
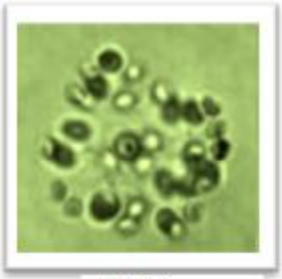


Fig 29 Fig 30 Fig 31 Fig 32

Chlorophyceae: Fig. 25 *Closterium acerosum* var. *angolense* West and West Fig. 26 *Triploceras gracile* Bail var. *undulatum* Scott & Pres Fig. 27 *Ankistrodesmus falcatms* (Corda) Rails Fig. 28 *Ankistrodesmus falcatus* (Corda) Ralfs var. *acicularis* (A.

Braun) G.S.West Fig. 29 *Ankistrodesmus spiralis* (Turner) Lemm. Fig. 30 *Chlorella vulgaris* Beyer. (Smith) Fig. 31 *Coelastrum cambricum* Archer var. *intermidium* (Bohlin) G.S.West Fig. 32 *Coelastrum sphaerium* Naeg.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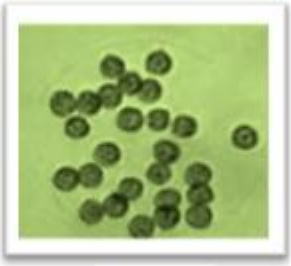
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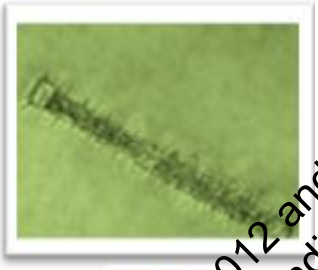
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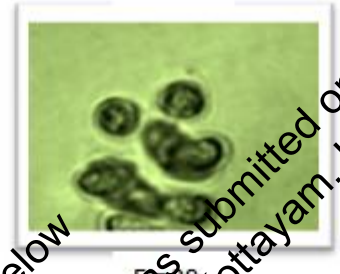
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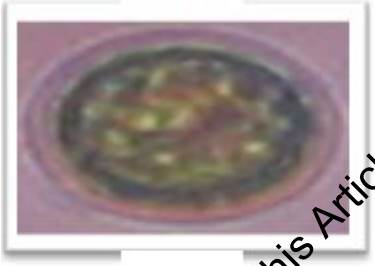
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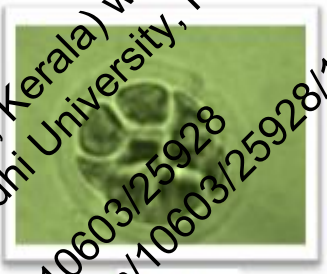
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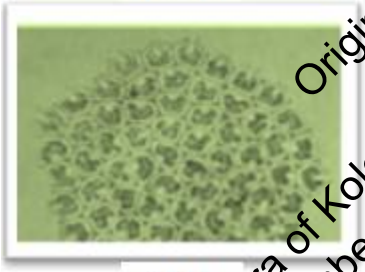
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Fig. 33 *Dictyosphaerium ehrenbergianum* Naegeli Fig. 34 *Dimorphococcus lunatus* A. Braun. Fig. 35 *Eudorina elegans* Ehr. Fig. 36 *Gonatozygon aculeatum* Hast. Fig. 37 *Gonatozygon monotaenium* De Bary Fig. 38 *Nephrocytium agardhianum* Nag. Fig. 39 *Nephrocytium lunatum* W.West Fig. 40 *Netrium digitus* (Ehrbg.) Itzigs. &Rothe Fig. 41 *Oocystis elliptica* W. West Fig. 42 *Pandorina cylindricum* Iyengar Fig. 43 *Pandorina. morum* (Mull.) Bory Fig. 44 *Pediastrum tetras* (Ehr.) Ralfs Fig. 45 *Pediastrum duradiatum* Meyen von Ralfs var. *longicornutum* Gutwinski Fig. 46 *Pediastrum duplex* Meyen var. *coronatum* Raciborski Fig. 47 *Pleodorina californica* Shaw Fig. 48 *Pleurotaenium baculoides* (Roy & Biss) Playf.


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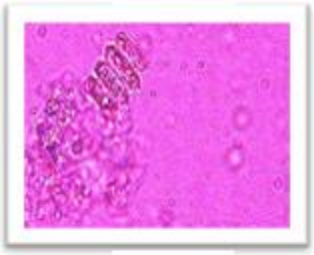
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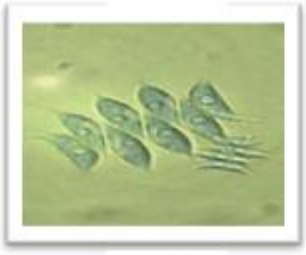
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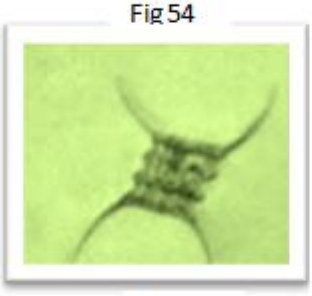
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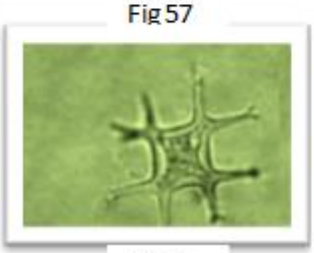
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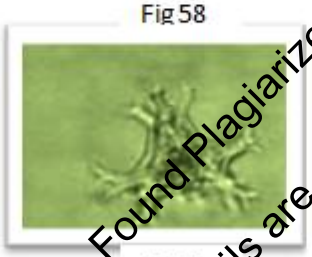
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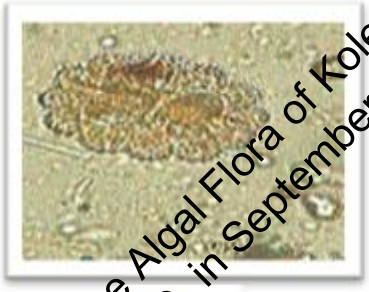
Fig 64

Fig. 49 *Pleurotaenium nodosum* (Bail.)Lund. Fig. 50 *Pleurotaenium trabecula* (Ehrbg) Nag Fig. 51*Pleurotaenium trabecula* (Ehrbg) Nag var. *maximum* (Reinsch) Roll Fig. 52 *Scenedesmus obliquus* (Lemmermann) Lemmarmann Fig. 53 *Scenedesmus bijugatus* (Turp.) Kuetz Fig. 54 *Scenedesmus dimorphus* (Turpin) Kuetzing Fig. 55 *Scenedesmus perforatus* (Lemmermann) Fig. 56 *Scenedesmus perforatus* (Lemmermann) var. *major* (Turner) Philipose Fig. 57 *Scenedesmus quadricauda* (Turpin) Brebisson Var. *bicaudatus* Hansgirg Fig. 58 *Scenedesmus quadricauda* (Turpin) Brebisson Var. *longispina* (Chodat) G.M.Smith Fig. 59 *Scenedesmus quadricauda* v. quadrispina (Chod.) G.M. Smith Fig. 60 *Spirogyra bernata* Ripart Fig. 61 *Tetraedron enorme* (Ralfs) Hansg var. *pentaedricum* Prescott Fig. 62 *Tetraedron limneticum* Borge Fig. 63 *Tetraedron trigonum* (Naeg) Hansg. fa. *gracile* (Reinsch) De Toni Fig. 64 *Tetraspora gelatinosa* (Vauch.) *Desv.*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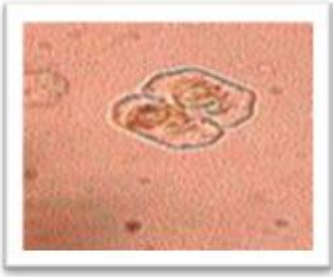
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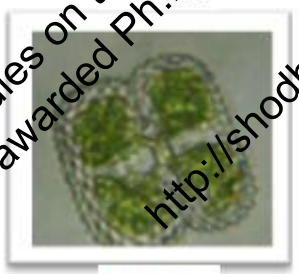
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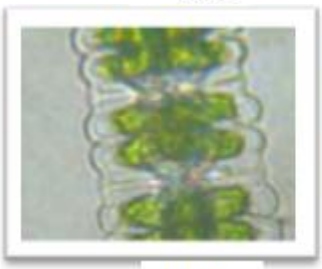
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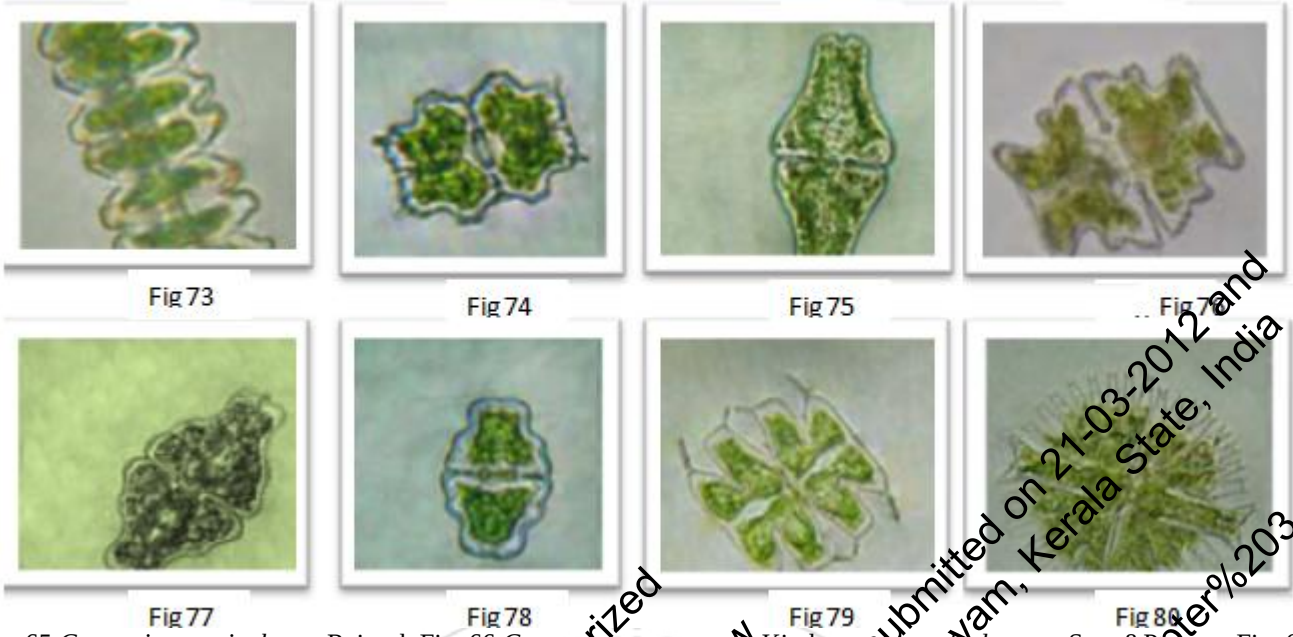


Fig. 65 *Cosmarium auriculatum* Reinsch Fig. 66 *Cosmarium contractum* Kirchner var. *pachydermum* Scott&Prescott Fig. 67 *Cosmarium cuneatum* Joshua Fig. 68 *Cosmarium quadrifarium* Lund. Fig. 69 *Cosmarium quadrum* Lund var. *minus* Nordst Fig. 70 *Cosmarium geminatum* Lund.var. *ornatum* Behre. Fig. 71 *Desmidium aptogonum* Breb. Fig. 72 *Desmidium baileyi* (Ralfs) Nordst. fa. *longiprocessum* Scott & Prescott. Fig. 73 *Desmidium swartzii* Agardh. Fig. 74 *Euastrum acanthophorum* Turn. Fig. 75*Euastrum ansatum* Ehrbg Fig. 76 *Euastrum roebii* (Borge) Scott & Prescott var. *burmense* West & West Fig. 77 *Euastrum sinuosum* Lenorm. var. *compactum* Prescott Fig. 78 *Euastrum sinuosum* Lenorm. var. *reductum* West & West. Fig. 79 *Micrasterias foliacia* Bail var. *quadrinflata* Prescott Fig. 80 *Micrasterias luxoshanica* var. *brevibracchiata* Behre fa. *spinosa* Prescott

Fig. 81 *Micrasterias mahabuleshwarensis* Hobs. var. *surculifera* Lagerh. Fig. 82 *Micrasterias pinnatifida* (Kuetz.) Ralfs var. *pseudoscitans* Gronbl. Fig. 83 *Micrasterias radians* Turn. Fig. 84 *Onychonema laeve* Nordst. var. *latum* West & West Fig. 85 *Spondylosium planum* (Wolle)West & West. Fig. 86 *Staurastrum anatinoides* Scott & Prescott var. *javanicum* Scott & Prescott. Fig. 87 *Staurastrum pinnatum* Turn var. *subpinnatum* (Sehm)West&West fa. *robustum* Krieg Fig. 88 *Staurastrum setigerum* Cleve.Fig.89. *Staurastrum tohopekaligense* Wolle var. *insigne* West & West. Fig. 90 *Staurastrum xanatum* Borges var. *majus* Presc. Fig. 91 *Staurastrum crenulatum* (Nag) Delp Fig. 92 *Xanthidium sexmamillatum* West & West var. *pulneyense* Iyengar & Bai Fig. 93 *Xanthidium. spinosum* (Josh.) West & West Fig. 94 *Arthrodesmus convergens* Ehr. Fig. 95 *Arthrodesmus curvatus* Turn. var. *latus* Scott and Prescott Fig. 96 *Hyalotheca dissiliens* (Smith) Brieb. var. *hians* Wolle.

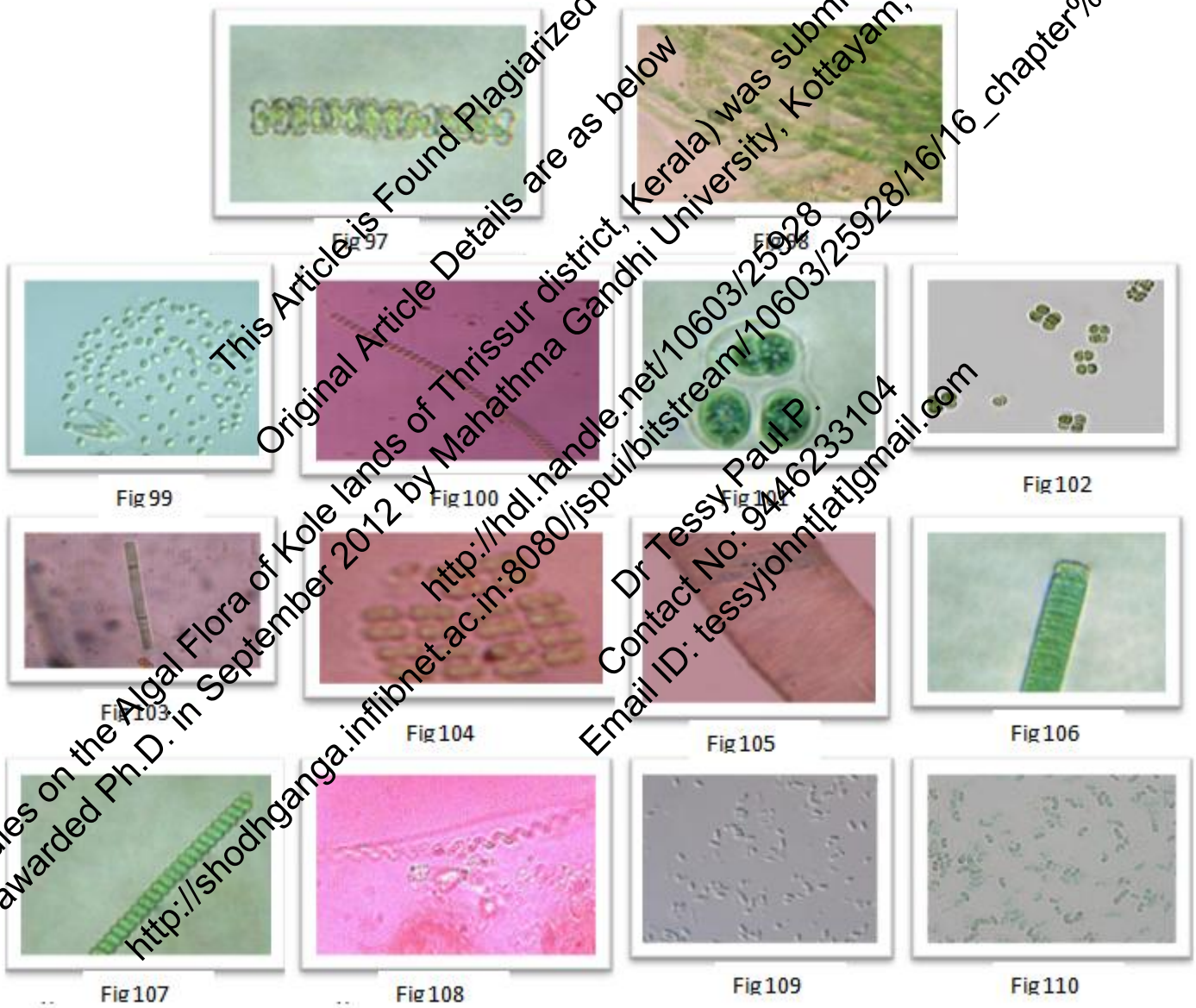
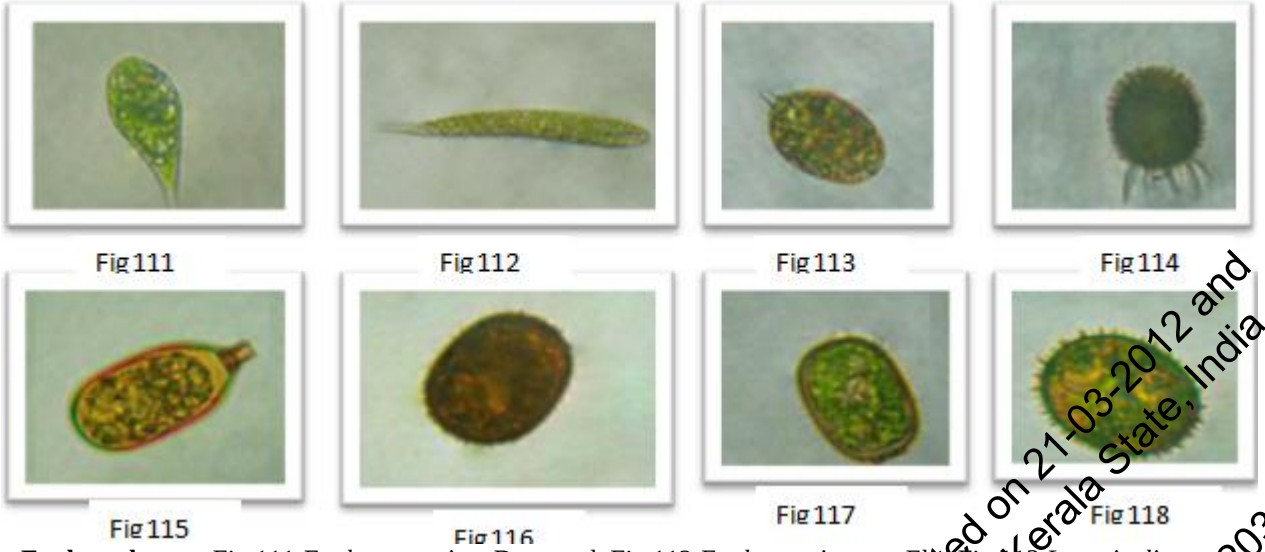


Fig. 97 *Sphaerozosma granulatum* Roy & Biss Fig. 98 *Anabaena sphaerica* var. *attenuata* Bharadwaja.
Cyanophyceae: Fig. 99 *Aphanocapsa littoralis* Hansgirg Fig. 96 *Arthrospira massartii* Kuffareth Fig. 101 *Chroococcus turgidus* (Kuetz.) Nag. Fig.102 *Gleocapsa atrata* (Corp.) Kuti Fig.103 *Lyngbya aestuarii* Liehm. Ex. Gomont Fig.104 *Merismopedia glauca* (Ehrenb). Nag. Fig.105 *Oscillatoria formosa* Dory ex Gomont Fig.106 *Oscillatoria princeps* Vaucher ex Gomont Fig.107 *Spirulina labyrinthiformis* (Menegh.) Gomont. Fig.108 *Spirulina princeps* Wet. G.S. West Fig.109 *Svnechocvstis aquatilis* Sauv. Fig.110 *Synechoccus elongates* Nag.



Euglenophyceae Fig.111 *Euglena proxima* Dangeard. Fig.112 *Euglena spirogyra* Ehr. Fig.113 *Lepocinclis ovum* (Eherenberg)Minkiewic var. *ovum* (Starmach) Fig.114 *Trachelomonas armata* var. *longispina* (Playfair) Deflandre Fig.115 *Trachelomonas dubia* (Swiremend) Defl. Fig.116 *Trachelomonas hispida* (Perty) Stein var. *hispida* Fig.117 *Trachelomonas lacustris* Drezepolski var. *klebsii* (Deflandre) Popova Fig.118 *Trachelomonas superba* var. *duplex* Defl

4. Results and Discussion

The algal flora of the Vena river in Hinganghat area comprised 118 taxa belonging to 61 genera, and was described systematically. The taxonomic analysis revealed that the phytoplankton of the study area belonged to four classes, The classes of algae represented are Bacillariophyceae, Chlorophyceae, Cyanophyceae and Euglenophyceae, Chlorophyceae (green algae) was the major group comprised of 73 taxa (61.86%) belonging to 32 genera. Bacillariophyceae (diatoms) was represented by 24 taxa (20.33%) belonging to 13 genera, Euglenophyceae represented by 8 taxa (6.77%) belonging to 3 genera and Cyanophyceae (blue green algae) represented by 13 taxa (11.01%) belonging to 11 genera were found in the study area.

Three seasons viz. summer, monsoon and winter were taken into account for analysis. It has been observed that the number of phytoplanktons were maximum during winter (408 taxon) followed by summer (400 taxon) and lowest during monsoon (360 taxon).

The number of phytoplanktons recorded were analysed by considering stations like SW_1, SW_2, SW_3, and SW_4. The maximum taxa were recorded from SW_1 (104), followed by SW_4 (79), SW_3 (72), and lowest SW_2 (68). The maximum genera were recorded from SW_1 (51), followed by SW_4 (50), SW_3 (43), and lowest SW_2 (42).

5. Acknowledgements

Authors would like to thanks Dr. S. N. Malode, Head, P. G. Department of Botany, GVISH, Amaravati and Dr. B. G. Ambatkar, Principal, R. S. Bidkar College, Hinganghat Dist. Wardha for providing the facilities. Authors would also like to thanks Prof. Sebastian Kulthassary for editing the manuscript.

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