

A CONTRIBUTION TO THE KNOWLEDGE OF THE DIATOMACEAE OF  
KANYA KUMARI (CAPE COMORIN), INDIA—I

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Menon (1931), Iyer *et al.* (1936), Menon (1945) and Subrahmanyam (1946) have recorded the Marine Diatoms from the East Coast and Misra (1956) from the West Coast. There is no record of the Marine Diatoms from the coast of Kanya Kumari, the southernmost point of the Indian peninsula. The present communication is based on the collections from this region during June 1956.

In all 29 forms have been described in this paper representing 16 genera. Of the total forms described three represent new varieties and two new forms.

SYSTEMATIC ENUMERATION

1. *Melosira granulata* (Éhr) Ralfs. var. *angustissima* Müll. Hustedt, 1930b, Bd. VII, Teil 1, p. 250, Fig. 104d; Venkataraman, 1939, p. 299, Fig. 2.

Frustules linked in long chains with narrow and long cells (Text-figs. 3 and 4).

Diam. frustule, 3.8–5.7 $\mu$ .

Height of the cell, 11.4–15.2 $\mu$ .

Punctae, 10–12 in 10 $\mu$ .

Habitat: Planktonic. 14th June, 1956.

2. *Terpsinoe musica* Éhr. Van Heurck, 1899, p. 452, Fig. 176; Venkataraman, *op. cit.*, p. 301, Figs. 18–21.

Frustules quadrangular in girdle view. Valves linear with undulating margins, slightly knobbed at the extremities. Frustules divided into 6–7 parts by cross septa. Coarsely punctate (Text-fig. 1).

Diam. frustules, 35–45.6 $\mu$ .

Length frustules, 95–144.4 $\mu$ .

Punctae, 8–10 in 10 $\mu$ .

Habitat: Epiphytic on *Chaetomorpha* sp. 14th June 1956.

3. *Synedra ulna* (Nitz) Éhr. var. *oxyrhyncus* (Kütz) Heurck. Heurck, *op. cit.*, p. 331, Fig. 418; Venkataraman, *op. cit.*, p. 307, Fig. 38.

Frustules linear, delicately and closely striated (Text-fig. 11).

Breadth frustule, 7.6 $\mu$ .

Length frustule, 72.2 $\mu$ .

Habitat: On the bottom mud of some saline pools. 14th June, 1956.

4. *Synedra ulna* (Nitz) Éhr. var. *crassa* var. nov.

Valves linear, strongly constricted in the middle, ends wedge-shaped, pseudo-raphe narrow and linear, striae absent in the central area (Text-fig. 13).

Breadth frustule, 7.6 $\mu$ .

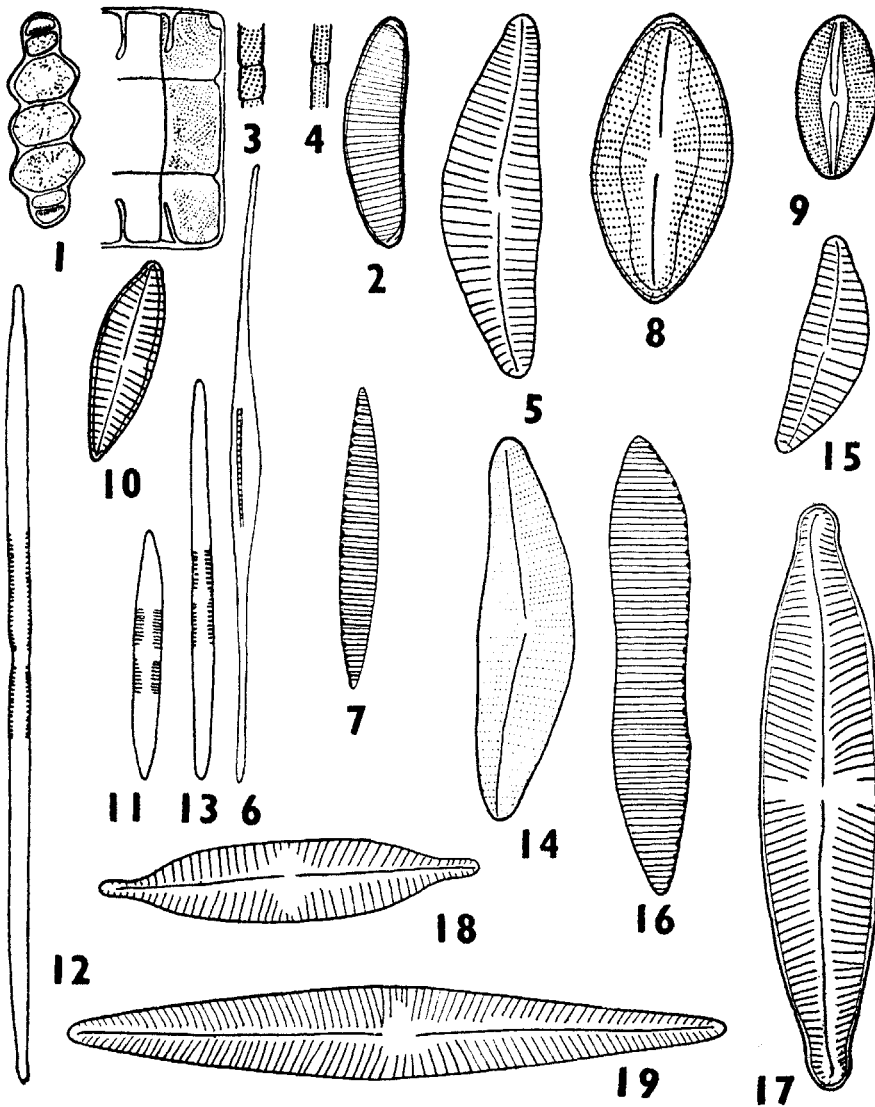
Length frustule, 110.4 $\mu$ .

Striae, 12–14 in 10 $\mu$ .

Habitat: On the bottom mud of some saline pools, 14th June, 1956.

This form differs from *S. ulna* var. *constricta* Venkat, in its bigger frustules and its slightly wedge shaped ends.

5. *Synedra ulna* (Nitz) Éhr. var. *amphirhyncus* (Éhr) Grün. Hustedt, *op. cit.*, p. 200, Fig. 619A, e; Venkataraman, *op. cit.*, p. 308, Figs. 28, 30, 31, 32.  
Valves linear, lanceolate, broad nearly to the end. The central area shows much variation viz. complete absence of striae or the striae being shorter on one side and absent on the other etc. (Text-fig. 12).  
Breadth frustule, 7.6 $\mu$ .  
Length frustule, 220.4 $\mu$ .  
Striae, 10–12 in 10 $\mu$ .  
Habitat: Planktonic. 15th June, 1956.
6. *Enuotia monodon* Éhr. Hustedt, *op. cit.*, p. 305. Fig. 772a, b; Venkataraman, *op. cit.*, p. 310. Fig. 40.  
Valves arcuate, ends rounded striations coarse (Text-fig. 2).  
Breadth frustule, 7.6–11.4 $\mu$ .  
Length frustule, 26.6–72.2 $\mu$ .  
Striae, 8–10 in 10 $\mu$ .  
Habitat: Bottom mud of saline pools. 14th June, 1956.
7. *Gyrosigma balticum* (Éhr) Rabh. Hustedt, *op. cit.*, p. 224. Fig. 331; Venkataraman, *op. cit.*, p. 318, Figs. 71, 72.  
Valves slightly sigmoid, broad, raphe eccentric and slightly sigmoid (Text-fig. 21).  
Breadth frustule, 30.4–34.2 $\mu$ .  
Length frustule, 209–323 $\mu$ .  
Striae, 12–15 in 10 $\mu$ .  
Habitat: Planktonic. 15th June, 1956.
8. *Pleurosigma galapagense* Cleve var. *kumariensis* var. nov.  
Valves scarcely sigmoid, lanceolate, tapering from the middle. Raphe slightly sigmoid (Text-fig. 22).  
Breadth frustule, 30.4 $\mu$ .  
Length frustule, 152 $\mu$ .  
Oblique striae, 22 in 10 $\mu$ .  
Transverse striae, 24 in 10 $\mu$ .  
Habitat: Planktonic. 15th June, 1956.  
This form differs from the type in its robust cells and slightly greater number of oblique and transverse striae.
9. *Pleurosigma Spencerii* var. *curvata* Grün. Van Heurck, *op. cit.*  
Valves sigmoid, raphe slightly eccentric and sigmoid (Text-fig. 25).  
Breadth frustule, 7.6 $\mu$ .  
Length frustule, 60.8 $\mu$ .  
Longitudinal striae, 8–10 in 10 $\mu$ .  
Transverse striae, 10–15 in 10 $\mu$ .  
Habitat: Bottom living in some saline pools. 14th June, 1956.
10. *Navicula fusca* var. *hyperborea* Heurck. Van Heurck, *op. cit.*, p. 199, Pl. 26, Fig. 745.  
Valves elliptical with clearly punctate striae (Text-fig. 8).  
Breadth frustule, 13.2 $\mu$ .  
Length frustule, 32.3 $\mu$ .  
Striae, 7–8 in 10 $\mu$ .  
Habitat: Bottom living in some saline pools. 14th June, 1956.
11. *Navicula elliptica* var. *ovalis* Hilse. Van Heurck, *op. cit.*  
Valves elliptical with punctate striae (Text-fig. 9).  
Breadth frustule, 11.4 $\mu$ .  
Length frustule, 26.6 $\mu$ .  
Striae, 12–13 in 10 $\mu$ .  
Habitat: Free-living. 15th June, 1956.



TEXT FIGS. 1-19.—Fig. 1. *Terpsinoe musica* Éhr. Fig. 2. *Eumotia monodon* Éhr. Figs. 3 & 4. *Melosira granulata* (Éhr) Ralfs. var. *angustissima* Müll. Fig. 5 & 15. *Cymbella turgida* (Greg.) Cleve. Fig. 6. *Nitzschia longissima* (Bréb) Ralfs. Fig. 7. *Nitzschia palea* (Kütz) W. Smith. Fig. 8. *Navicula fusca* var. *hyperborea* Heurck. Fig. 9. *Navicula elliptica* var. *ovalis* Hilse. Fig. 10. *Gomphonema parvulum* var. *subcapitata* Heurck. Fig. 11. *Synedra ulna* var. *oxyrhynchus* (Kütz) Heurck. Fig. 12. *Synedra ulna* var. *amphirhynchus* (Éhr) Grün. Fig. 13. *Synedra ulna* var. *crassa* var. nov. Fig. 14. *Cymbella cystula* var. *maculata* (Kütz) Heurck. Fig. 16. *Nitzschia tryblionella* var. *levidensis* (W. Smith) Grün. Fig. 17. *Pinnularia interrupta* f. *genuina* Fritsch. Fig. 18. *Navicula halophila* f. *subcapitata* Östrup. Fig. 19. *Navicula hasta* Panto. (Fig. 1,  $\times 540$ ; 2,5,7-10,14-19,  $\times 1600$ ; 3,4,6,11,12, and 13,  $\times 685$ ).

12. *Navicula halophila* f. *subcapitata* Östrup. Hustedt, 1930a, Heft 10, p. 269; Venkataraman, *op. cit.*, p. 327, Fig. 91.

Valves with slightly produced and capitate ends. Central area slightly widened in the middle (Text-fig. 18).

Breadth frustule,  $7.6\mu$ .

Length frustule,  $38\mu$ .

Striae, 9 in  $10\mu$ .

Habitat: Free-living. 15th June, 1956.

13. *Navicula hasta* Pantocsek. Hustedt, 1930a, p. 306, Fig. 541; Venkataraman, *op. cit.*, p. 331, Fig. 98.

Valves lanceolate, gradually tapering to the ends; ends subacute, striations radial (Text-fig. 19).

Breadth frustule,  $11.4\mu$ .

Length frustule,  $60.2\mu$ .

Striae, 9–10 in  $10\mu$ .

Habitat: Bottom living in saline pools. 16th June, 1956.

14. *Navicula cuspidata* Kütz var. *conspicua* Venkataraman, forma *crassa* form nov.

Valves elliptic, lanceolate with rounded slightly constricted ends. Longitudinal striations coarse and prominent, closer towards the margins and wider towards the middle (Text-fig. 26).

Breadth frustule,  $30.4$ – $38\mu$ .

Length frustule,  $129.2$ – $163.4\mu$ .

Transverse striae, 18–20 in  $10\mu$ .

Longitudinal striae, 8–16 in  $10\mu$ .

Habitat: Bottom living in saline pools. 16th June, 1956.

This form differs from the variety in slightly bigger dimensions and in greater number of the transverse striae.

15. *Navicula cuspidata* Kütz. var. *ambigua* (Éhr) Cleve. Hustedt, 1930b, p. 268, Fig. 434; Venkataraman, *op. cit.*, p. 327, Fig. 94.

Valves elliptic, lanceolate with rostrate produced ends. Longitudinal striae are equally placed (Text-fig. 29).

Breadth frustule,  $22.8\mu$ .

Length frustule,  $72.2\mu$ .

Transverse striae, 20 in  $10\mu$ .

Habitat: Bottom living in saline pools. 17th June, 1956.

This form has slightly boarder frustules than the type.

16. *Pinnularia interrupta* W. Smith. f. *genuina* Fritsch. Venkataraman, *op. cit.*, p. 336, Fig. 112.

This form shows interruption of striae at the middle of the valve (Text-fig. 17).

Breadth frustule,  $11.4\mu$ .

Length frustule,  $76\mu$ .

Striae, 10 in  $10\mu$ .

Habitat: Bottom living in saline pools. 16th June, 1956.

17. *Pinnularia viridis* (Nitz) Éhr. Hustedt, 1930b, p. 334, Fig. 617a; Venkataraman, *op. cit.*, p. 339, Fig. 114.

Valves linear with slightly convex margins and rounded ends. Axial area narrow, slightly widened at the middle, striae coarse. The longitudinal band present (Text-fig. 27).

Breadth frustule,  $19\mu$ .

Length frustule,  $72.2\mu$ .

Striae, 8–9 in  $10\mu$ .

Habitat: Bottom living in the crevice of rocks. 16th June, 1956.

18. *Amphora coffeiformis* Agardh. var. *africana* Fritsch and Rich. Venkataraman, *op. cit.*, p. 342, Fig. 102.

Forma *kurze* form nov.

Valves arcuate dorsally and straight ventrally, ends pronouncedly capitate, striae delicately punctate (Text-fig. 31).

Breadth frustule, 4.7—7.6 $\mu$ .

Length frustule, 22.8—38 $\mu$ .

Striae, 18—22 in 10 $\mu$ .

Habitat: Free-living. 17th June, 1956.

This form differs from the type in its greater number of striae.

19. *Cymbella turgida* (Greg.) Cleve. Hustedt, 1930b, p. 358, Fig. 660; Venkataraman, *op. cit.*, p. 343, Fig. 125.

Valves lunate with convex dorsal side and gibbous ventral margin. Ends acute, striations radial in the middle and slightly convergent towards the ends, punctate (Text-figs. 5 and 15).

Breadth frustule, 11.4 $\mu$ .

Length frustule, 22.8—34.2 $\mu$ .

Striae, 8—9 in 10 $\mu$ .

Habitat: Free-living. 16th June, 1956.

20. *Cymbella cistula* (Hemp) Grün. var. *maculata* (Kütz) Heurck. Van Heurck, *op. cit.*, p. 147, Pl. 1, Fig. 41; Venkataraman, *op. cit.*, p. 344, Fig. 136.

Frustules boat-shaped with ventral gibbous margins and rounded ends, striations radial, punctate (Text-fig. 14).

Breadth frustule, 30.4 $\mu$ .

Length frustule, 110.2 $\mu$ .

Striae, 8—10 in 10 $\mu$ .

Habitat: Free-living. 17th June, 1956.

21. *Gomphonema parvulum* (Kütz) Grün. var. *subcapitata* Heurck. Van Heurck, *op. cit.*, p. 272.

Valves club-shaped with subcapitate end (Text-fig. 10).

Breadth frustule, 7.6 $\mu$ .

Length frustule, 22.8 $\mu$ .

Striae, 12—13 in 10 $\mu$ .

Habitat: Epiphytic on *Chaetomorpha* sp. 15th June, 1956.

22. *Rhopalodia gibba* (Éhr) O. Müll. Venkataraman, *op. cit.*, p. 349, Fig. 115.

Frustules gibbous in the middle, slightly tapering at the ends, reflexed at the ends, costae strong.

Breadth frustule, 22.8—26.6 $\mu$ .

Costae, 6—8 in 10 $\mu$ .

Habitat: Bottom living in saline pools. 16th June, 1956.

23. *Hantzschia amphioxys* (Éhr) Grün. var. *vivax* (Hantz.) Grün. Van Heurck, *op. cit.*, p. 381, Pl. 15, Fig. 486b; Venkataraman, *op. cit.*, p. 351, Fig. 148.

Valves linear, slender, keel punctae short (Text-fig. 30).

Breadth frustule, 7.6 $\mu$ .

Length frustule, 60.8 $\mu$ .

Keel punctae, 8 in 10 $\mu$ .

Striae, 16 in 10 $\mu$ .

Habitat: From the scrapings of the rocks. 17th June, 1956.

24. *Bacillaria paradoxa* Gmelin. Venkataraman, *op. cit.*, p. 351, Figs. 144 and 145; Subrahmanyam, 1946, p. 187, Figs. 417, 421 and 427; Misra, 1956, p. 566, Fig. 71.

Valves linear, spindle shaped, carinal dots form a row in the middle portion of the valve (Text-fig. 24).

Breadth frustule,  $5.7\mu$ .

Length frustule,  $76\mu$ .

Carinal dots, 8–10 in  $10\mu$ .

Habitat: Free-living. 14th June, 1956.

25. *Nitzschia longissima* (Bréb) Ralfs. Subrahmanyam, *op. cit.*, p. 191, Figs. 435-437; Van Heurck, *op. cit.*, p. 404, Pl. XVII, Fig. 568.

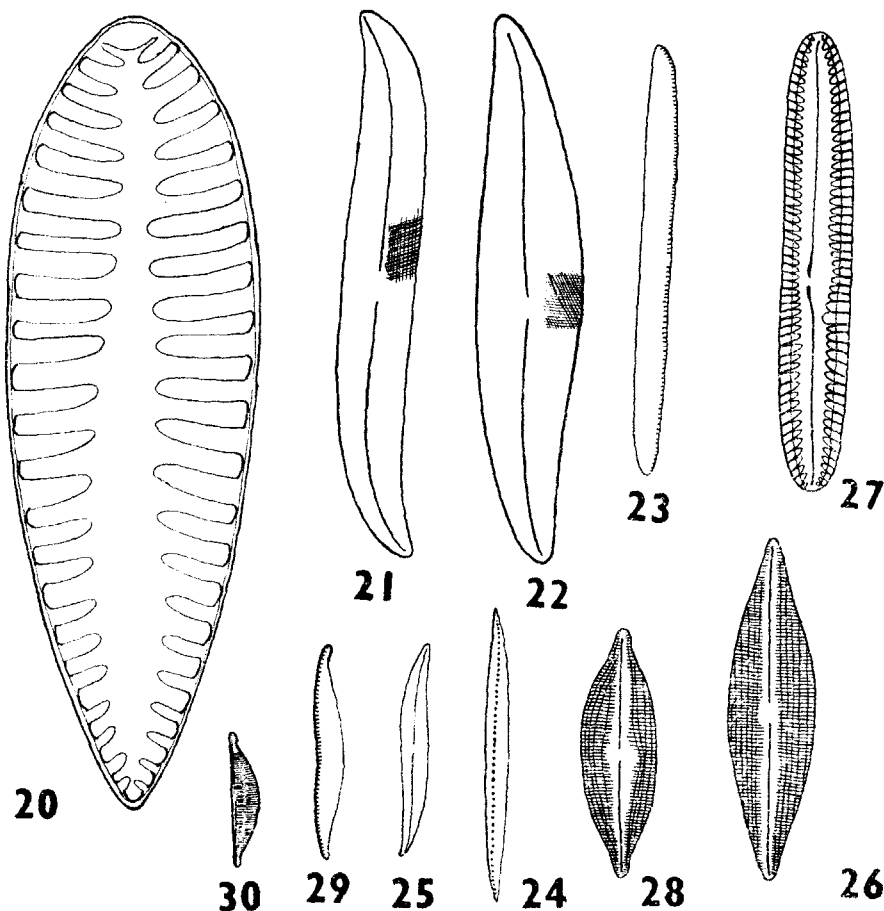
Cells solitary, central enlarged portion lanceolate, ends hair-like, elongated nearly straight (Text-fig. 6).

Breadth frustule,  $5.7\mu$ .

Length frustule,  $180.8-342\mu$ .

Keel punctae, 12 in  $10\mu$ .

Habitat: Free-living. 14th June, 1956.



TEXT FIGS. 20-30.—Fig. 20. *Surirella elegans* var. *tenuis* var. nov. Fig. 21. *Gyrosigma balticum* (Éhr) Rahb. Fig. 22. *Pleurosigma galapagense* var. *kumariensis* var. nov. Fig. 23. *Nitzschia obtusa* var. *scalpelliformis* Grün. Fig. 24. *Bacillaria paradoxa* Gmelin. Fig. 25. *Pleurosigma spencerii* var. *curvata* Grün. Fig. 26. *Navicula cuspidata* f. *crassa* form nov. Fig. 27. *Pinnularia viridis* (Nitzsch) Éhr. Fig. 28. *Navicula cuspidata* var. *ambigua* Venkataraman. Fig. 29. *Hantzschia amphioxys* var. *vivar* (Hantz) Grün. Fig. 30. *Amphora coffeiformis* var. *africana* Fritsch and Rich. (Figs. 20-29,  $\times 685$ ; Fig. 30,  $\times 1600$ ).

26. *Nitzschia palea* (Kütz) W. Smith. Van Heurck, *op. cit.*, p. 401, Pl. 17, Fig. 554; Venkataraman, *op. cit.*, p. 353, Fig. 146.

Valves linear to linear-lanceolate, striations delicate (Text-fig. 7).

Breadth frustule, 3.8 $\mu$ .

Length frustule, 30.4 $\mu$ .

Habitat: Free-living. 17th June, 1956.

27. *Nitzschia tryblionella* Hantzsch. var. *levidensis* (Smith) Grün. Van Heurck, *op. cit.*, p. 385, Pl. 15, Fig. 494; Venkataraman, *op. cit.*, p. 352, Fig. 141.

Valves linear with slightly concave margins, ends wedge-shaped, striae clear (Text-fig. 16).

Breadth frustule, 7.6—9.5 $\mu$ .

Length frustule, 68.4 $\mu$ .

Striae, 11—14 in 10 $\mu$ .

Habitat: Bottom living in saline pools. 17th June, 1956.

28. *Nitzschia obtusa* W. Smith. var. *scalpelliformis* Grün. Van Heurck, *op. cit.*, p. 397, Pl. 16, Fig. 538; Venkataraman, *op. cit.*, p. 255, Figs. 142, 147.

Frustules broad, keel fairly large. Two median keel punctae distant (Text-fig. 23).

Breadth frustule, 7.6—11.4 $\mu$ .

Length frustule, 117.7 $\mu$ .

Striae, 20—24 in 10 $\mu$ .

This form is slightly narrower and longer than the type.

Habitat: Free-living. 15th June, 1956.

29. *Surirella elegans* var. *tenuis* var. nov.

Valves narrowly or broadly ovate, rounded at one end and acute at the other end, costae broad, wedge shaped in the girdle view (Text-fig. 20).

Breadth frustule, 49.4—57.4 $\mu$ .

Length frustule, 110.2—144.4 $\mu$ .

Habitat: Bottom living in saline pools. 16th June, 1956.

This form differs from the type in much smaller frustules.

#### ACKNOWLEDGEMENTS

In conclusion, the author wishes to express his great indebtedness to Dr. M. S. Randhawa for his keen interest and valuable criticisms throughout the course of this investigation. He is also grateful to Dr. B. P. Pal and Dr. S. M. Sikka for kindly providing the facilities to carry out this work.

*Statement showing the distribution of the forms recorded in this paper in the Indian region.*

	Previous places of collection	Authors
<i>Amphora coffeiformis</i> var. <i>africana</i> f. <i>kurze</i> form nov.	....	....
<i>Bacillaria paradoxa</i> Gmelin.	Madras coast Madras Madras Porbandar	R. Gopala Iyer & Sankara Menon (1936). Venkataraman (1939). Subrahmanyan (1946). Misra (1956).
<i>Cymbella turgida</i> (Greg) Cleve.	Island of Banka Madras Darwar	A. Grumon (1865). Venkataraman (1939). Gandhi (1956).

Statement showing the distribution of the forms recorded in this paper in the Indian region.

	Previous places of collection	Authors
<i>Cymbella cistula</i> var. <i>maculata</i> (Kütz.) Heurek.	Vaiyampatti	Venkataraman (1939).
<i>Eunotia monodon</i> Éhr.	Batang valley, Sikkim Himalayas, Peradeniya, Ceylon, Madras	Dickie, George (1882). Skvortzow (1930). Venkataraman (1939).
<i>Gyrosigma balticum</i> (Éhr.) Rahbh.	Ceylon Madras  Bombay	Fortmoral. Venkataraman (1939), Subrahmanyan (1946). Gonzalves & Gandhi (1954).
<i>Gomphonema parvulum</i> var. <i>subcapitata</i> Heurek.	....	....
<i>Hantzschia amphioxys</i> var. <i>vivax</i> (Hantz.) Grün.	Ceylon Madras	Skvortzow (1930). Venkataraman (1939).
<i>Melosira granulata</i> var. <i>angustissima</i> Müll.	Madras	Venkataraman (1939).
<i>Navicula fusca</i> var. <i>hyperborea</i> Heurek.	....	....
<i>Navicula elliptica</i> var. <i>ovalis</i> Hilse.	....	....
<i>Navicula halophila</i> f. <i>subcapitata</i> Östrup.	Madras	Venkataraman (1939).
<i>Navicula hasta</i> Pento.	Madras	Venkataraman (1939).
<i>Navicula cuspidata</i> var. <i>conspicua</i> f. <i>crassa</i> f. nov.	....	....
<i>Navicula cuspidata</i> var. <i>ambigua</i> Venk.	Madras Bombay	Venkataraman (1939). Gonzalves & Gandhi (1954).
<i>Nitzschia longissima</i> (Bréb) Ralfs.	Madras	Subrahmanyan (1946).
<i>Nitzschia palea</i> (Kütz.) Smith.	Vizagapatam  Ceylon  Madras	W. & G. S. West (1907), Skvortzow (1935). Skvortzow (1935) and W. & G. S. West (1901-5). Venkataraman (1939).
<i>Nitzschia tryblionella</i> var. <i>levidensis</i> (Smith) Grün.	Madras	Venkataraman (1939).
<i>Nitzschia obtusa</i> var. <i>scalpiformis</i> Grün.	Calcutta Madras Darwar	Skvortzow (1935). Venkataraman (1939). Gandhi (1956).
<i>Pinnularia viridis</i> (Nitz) Éhr.	Burma Madras	W. & G. S. West (1907). Venkataraman (1939).



*Statement showing the distribution of the forms recorded in this paper in the Indian region*

	Previous places of collection	Authors
<i>Pinnularia interrupta</i> f. <i>genuina</i> Fritsch.	Madras	Venkataraman (1939).
<i>Pleurosigma spencerii</i> var. <i>curvata</i> Grün	....	....
<i>Pleurosigma galapagense</i> var. <i>kumariensis</i> var. nov.	....	....
<i>Rhopalodia gibba</i> .	Manipur Madras	K. Biswas (1936). Venkataraman (1939).
<i>Synedra ulna</i> var. <i>oxyrhyncus</i> (Kütz) Heurck.	Madras	Venkataraman (1939).
<i>Synedra ulna</i> var. <i>crassa</i> var. nov.	....	....
<i>Synedra ulna</i> var. <i>amphirhyncus</i> (Ehr) Grün.	Madras, Trichino- poly, Nilgris Darwar	Venkataraman (1939). Gandhi (1956).
<i>Surirella elegans</i> var. <i>tenuis</i> var. nov.	....	....
<i>Terpsinoe musica</i> Ehr.	Ceylon Ceylon Madras	W. & G. S. West (1901-8). Skvortzow (1930). Venkataraman (1939).

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