Phytoplankton and Sea Ice Microalgal Data from Frobisher Bay, 1971 to 1978

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ABSTRACT

Hsiao, S. I. C. 1979. Phytoplankton and sea ice microalgal data from Frobisher Bay, 1971 to 1978. Fish. Mar. Serv. Data Rep. 155: 82 p.

Phytoplankton collections made in May 1978, and sea ice microalgal collections made during the late winter and spring of the years 1971 to 1973, 1977 and 1978 in Frobisher Bay, are tabulated quantitatively. Twelve species and 13 genera of phytoplankton occurred in the water column beneath the sea ice. The sea ice microalgal flora is made up of 159 species arranged in 39 genera. Ice diatoms, consisting of 156 species in 34 genera, are the largest group. The standing stock of phytoplankton is greatest at the interface of sea ice and seawater. It decreases with increasing depth. The sea ice microalgae are most abundant in late spring at the bottom of the sea ice.

Key words: Phytoplankton, diatoms, sea ice microalgae, ice diatoms, quantitative species composition, vertical distribution, standing stock, Arctic.

RÉSUMÉ

Hsiao, S. I. C. 1979. Phytoplankton and sea ice microalgal data from Frobisher Bay, 1971 to 1978. Fish. Mar. Serv. Data Rep. 155: 82 p.

Des échantillons de phytoplancton prélevés en mai 1978 de même que des échantillons d'algues microscopiques de glace marine prélevés à Frobisher Bay à la fin de l'hiver et au printemps de 1971 à 1973, en 1977 et 1978 sont classés quantitativement. On retrouve douze espèces et treize genres de phytoplancton dans la colonne d'eau sous la glace. La flore d'algues microscopiques de la glace marine comprend 159 espèces réparties en 39 genres. Les diatomées de glace représentent le groupe le plus important avec 156 espèces et 34 genres. La plus grande partie de la biomasse du phytoplancton se situe à l'interface de la glace et de l'eau de mer et décroit en profondeur. C'est à la fin du printemps que l'on retrouve une plus grande abondance d'algues microscopiques sur la face inférieure de la glace.

INTRODUCTION

Colored bands ranging from green, greenish-brown, yellow-brown, golden brown, brown, brownish-red, reddish-yellow to red appear in late winter and spring in sea ice, especially in the bottom layers (Apollonio, 1961; Bursa, 1961; Bunt and Wood, 1963; Meguro, 1962; Meguro et al., 1966, 1967; McRoy and Goering, 1976). These bands are caused by different proportions of diatoms, green flagellates, dinoflagellates and chrysophytes growing on or trapped within the ice. It has been recognized that the sea ice microalgae play an important role as primary producers in the arctic marine ecosystems (Meguro et al., 1966, 1967; McRoy and Goering, 1974; Alexander, 1974). They may provide a potential food source for grazing zooplankton (English, 1961; Apollonio, 1965) and polar cod (Andriashev, 1968).

Previous investigators (Ehrenberg, 1841, 1853; Dickie, 1878; Cleve, 1898, 1899, 1900a; Gran, 1900; Kindle, 1909; Seidenfaden, 1947; Usachev, 1938, 1949) compiled species lists of arctic sea ice microalgae collected from drifting ice floes. None of them quantitatively evaluated samples for species composition. Recently, Alexander et al. (1974) used SIPRE and plexiglass corers to take samples from solid, unbroken sea ice to determine the quantitative composition and standing stock of the ice community at Barrow, Alaska. The only other quantitative study of phytoplankton distribution of Frobisher Bay was conducted by Bursa (1971) during August, September and December, 1967. He did not find any phytoplankton cells present in the samples collected from the water column beneath the sea ice in December.

The purpose of this report is to investigate the quantitative composition, vertical distribution and standing stock of microalgae in and beneath the sea ice of Frobisher Bay.

METHODS

The sea ice microalgal samples were collected with a 7.5 cm diameter SIPRE ice corer from the top to the bottom of the sea ice at stations 1, 5, and 5B in Frobisher Bay during late winter and spring of the years 1971 to 1973, 1977 and 1978 (Fig. 1). The length of the ice core was measured, and various parts of the core were cut with a fine toothed meat saw. The ice samples were placed in clean plastic containers, and then thawed in the laboratory at room temperature. Seawater samples from beneath the sea ice were collected with a Van Dorn sampler from 0, 5, 10, 15, 20, and 25 m at station 1 only. All these samples were preserved with formalin at a final concentration of 2%, neutralized with calcium carbonate, in Boston round polyethylene bottles.

The preserved sea ice microalgae and phytoplankton were quantitatively analyzed for species composition and standing stock. The techniques for preparing permanent slides of cleaned diatoms for species identifications were described by Foy and Hsiao (1976). Sea ice microalgae and phytoplankton were identified with the aid of a Leitz phase-contrast compound microscope. References used to identify the species were Smith (1853, 1856), Cleve and Grunow (1880), Cleve (1873, 1883, 1884, 1894-1896, 1896, 1900a, b), Grunow (1884), Oestrup (1895), Van Heurck (1896), Gran (1900, 1904, 1908), Boyer (1926-27), Mann (1925), Heiden and Kolbe (1928), Lebour (1930), Hustedt (1930, 1959, 1961-66), Grøntved and Seidenfaden (1938), Cupp (1943), Cleve-Euler (1951-55), Schmidt et al. (1874-1959), Hendey (1964), Hasle (1964, 1965a, b, 1972) and Van Landingham (1967, 1968, 1969, 1971, 1975) for diatoms; Lebour (1925), Paulsen (1908, 1949), Schiller

(1933), Lemmermann (1908) and Leedale (1967) for dinoflagellates, chrysophytes and flagellates.

All samples were thoroughly shaken to suspend the cells. Subsamples of 10 mL (except for those taken from the bottom of the ice cores which, because of the dense concentrations of cells there, were only 1 mL) were pipetted into a Zeiss 10 mL phytoplankton sedimentation chamber. The cells were allowed to settle for 12-24 hours, and were enumerated with the aid of a Leitz inverted microscope at a magnification of 500 times. The cells in an area equivalent to 89 microscope fields were counted. They were identified to species when possible, otherwise to higher taxonomic levels or groups. Total cell counts were used to estimate the standing stock of sea ice microalgae and phytoplankton. Standing stock is given in cells per litre for each species. The results were tabulated. A "+" indicates that the organisms were observed at some time during the analysis but not during the count, while a "-" indicates that the organisms were not observed at any stage of the analysis. Cell numbers given as "spp" may include individuals of species listed that could not be identified during the count and/or different species.

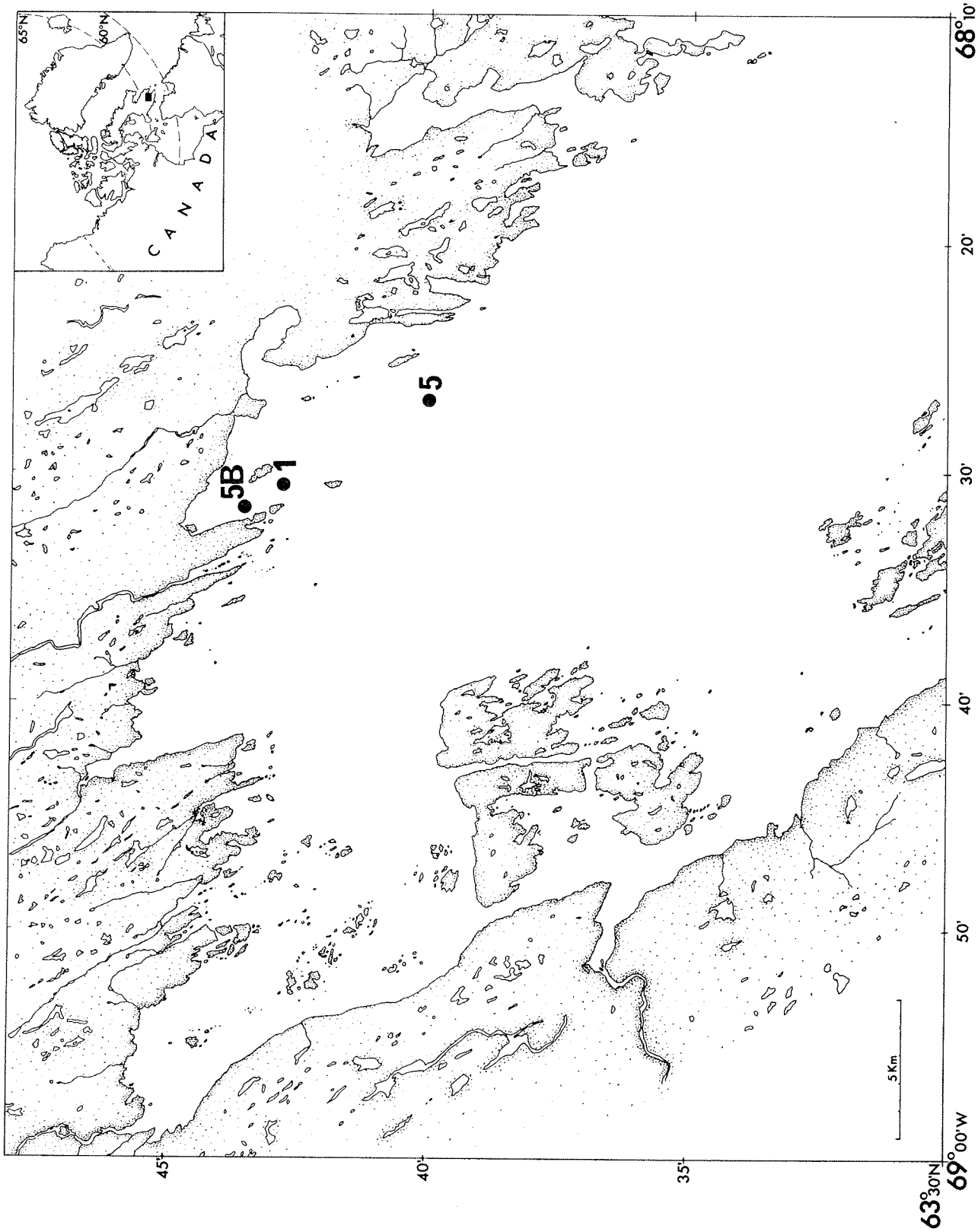

Figure 1. Station locations in Frobisher Bay.

List of Tables

Table 1. Phytoplankton taxa found in the water beneath the sea ice in Frobisher Bay.

Bacillariophyta
  Centrales
    Chaetoceros Ehrenberg
      C. furcellatus Bailey
    Melosira Agardh
    Thalassiosira Cleve
  Pennales
    Amphiprora Ehrenberg
      A. kjellmanii var. *striolata* (Grunow *in* Cleve and Grunow) Cleve
    Cocconeis Ehrenberg
      C. scutellum var. *parva* (Grunow *in* Van Heurck) Cleve
    Diploneis Ehrenberg
      D. litoralis var. *arctica* Cleve
    Fragilaria Lyngbye
    Gomphonema Agardh
      G. exiguum var. *pachycladum* (Brébisson *in* Brébisson and Godey) Cleve
    Navicula Bory
      N. marina Ralphs *in* Pritchard
      N. quadripedis Cleve-Euler
    Nitzschia Hassall
      N. cylindrus (Grunow) Hasle
      N. frigida Grunow
      N. hybrida Grunow
      N. polaris Grunow
    Pleurosigma Wm. Smith
    Tropidoneis Cleve
      T. maxima var. *dubia* (Cleve and Grunow) Cleve

Euglenophyta
    Euglena Ehrenberg

Pyrrophyta

Table 2. Genera and species of sea ice microalgae from Frobisher Bay.

Bacillariophyta
- Centrales
  - *Biddulphia* Gray
    - *B. aurita* (Lyngbye) Brébisson and Godey
  - *Chaetoceros* Ehrenberg
    - *C. borealis* Bailey
    - *C. fragilis* Meunier
    - *C. furcellatus* Bailey
    - *C. septentrionalis* Oestrup
  - *Coscinodiscus* Ehrenberg
    - *C. kuetzingii* var. *glacialis* Grunow
    - *C. lacustris* var. *septentrionalis* (Grunow) Rattray
    - *C. polyacanthus* Grunow *in* Cleve and Grunow
  - *Coscinosira* Gran
    - *C. oestrupii* Ostenfeld
  - *Melosira* Agardh
    - *M. arctica* (Ehrenberg) Dickie *in* Pritchard
  - *Rhizosolenia* Ehrenberg
  - *Thalassiosira* Cleve
    - *T. bioculata* var. *exigua* (Grunow) Hustedt
    - *T. decipiens* (Grunow) Joergensen
    - *T. gravida* Cleve
    - *T. nordenskioldii* Cleve
  - *Trigonium* Cleve
    - *T. arcticum* (Brightwell) Cleve
- Pennales
  - *Achnanthes* Bory
    - *A. delicatula* (Kuetzing) Grunow *in* Cleve and Grunow
    - *A. taeniata* Grunow *in* Cleve and Grunow
  - *Amphipleura* Kuetzing
    - *A. rutilans* (Trentepohl) Cleve
  - *Amphiprora* Ehrenberg
    - *A. concilians* Cleve
    - *A. gigantea* var. *septentrionalis* (Grunow *in* Cleve and Grunow) Cleve
    - *A. kjellmanii* var. *kariana* (Grunow *in* Cleve and Grunow) Cleve
    - *A. kjellmanii* var. *striolata* (Grunow *in* Cleve and Grunow) Cleve
    - *A. kryophila* Cleve
  - *Amphora* Ehrenberg
    - *A. eunotia* Cleve
    - *A. exsecta* Grunow *in* Schmidt et al.
    - *A. laevis* var. *laevissima* (Gregory) Cleve
    - *A. laevissima* var. *minuta* Cleve
    - *A. proteus* Gregory
  - *Bacillaria* Gmelin
    - *B. paradoxa* Gmelin *in* Linnaeus
  - *Caloneis* Cleve
    - *C. brevis* (Gregory) Cleve
    - *C. kryophila* (Cleve) Cleve
    - *C. semiinflata* (Oestrup) Boyer

Table 2 (Cont'd)

Cocconeis Ehrenberg
C. costata Gregory
C. placentula var. *euglypta* (Ehrenberg) Grunow
C. scutellum Ehrenberg
C. scutellum var. *parva* (Grunow *in* Van Heurck) Cleve
C. scutellum var. *stauroneiformis* Rabenhorst
Diploneis Ehrenberg
D. didyma (Ehrenberg) Ehrenberg
D. incurvata (Gregory) Cleve
D. lineata (Donkin) Cleve
D. litoralis var. *arctica* Cleve
D. litoralis var. *clathrata* (Oestrup) Cleve
D. smithii (Brébisson *in* Wm. Smith) Cleve
D. vacillans (Schmidt) Cleve
Eunotia Ehrenberg
Gomphonema Agardh
G. exiguum Kuetzing
G. exiguum var. *pachycladum* (Brébisson *in* Brébisson and Godey) Cleve
G. groenlandicum Oestrup
Grammatophora Ehrenberg
G. angulosa Ehrenberg
G. arctica Cleve
G. hamulifera Kuetzing
Gyrosigma Hassall
G. fasciola (Ehrenberg) Cleve
Hantzschia Grunow
H. weyprechtii Grunow *in* Cleve and Grunow
Licmophora Agardh
L. gracilis var. *anglica* (Kuetzing) Peragallo and Peragallo
Navicula Bory
N. algida Grunow
N. cancellata Donkin
N. cluthensis var. *pagophila* Grunow
N. crassirostris Grunow *in* Cleve and Grunow
N. crucigeroides Hustedt
N. decipiens O'Meara
N. digitoradiata (Gregory) Ralfs *in* Pritchard
N. directa (Wm. Smith) Ralfs *in* Pritchard
N. directa var. *javanica* Cleve
N. forcipata Greville
N. gastrum (Ehrenberg) Kuetzing
N. gelida Grunow
N. glacialis (Cleve) Grunow
N. imperfecta Cleve
N. kariana Grunow *in* Cleve and Grunow
N. kariana var. *detersa* Grunow *in* Cleve and Moeller
N. kjellmanii (Cleve *in* Cleve and Grunow) Cleve
N. lineola Grunow

Table 2 (Cont'd)

N. lyra var. *atlantica* Schmidt
N. marina Ralfs *in* Pritchard
N. novadecipiens Hustedt
N. obtusa (Cleve *in* Cleve and Moeller) Cleve
N. oestrupi Cleve
N. pellucida Karsten
N. perlucens Oestrup
N. pymaea Kuetzing
N. quadripedis Cleve-Euler
N. recurvata Gran
N. salinarum Grunow *in* Cleve and Moeller
N. siberica (Grunow *in* Cleve and Moeller) Cleve
N. solitaria Cleve
N. spicula (Hickie) Cleve
N. stuxbergii var. *subglabra* Oestrup
N. subinflata Grunow *in* Cleve and Moeller
N. superba Cleve
N. superba var. *crassa* (Oestrup) Gran
N. superba var. *elliptica* Cleve
N. superba var. *subacuta* Gran
N. transfuga var. *plagiostoma* (Grunow *in* Cleve and Moeller) Cleve
N. transfuga var. *septentrionalis* Oestrup
N. transitans Cleve
N. transitans var. *derasa* (Grunow *in* Cleve and Grunow) Cleve
N. transitans var. *erosa* (Cleve) Cleve
N. transitans var. *incudiformis* (Grunow *in* Cleve) Cleve
N. trigonocephala Cleve
N. trigonocephala var. *contracta* Oestrup
N. trigonocephala var. *depressa* Oestrup
N. valida Cleve and Grunow
N. valida var. *minuta* Cleve
Nitzschia Hassall
N. acicularis (Kuetzing) Wm. Smith
N. angularis Wm. Smith
N. brebissonii var. *borealis* Grunow
N. closterium (Ehrenberg) Wm. Smith
N. cylindrus (Grunow) Hasle
N. diaphana Cleve
N. distans var. *erratica* Cleve
N. frigida Grunow
N. gelida Cleve and Grunow
N. gruendleri Grunow
N. grunowii Hasle
N. hybrida Grunow
N. laevissima Grunow
N. lecointei Heurck
N. linearis (Agardh) Wm. Smith
N. linearis var. *tenuis* (Wm. Smith) Grunow

Table 2 (cont'd)

N. longissima (Brébisson) Ralfs
N. polaris Grunow
N. seriata Cleve
Pinnularia Ehrenberg
P. ambigua Cleve
P. quadratarea (Schmidt) Cleve
P. quadratarea var. *bicontracta* Oestrup
P. quadratarea var. *bicuneata* Heiden and Kolbe
P. quadratarea var. *constricta* Oestrup
P. quadratarea var. *cuneata* Oestrup
P. quadratarea var. *densestriata* Cleve
P. quadratarea var. *leptostauron* Cleve
P. quadratarea var. *maxima* Oestrup
P. quadratarea var. *minima* Oestrup
P. quadratarea var. *stuxbergii* (Cleve *in* Cleve and Grunow) Cleve
P. quadratarea var. *subconstricta* Oestrup
P. quadratarea var. *subcontinua* (Grunow) Cleve
P. semiinflata Cleve
P. semiinflata var. *decipiens* (Cleve) Gran
Plagiogramma Greville
P. staurophorum (Gregory) Heiberg
Pleurosigma Wm. Smith
P. antarcticum Heiden and Kolbe
P. clevei Grunow
P. cuspidatum Cleve
P. karianum Grunow
P. stuxbergii Cleve and Grunow
P. stuxbergii var. *minor* Grunow
Rhabdonema Kuetzing
R. arcuatum (Lyngbye) Kuetzing
R. minutum Kuetzing
Stenoneis Cleve
S. inconspicua var. *baculus* (Cleve) Cleve
Surirella Turpin
Synedra Ehrenberg
S. camtschatica var. *finnamarchica* Grunow
S. hyperborea Grunow
S. hyperborea var. *rostellata* Grunow
S. pulchella (Ralfs) Kuetzing
S. tabulata (Agardh) Kuetzing
S. tabulata var. *fasciculata* (Kuetzing) Grunow
Tabellaria Ehrenberg
T. flocculosa (Roth) Kuetzing
Trachyneis Cleve
T. aspera var. *aspera* (Ehrenberg) Cleve
Tropidoneis Cleve
T. maxima (Gregory) Cleve
T. maxima var. *dubia* (Cleve and Grunow) Cleve

Table 2 (cont'd)

Chlorophyta
    Unidentified green flagellates

Chrysophyta
    Phaeocystis Lagerheim
      P. pouchetii (Hariot) Lagerheim

Euglenophyta
    Euglena Ehrenberg
      E. proxima Dangeard

Pyrrophyta
    Goniaulax Diesing
    Peridinium Ehrenberg
    Prorocentrum Ehrenberg
      P. ovalis Rampi

Table 3. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5, April 27, 1971.

Sea ice thickness (cm)			158		
Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	148-158
Total sea ice microalgae (cells/litre)	141,418	203,064	369,862	525,790	65,452,910
Bacillariophyta	105,156	163,176	358,984	500,407	64,582,622
Centrales	47,139	10,878	7,252	43,513	4,097,606
Chaetoceros	+	+	-	3,626	652,716
C. borealis	-	-	-	+	-
C. septentrionalis	+	+	-	-	145,048
C. spp.	-	-	-	3,626	507,668
Coscinodiscus	+	+	+	+	-
C. polyacanthus	-	-	-	+	-
C. spp.	+	+	+	+	-
Coscinosira	+	+	+	3,626	+
C. oestrupii	+	+	+	3,626	+
Melosira	-	-	-	-	688,978
M. arctica	-	-	-	-	543,930
M. spp.	-	-	-	-	145,048
Rhizosolenia	-	-	-	-	145,048
R. spp.	-	-	-	-	145,048
Thalassiosira	10,878	+	-	10,878	217,572
T. bioculata var. *exigua*	-	+	-	-	-
T. gravida	-	-	-	-	72,524
T. nordenskioldii	3,626	-	-	7,252	145,048
T. spp.	7,252	-	-	3,626	-
Trigonium	3,626	3,626	3,626	-	-
T. arcticum	3,626	3,626	3,626	-	-
Unidentified	32,635	7,252	3,626	25,383	2,393,292

Table 3. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	148-158
Pennales	58,017	152,298	351,732	456,894	60,485,016
Achnanthes	-	-	-	-	4,641,536
A. taeniata	-	-	-	-	2,973,484
A. spp.	-	-	-	-	1,668,052
Amphiprora	-	+	50,765	3,626	2,937,222
A. gigantea var. *septentrionalis*	-	-	-	+	435,144
A. kjellmanii var. *kariana*	-	-	-	-	145,048
A. kjellmanii var. *striolata*	-	+	14,504	+	1,087,860
A. kryophila	-	-	25,383	+	543,930
A. spp.	-	+	10,878	3,626	725,240
Amphora	-	-	21,757	14,504	1,958,148
A. eunotia	-	-	3,626	3,626	-
A. exsecta	-	-	-	-	+
A. laevis var. *laevissima*	-	-	-	-	870,288
A. spp.	-	-	18,131	10,878	1,087,860
Bacillaria	-	-	-	-	+
B. paradoxa	-	-	-	-	+
Caloneis	-	+	-	-	108,786
C. kryophila	-	+	-	-	108,786
Cocconeis	3,626	3,626	-	+	+
C. costata	-	-	-	-	+
C. scutellum	+	-	-	-	-
C. scutellum var. *parva*	-	-	-	+	-
C. scutellum var. *stauroneiformis*	-	3,626	-	-	-
C. spp.	3,626	-	-	-	+
Diploneis	-	+	10,878	3,626	398,882
D. lineata	-	-	-	-	+
D. litoralis var. *arctica*	-	+	10,878	3,626	72,524
D. spp.	-	-	-	-	326,358

Table 3. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	148-158
Gomphonema	+	+	7,252	3,626	2,175,720
G. exiguum var. *pachycladum*	+	+	3,626	3,626	725,240
G. groenlandicum	-	-	-	+	507,668
G. spp.	-	-	3,626	-	942,812
Licmophora	3,626	-	-	-	-
L. spp.	3,626	-	-	-	-
Navicula	7,252	39,887	130,540	123,289	8,050,164
N. cluthensis var. *pagophila*	-	-	-	+	-
N. crassirostris	-	-	-	+	+
N. crucigeroides	-	-	3,626	3,626	+
N. decipiens	-	+	-	-	+
N. digitoradiata	-	-	10,878	7,252	72,524
N. directa	+	+	14,504	7,252	72,524
N. directa var. *javanica*	-	-	3,626	-	-
N. forcipata	-	-	3,626	-	+
N. gastrum	+	-	+	-	-
N. gelida	-	+	3,626	+	+
N. glacialis	-	-	-	-	+
N. imperfecta	-	-	-	-	+
N. kariana	-	-	-	+	-
N. kariana var. *detersa*	-	-	+	-	+
N. kjellmanii	-	-	3,626	+	108,786
N. marina	-	-	-	-	+
N. novadecipiens	-	-	-	-	+
N. obtusa	-	-	-	-	+
N. quadripedis	-	-	-	-	4,496,488
N. recurvata	-	10,878	10,878	+	+
N. stuxbergii var. *subglabra*	-	-	-	-	+
N. subinflata	+	-	+	-	-

Table 3. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	148-158
N. superba	-	-	-	+	+
N. superba var. *crassa*	-	-	-	+	+
N. superba var. *subacuta*	-	-	-	-	72,524
N. transitans	-	-	+	3,626	145,048
N. transitans var. *derasa*	-	-	-	-	+
N. transitans var. *erosa*	-	-	-	-	+
N. transitans var. *incudiformis*	-	+	+	+	+
N. trigonocephala	-	-	-	-	+
N. trigonocephala var. *contracta*	-	-	-	-	72,524
N. trigonocephala var. *depressa*	-	-	-	+	+
N. valida	-	-	+	3,626	+
N. valida var. *minuta*	-	-	-	-	+
N. spp.	7,252	29,009	76,150	97,907	3,009,746
Nitzschia	14,504	65,271	119,662	155,924	26,688,832
N. brebissonii var. *borealis*	-	-	+	+	+
N. closterium	-	3,626	-	-	1,015,336
N. cylindrus	7,252	25,383	3,626	10,878	4,786,584
N. diaphana	-	-	10,878	3,626	145,048
N. distans var. *erratica*	-	-	-	7,252	398,882
N. gelida	-	-	-	-	362,620
N. gruendleri	-	-	-	-	725,240
N. hybrida	+	+	14,504	+	217,572
N. laevissima	-	-	7,252	10,878	580,192
N. lecointei	-	-	-	+	+
N. linearis	-	-	-	-	362,620
N. linearis var. *tenuis*	-	-	+	7,252	-
N. polaris	7,252	+	29,009	36,262	1,450,480
N. seriata	-	-	-	-	1,196,646
N. spp.	+	36,262	54,393	79,776	15,447,612

Table 3. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	148-158
Pinnularia	+	3,626	+	+	688,978
P. ambigua	-	-	-	-	+
P. quadratarea	+	+	-	-	-
P. quadratarea var. *bicontracta*	-	-	-	+	72,524
P. quadratarea var. *bicuneata*	-	-	-	-	+
P. quadratarea var. *constricta*	-	-	-	+	145,048
P. quadratarea var. *maxima*	-	-	-	-	+
P. quadratarea var. *minima*	-	-	-	+	+
P. quadratarea var. *stuxbergii*	+	+	+	+	+
P. semiinflata	-	-	-	-	+
P. semiinflata var. *decipiens*	-	-	-	-	+
P. spp.	-	3,626	+	+	471,406
Pleurosigma	-	+	+	21,756	1,160,384
P. antarcticum	-	-	-	3,626	435,144
P. clevei	-	-	+	7,252	145,048
P. cuspidatum	-	-	+	-	+
P. stuxbergii	-	-	+	+	72,524
P. stuxbergii var. *minor*	-	+	+	+	-
P. spp.	-	+	+	10,878	507,668
Stenoneis	+	-	-	-	435,144
S. inconspicua var. *baculus*	+	-	-	-	435,144
Synedra	+	3,626	-	3,626	145,048
S. tabulata	+	+	-	-	+
S. spp.	+	3,626	-	3,626	145,048
Tropidoneis	+	-	-	+	362,620
T. maxima	+	-	-	+	362,620
Unidentified	29,009	36,262	108,786	126,917	10,733,552

Table 3. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	148-158
Euglenophyta	-	-	-	-	362,620
Euglena	-	-	-	-	362,620
E. proxima	-	-	-	-	+
E. spp.	-	-	-	-	362,620
Pyrrophyta	36,262	39,888	10,878	25,383	507,668
Unidentified	36,262	39,888	10,878	25,383	507,668

Table 4. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5B, April 27, 1971.

Sea ice thickness (cm)			163		
Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	153-163
Total sea ice microalgae (cells/litre)	221,194	58,016	348,111	525,791	38,205,643
Bacillariophyta	217,568	36,260	329,980	471,398	38,060,595
Centrales	29,008	18,130	7,252	39,887	3,916,296
Biddulphia	-	-	-	-	+
B. aurita	-	-	-	-	+
Chaetoceros	3,626	+	-	+	797,764
C. furcellatus	+	+	-	+	290,096
C. septentrionalis	-	-	-	-	72,524
C. spp.	3,626	-	-	+	435,144
Coscinodiscus	+	-	+	+	145,048
C. kuetzingii var. *glacialis*	+	-	-	-	-
C. polyacanthus	-	-	+	-	-
C. spp.	-	-	-	+	145,048
Coscinosira	+	+	+	+	-
C. oestrupii	+	+	+	+	-
Melosira	-	-	-	-	290,096
M. spp.	-	-	-	-	290,096
Rhizosolenia	-	-	-	-	36,262
R. spp.	-	-	-	-	36,262
Thalassiosira	10,878	7,252	+	7,252	362,620
T. gravida	-	-	+	-	-
T. nordenskioldii	-	-	+	3,626	217,572
T. spp.	10,878	7,252	-	3,626	145,048
Trigonium	-	-	-	-	36,262
T. spp.	-	-	-	-	36,262
Unidentified	14,504	10,878	7,252	32,635	2,248,244

Table 4. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	153-163
Pennales	188,560	18,130	322,728	431,511	34,144,299
Achnanthes	+	-	14,504	21,757	+
A. delicatula	-	-	-	-	+
A. spp.	+	-	14,504	21,757	-
Amphipleura	-	-	-	-	+
A. rutilans	-	-	-	-	+
Amphiprora	+	-	21,757	25,383	1,377,956
A. gigantea var. *septentrionalis*	+	-	+	+	652,716
A. kjellmanii var. *kariana*	-	-	+	-	-
A. kjellmanii var. *striolata*	-	-	+	3,626	-
A. kryophila	-	-	3,626	+	-
A. spp.	-	-	18,131	21,757	725,240
Amphora	3,626	+	+	3,626	2,610,864
A. exsecta	-	+	-	-	72,524
A. laevis var. *laevissima*	-	-	-	+	797,764
A. proteus	-	-	-	-	290,096
A. spp.	3,626	-	+	3,626	1,450,480
Bacillaria	-	-	-	+	+
B. paradoxa	-	-	-	+	+
Caloneis	-	-	-	-	+
C. brevis	-	-	-	-	+
C. kryophila	-	-	-	-	+
Cocconeis	+	-	-	7,252	1,704,314
C. costata	-	-	-	-	+
C. scutellum	+	-	-	-	-
C. scutellum var. *parva*	+	-	-	-	290,096
C. scutellum var. *stauroneiformis*	+	-	-	3,626	725,240
C. spp.	-	-	-	3,626	688,978
Diploneis	+	-	14,504	14,504	652,716
D. didyma	-	-	-	-	+

Table 4. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	153-163
D. incurvata	-	-	-	-	+
D. lineata	-	-	3,626	-	72,524
D. litoralis var. *arctica*	-	-	7,252	14,504	290,096
D. smithii	+	-	-	+	+
D. vacillans	-	-	-	-	+
D. spp.	-	-	3,626	-	290,096
Eunotia	-	-	-	-	+
E. spp.	-	-	-	-	+
Gomphonema	3,626	-	+	+	725,240
G. exiguum var. *pachycladum*	3,626	-	+	+	725,240
G. groenlandicum	-	-	-	+	+
Grammatophora	-	-	-	-	+
G. hamulifera	-	-	-	-	+
Gyrosigma	-	-	-	-	+
G. fasciola	-	-	-	-	+
Licmophora	-	-	-	-	108,786
L. gracilis var. *anglica*	-	-	-	-	108,786
Navicula	10,878	3,626	90,654	130,542	6,672,208
N. crassirostris	-	-	+	-	-
N. crucigeroides	-	-	-	-	290,096
N. decipiens	-	-	-	+	+
N. digitoradiata	-	-	-	18,131	217,572
N. directa	-	+	14,504	10,878	507,668
N. directa var. *javanica*	-	-	-	-	+
N. forcipata	+	-	+	+	+
N. gelida	+	+	+	+	+
N. glacialis	-	-	-	+	72,524
N. kjellmanii	+	-	-	+	+
N. lyra var. *atlantica*	-	-	-	-	+

Table 4. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	153-163
N. marina	-	-	+	+	72,524
N. obtusa	-	-	-	-	+
N. pellucida	-	-	-	-	+
N. perlucens	-	-	-	+	-
N. quadripedis	-	-	-	-	870,288
N. recurvata	-	-	+	+	145,048
N. solitaria	-	-	-	-	+
N. stuxbergii var. *subglabra*	-	+	+	-	-
N. superba	-	-	-	+	+
N. superba var. *subacuta*	-	-	-	-	+
N. transfuga	-	-	-	-	+
N. transitans	-	-	+	+	+
N. transitans var. *derasa*	-	-	+	+	+
N. transitans var. *incudiformis*	-	-	+	+	+
N. trigonocephala	-	-	-	-	72,524
N. trigonocephala var. *depressa*	-	-	-	-	+
N. valida	-	-	3,626	3,626	72,524
N. valida var. *minuta*	-	-	+	3,626	+
N. spp.	10,878	3,626	72,524	94,281	4,351,440
Nitzschia	134,168	+	90,655	112,410	15,701,446
N. acicularis	-	+	+	-	36,262
N. brebissonii var. *borealis*	-	-	+	+	72,524
N. closterium	-	-	-	10,878	1,015,336
N. cylindrus	7,252	+	54,393	14,504	652,716
N. diaphana	-	+	-	-	+
N. frigida	-	-	-	-	1,414,218
N. gruendleri	-	-	+	-	217,572
N. hybrida	-	-	+	+	652,716
N. laevissima	-	-	+	-	-

Table 4. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	153-163
N. lecointei	-	+	-	+	-
N. polaris	14,504	+	+	18,131	2,792,174
N. seriata	-	-	-	+	-
N. spp.	47,140	-	36,262	68,897	8,847,928
Pinnularia	+	-	7,252	10,878	362,620
P. ambigua	-	-	-	+	-
P. quadratarea var. *bicontracta*	-	-	+	+	+
P. quadratarea var. *constricta*	-	-	+	+	72,524
P. quadratarea var. *minima*	-	-	-	+	-
P. quadratarea var. *stuxbergii*	+	-	3,626	3,626	+
P. spp.	+	-	3,626	7,252	290,096
Plagiogramma	-	-	-	-	+
P. staurophorum	-	-	-	-	+
Pleurosigma	+	7,252	+	3,626	1,595,528
P. antarcticum	-	-	-	+	217,572
P. clevei	+	-	-	-	-
P. cuspidatum	-	-	-	-	+
P. karianum	+	-	-	-	-
P. stuxbergii	-	3,626	-	+	290,096
P. stuxbergii var. *minor*	-	-	+	+	145,048
P. spp.	+	3,626	+	3,626	942,812
Rhabdonema	+	+	-	-	1,051,598
R. arcuatum	+	-	-	-	36,262
R. minutum	-	+	-	-	1,015,336
Stenoneis	-	-	-	-	+
S. inconspicua var. *baculus*	-	-	-	-	+
Surirella	-	-	-	-	+
*S.*spp.	-	-	-	-	+
Synedra	+	-	-	3,626	507,668
S. camtschatica var. *finnamarchica*	-	-	-	-	+

Table 4. (cont'd.)

Ice section from top to bottom	0-10	35-45	70-80	105-115	153-163
S. pulchella	-	-	-	+	+
S. tabulata	+	-	-	+	253,834
S. spp.	-	-	-	3,626	253,834
Tabellaria	-	-	-	-	+
T. flocculosa	-	-	-	-	+
Trachyneis	-	-	-	-	+
T. aspera var. *aspera*	-	-	-	-	+
Tropidoneis	-	-	+	-	72,524
T. maxima	-	-	+	-	72,524
Unidentified	36,262	7,252	83,402	97,907	1,000,831
Chlorophyta					
Unidentified green flagellates	-	7,252	-	-	-
Chrysophyta	-	-	-	18,131	-
Phaeocystis	-	-	-	18,131	-
P. pouchetii	-	-	-	18,131	-
Euglenophyta	-	-	-	-	72,524
Euglena	-	-	-	-	72,524
E. spp.	-	-	-	-	72,524
Pyrrophyta	3,626	14,504	18,131	36,262	72,524
Peridinium	-	-	-	-	72,524
P. spp.	-	-	-	-	72,524
Unidentified	3,626	14,504	18,131	36,262	-

Table 5. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5, May 27, 1971.

Sea ice thickness (cm)			160		
Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	152-160
Total sea ice microalgae (cells/litre)	638,205	431,510	848,521	1,127,732	68,172,560
Bacillariophyta	623,701	391,623	830,390	1,109,601	67,374,796
Centrales	87,027	36,261	83,401	105,158	5,584,348
Chaetoceros	+	+	10,878	3,626	1,486,742
C. furcellatus	-	-	+	+	-
C. septentrionalis	-	-	-	-	217,572
C. spp.	+	+	10,878	3,626	1,269,170
Coscinodiscus	+	-	-	+	+
C. spp.	+	-	-	+	+
Coscinosira	10,878	+	3,626	3,626	-
C. oestrupii	10,878	+	3,626	3,626	-
Melosira	-	-	-	-	1,124,122
M. spp.	-	-	-	-	1,124,122
Thalassiosira	7,252	3,626	21,757	32,635	362,620
T. bioculata var. *exigua*	-	-	-	-	+
T. decipiens	-	-	+	-	-
T. gravida	-	-	-	+	-
T. nordenskioldii	3,626	-	-	18,131	362,620
T. spp.	3,626	3,626	21,757	14,504	+
Unidentified	68,897	32,635	47,140	65,271	2,610,864
Pennales	536,674	355,362	746,989	1,004,443	61,790,448
Achnanthes	+	+	+	7,252	1,849,362
A. spp.	+	+	+	7,252	1,849,362
Amphiprora	+	+	50,766	43,513	3,553,676
A. gigantea var. *septentrionalis*	-	-	-	+	652,716
A. kjellmanii var. *kariana*	-	-	-	7,252	-
A. kjellmanii var. *striolata*	+	-	3,626	+	507,668

Table 5. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	152-160
A. kryophila	-	-	25,383	10,878	507,668
A. spp.	-	+	21,757	25,383	1,885,624
Amphora	3,626	3,626	3,626	39,887	2,284,506
A. exsecta	+	-	3,626	-	-
A. laevis var. *laevissima*	-	-	-	3,626	1,087,860
A. laevissima var. *minuta*	-	-	-	3,626	-
A. spp.	3,626	3,626	+	32,635	1,196,646
Caloneis	-	-	-	+	181,310
C. kryophila	-	-	-	+	181,310
Cocconeis	18,131	14,504	-	3,626	217,572
C. costata	+	-	-	-	+
C. scutellum var. *parva*	+	+	-	+	-
C. scutellum var. *stauroneiformis*	+	-	-	-	-
C. spp.	18,131	14,504	-	3,626	217,572
Diploneis	+	+	21,757	29,008	797,764
D. lineata	-	-	-	+	72,524
D. litoralis var. *arctica*	+	+	18,131	14,504	435,144
D. spp.	-	-	3,626	14,504	290,096
Gomphonema	+	-	3,626	14,504	1,994,410
G. exiguum var. *pachucladum*	+	-	3,626	10,878	1,631,790
G. groenlandicum	-	-	-	3,626	290,096
G. spp.	-	-	-	-	72,524
Hantzschia	-	-	-	+	-
H. weyprechtii	-	-	-	+	-
Licmophora	+	-	-	+	-
L. spp.	+	-	-	+	-
Navicula	61,645	58,018	90,653	250,204	9,138,024
N. algida	-	-	-	+	+
N. cluthensis var. *pagophila*	-	-	+	+	+

Table 5. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	152-160
N. crassirostris	-	-	-	3,626	72,524
N. crucigeroides	-	-	-	3,626	290,096
N. decipiens	-	-	-	+	108,786
N. digitoradiata	-	-	7,252	3,626	435,144
N. directa	-	+	10,878	21,757	507,668
N. forcipata	-	-	-	+	+
N. gastrum	-	+	-	14,504	-
N. gelida	+	+	+	7,252	+
N. imperfecta	-	-	-	-	+
N. kariana	-	-	-	+	-
N. kjellmanii	-	3,626	+	3,626	253,834
N. marina	-	-	-	3,626	72,524
N. novadecipiens	-	-	-	+	+
N. obtusa	-	-	-	+	+
N. oestrupi	-	-	-	-	+
N. quadripedis	-	-	-	-	1,450,480
N. recurvata	-	-	3,626	+	36,262
N. solitaria	-	-	-	+	+
N. subinflata	-	+	-	-	-
N. superba	-	7,252	-	+	36,262
N. superba var. *crassa*	-	-	-	-	+
N. superba var. *subacuta*	-	-	-	-	108,786
N. transfuga var. *septentrionalis*	-	-	-	-	36,262
N. transitans	-	-	+	3,626	290,096
N. transitans var. *derasa*	-	-	+	+	+
N. transitans var. *incudiformis*	+	+	3,626	+	+
N. transitans var. *erosa*	-	-	-	+	+
N. trigonocephala	-	-	-	-	145,048
N. trigonocephala var. *contracta*	-	-	-	-	72,524
N. trigonocephala var. *depressa*	-	-	3,626	10,878	-
N. valida	-	-	7,252	3,626	362,620

Table 5. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	152-160
N. valida var. *minuta*	-	-	+	3,626	108,786
N. spp.	61,645	47,140	54,393	166,805	4,750,322
Nitzschia	297,346	159,550	427,889	348,112	26,072,378
N. acicularis	-	+	-	3,626	-
N. brébissonii var. *borealis*	-	-	3,626	3,626	108,786
N. closterium	58,019	10,878	18,131	61,645	2,393,292
N. cylindrus	76,150	18,131	65,271	21,757	4,895,370
N. diaphana	-	-	-	+	-
N. distans var. *erratica*	-	-	+	7,252	1,559,266
N. frigida	-	-	-	36,262	2,683,388
N. gelida	-	-	-	-	290,096
N. gruendleri	-	-	-	3,626	+
N. hybrida	+	+	145,048	7,252	290,096
N. laevissima	3,626	3,626	10,878	10,878	362,620
N. lecointei	-	+	-	+	-
N. linearis	-	-	-	-	362,620
N. polaris	32,635	10,878	50,766	29,009	1,631,790
N. spp.	126,916	116,037	134,169	163,179	11,495,054
Pinnularia	-	7,252	18,130	7,252	1,305,432
P. ambigua	-	-	-	-	+
P. quadratarea	-	3,626	-	-	-
P. quadratarea var. *bicontracta*	-	-	+	+	290,096
P. quadratarea var. *bicuneata*	-	-	+	-	+
P. quadratarea var. *constricta*	-	-	3,626	+	435,144
P. quadratarea var. *stuxbergii*	-	-	10,878	+	108,786
P. quadratarea var. *subconstricta*	-	-	3,626	+	-
P. semiinflata	-	-	-	+	-
P. semiinflata var. *decipiens*	-	-	-	-	+
P. spp.	-	3,626	+	7,252	471,406
Rhabdonema	-	+	-	-	-
R. spp.	-	+	-	-	-

Table 5. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	152-160
Stenoneis	-	+	7,252	3,626	290,096
S. inconspicua var. *baculus*	-	+	7,252	3,626	290,096
Synedra	10,878	+	-	-	580,192
S. tabulata	+	-	-	-	-
S. spp.	10,878	+	-	-	580,192
Tropidoneis	-	+	+	7,252	725,240
T. maxima	-	+	+	7,252	725,240
Unidentified	145,048	112,412	123,290	250,207	12,800,486
Chlorophyta	3,626	10,878	-	-	-
Unidentified green flagellates	3,626	10,878	-	-	-
Euglenophyta	-	-	-	-	362,620
Euglena	-	-	-	-	362,620
E. spp.	-	-	-	-	362,620
Pyrrophyta	10,878	29,009	18,131	18,131	435,144
Unidentified	10,878	29,009	18,131	18,131	435,144

Table 6. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5B, May 27, 1971.

Sea ice thickness (cm)			166		
Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	158-166
Total sea ice microalgae (cells/litre)	957,309	627,326	902,913	1,493,978	54,429,262
Bacillariophyta	950,057	591,065	892,035	1,483,100	53,341,402
Centrales	79,776	76,149	112,411	206,690	1,813,100
Chaetoceros	+	3,626	7,252	32,635	290,096
C. fragilis	+	-	-	+	-
C. furcellatus	-	3,626	-	3,626	-
C. spp.	+	-	7,252	29,009	290,096
Coscinodiscus	+	+	3,626	+	+
C. spp.	+	+	3,626	+	+
Coscinosira	+	+	7,252	10,878	-
C. oestrupii	+	+	7,252	10,878	-
Melosira	-	7,252	-	32,635	-
M. spp.	-	7,252	-	32,635	-
Thalassiosira	7,252	14,504	21,757	21,756	+
T. decipiens	-	+	+	-	-
T. gravida	-	-	-	+	-
T. nordenkioldii	-	-	-	10,878	-
T. spp.	7,252	14,504	21,757	10,878	+
Trigonium	-	-	-	-	72,524
T. arcticum	-	-	-	-	72,524
Unidentified	72,524	58,019	72,524	141,421	1,450,480
Pennales	870,281	514,916	779,624	1,276,410	51,528,302
Achnanthes	39,888	+	+	76,150	797,764
A. delicatula	-	-	-	+	-
A. spp.	39,888	+	+	76,150	797,764

Table 6. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	158-166
Amphiprora	14,504	32,635	112,411	119,663	1,160,384
A. gigantea var. *septentrionalis*	-	+	-	7,252	290,096
A. kjellmanii var. *kariana*	-	-	-	7,252	-
A. kjellmanii var. *striolata*	-	-	54,393	21,757	72,524
A. kryophila	-	3,626	7,252	25,383	-
A. spp.	14,504	29,009	50,766	58,019	797,764
Amphora	14,504	10,878	7,252	21,757	3,553,676
A. exsecta	+	-	-	-	-
A. laevis var. *laevissima*	-	-	-	-	1,015,336
A. laevissima var. *minuta*	-	-	-	-	870,288
A. spp.	14,504	10,878	7,252	21,757	1,668,052
Caloneis	-	-	-	-	+
C. kryophila	-	-	-	-	+
Cocconeis	29,009	3,626	3,626	+	108,786
C. costata	+	-	-	-	-
C. scutellum var. *parva*	-	-	+	+	-
C. scutellum var. *stauroneiformis*	+	-	-	+	-
C. spp.	29,009	3,626	3,626	-	108,786
Diploneis	+	+	3,626	7,252	398,882
D. lineata	-	-	-	+	+
D. litoralis var. *arctica*	+	+	+	3,626	362,620
D. smithii	-	-	-	+	-
D. spp.	-	-	3,626	3,626	36,262
Eunotia	-	-	-	+	-
E. spp.	-	-	-	+	-
Gomphonema	7,252	-	-	10,878	580,192
G. exiguum var. *pachycladum*	7,252	-	-	7,252	290,096
G. groenlandicum	-	-	-	3,626	36,262
G. spp.	-	-	-	-	253,834
Hantzschia	-	-	-	-	+
H. weyprechtii	-	-	-	-	+

Table 6. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	158-166
Licmophora	-	-	-	+	-
L. spp.	-	-	-	+	-
Navicula	163,178	87,028	126,915	315,476	10,189,622
N. algida	-	-	-	-	217,572
N. cancellata	+	-	-	-	-
N. cluthensis var. *pagophila*	-	-	-	3,626	-
N. crassirostris	+	-	-	3,626	145,048
N. crucigeroides	+	-	-	-	688,978
N. digitoradiata	3,626	7,252	7,252	7,252	217,572
N. directa	+	3,626	10,878	18,131	217,572
N. directa var. *javanica*	-	-	-	-	+
N. forcipata	-	-	3,626	+	+
N. gastrum	-	-	-	3,626	-
N. gelida	+	+	+	3,626	+
N. kariana	-	-	-	+	+
N. kjellmanii	-	-	+	3,626	435,144
N. marina	+	-	-	7,252	1,015,336
N. obtusa	-	-	-	-	+
N. oestrupi	-	-	+	-	-
N. quadripedis	-	-	-	-	1,559,266
N. recurvata	-	-	+	10,878	72,524
N. siberica	-	-	-	-	36,262
N. solitaria	-	+	-	3,626	+
N. subinflata	-	+	+	-	-
N. superba	-	-	-	+	+
N. superba var. *crassa*	-	-	-	-	+
N. superba var. *subacuta*	-	-	-	-	72,524
N. transitans	-	-	+	3,626	36,262
N. transitans var. *derasa*	-	-	+	+	+
N. transitans var. *erosa*	-	-	-	-	+
N. transitans var. *incudiformis*	-	-	+	+	+

Table 6. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	158-166
N. transfuga var. *septentrionalis*	-	-	-	-	+
N. trigonocephala	3,626	-	3,626	-	290,096
N. trigonocephala var. *contracta*	-	-	-	-	72,524
N. trigonocephala var. *depressa*	-	-	-	7,252	72,524
N. valida	-	+	3,626	+	36,262
N. valida var. *minuta*	-	-	-	3,626	181,310
N. spp.	155,926	76,150	97,907	235,703	4,822,846
Nitzschia	424,264	206,692	210,316	271,963	22,554,964
N. acicularis	3,626	-	3,626	+	181,310
N. brebissonii var. *borealis*	-	-	-	+	+
N. closterium	108,786	76,150	50,766	36,262	4,569,012
N. cylindrus	145,048	50,766	50,766	97,907	1,015,336
N. distans var. *erratica*	-	3,626	-	-	217,572
N. frigida	-	-	29,009	25,383	4,133,868
N. gruendleri	-	-	+	+	+
N. hybrida	3,626	-	3,626	-	2,538,340
N. laevissima	-	-	+	+	-
N. lecointei	-	-	+	+	-
N. polaris	3,626	+	7,252	32,635	3,517,414
N. spp.	159,552	76,150	65,271	79,776	6,382,112
Pinnularia	3,626	7,252	7,252	18,130	652,716
P. ambigua	-	-	-	-	+
P. quadratarea	-	3,626	+	-	+
P. quadratarea var. *bicontracta*	-	-	-	-	108,786
P. quadratarea var. *bicuneata*	-	-	-	+	-
P. quadratarea var. *constricta*	+	+	-	-	362,620
P. quadratarea var. *leptostauron*	-	-	+	+	-
P. quadratarea var. *minima*	-	-	-	-	+
P. quadratarea var. *stuxbergii*	+	+	+	10,878	+
P. quadratarea var. *subconstricta*	-	-	3,626	+	-

Table 6. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	158-166
P. semiinflata	-	+	-	-	+
P. semiinflata var. *decipiens*	-	-	+	-	-
P. spp.	3,626	3,626	3,626	7,252	181,310
Pleurosigma	3,626	3,626	10,878	25,382	1,087,860
P. antarcticum	-	+	3,626	10,878	217,572
P. clevei	-	-	-	-	290,096
P. cuspidatum	-	-	-	-	145,048
P. stuxbergii	+	-	-	3,626	72,524
P. stuxbergii var. *minor*	-	-	3,626	7,252	-
P. spp.	3,626	3,626	3,626	3,626	362,620
Rhabdonema	+	-	-	-	-
R. spp.	+	-	-	-	-
Stenoneis	-	+	-	7,252	-
S. inconspicua var. *baculus*	-	+	-	7,252	-
Synedra	10,878	-	-	7,252	435,144
S. hyperborea var. *rostellata*	+	-	-	-	-
S. tabulata	3,626	-	-	-	-
S. spp.	7,252	-	-	7,252	435,144
Tabellaria	-	-	-	+	-
T. spp.	-	-	-	+	-
Trachyneis	+	-	-	-	-
T. aspera var. *aspera*	+	-	-	-	-
Tropidoneis	+	-	7,252	+	580,192
T. maxima	+	-	7,252	+	580,192
Unidentified	159,552	163,179	290,096	395,255	9,428,120
Chlorophyta	-	-	-	-	181,310
Unidentified green flagellates	-	-	-	-	181,310

Table 6. (cont'd.)

Ice section from top to bottom (cm)	0-8	37-45	72-80	107-115	158-166
Euglenophyta	-	3,626	-	-	471,406
Euglena	-	3,626	-	-	471,406
E. spp.	-	3,626	-	-	471,406
Pyrrophyta	7,252	32,635	10,878	10,878	435,144
Unidentified	7,252	32,635	10,878	10,878	435,144

Table 7. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5 during June 1971.

Date	June 3	June 9
Sea ice thickness (cm)	159	158
Ice section from top to bottom (cm)	151-159	150-158
Total sea ice microalgae (cells/litre)	51,238,206	41,810,086
Bacillariophyta	50,150,346	41,665,038
Centrales	3,698,724	2,030,672
Chaetoceros	725,240	1,015,336
C. furcellatus	+	72,524
C. septentrionalis	362,620	+
C. spp.	362,620	942,812
Coscinodiscus	+	72,524
C. spp.	+	72,524
Melosira	1,087,860	+
M. artica	72,524	+
M. spp.	1,015,336	+
Thalassiosira	290,096	217,572
T. nordenskioldii	290,096	217,572
T. spp.	+	+
Unidentified	1,595,528	725,240
Pennales	46,451,622	39,634,366
Achnanthes	2,030,672	1,160,384
A. spp.	2,030,672	1,160,384
Amphiprora	1,015,336	290,096
A. gigantea var. *septentrionalis*	217,572	145,048
A. kjellmanii var. *striolata*	290,096	+
A. spp.	507,668	145,048
Amphora	2,030,672	1,377,956
A. laevis var. *laevissima*	1,450,480	435,144
A. laevissima var. *minuta*	72,524	+
A. spp.	507,668	942,812
Caloneis	108,786	+
C. kryophila	108,786	+
Cocconeis	+	+
C. costata	+	+
C. scutellum var. *parva*	+	+
C. scutellum var. *stauroneiformis*	-	+
C. spp.	-	-
Diploneis	72,524	72,524
D. litoralis var. *arctica*	72,524	72,524
Gomphonema	1,994,410	1,668,052
G. exiguum var. *pachycladum*	1,486,742	1,377,956
G. groenlandicum	507,668	290,096

Table 7. (cont'd.)

Date	June 3	June 9
Navicula	6,926,042	4,931,632
N. algida	+	-
N. crucigeroides	72,524	-
N. decipiens	290,096	+
N. digitoradiata	145,048	72,524
N. directa	+	108,786
N. directa var. *javanica*	145,048	-
N. forcipata	+	+
N. gastrum	217,572	-
N. gelida	+	+
N. imperfecta	72,524	+
N. kariana	+	-
N. kjellmanii	217,572	362,620
N. marina	+	+
N. obtusa	+	+
N. oestrupi	72,524	-
N. quadripedis	1,015,336	36,262
N. recurvata	+	+
N. stuxbergii var. *subglabra*	+	72,524
N. superba	72,524	108,786
N. superba var. *crassa*	+	+
N. superba var. *subacuta*	+	+
N. transitans	217,572	+
N. transitans var. *derasa*	+	+
N. transitans var. *erosa*	+	+
N. transitans var. *incudiformis*	+	+
N. trigonocephala	72,524	72,524
N. trigonocephala var. *depressa*	+	+
N. valida	435,144	145,048
N. valida var. *minuta*	145,048	108,786
N. spp.	3,734,986	3,843,772
Nitzschia	13,924,608	16,535,472
N. brebissonii var. *borealis*	72,524	+
N. closterium	2,792,174	217,572
N. cylindrus	1,740,576	145,048
N. diaphana	+	-
N. distans var. *erratica*	725,240	2,103,196
N. gelida	797,764	290,096
N. gruendleri	+	72,524
N. hybrida	+	217,572
N. laevissima	+	290,096
N. linearis	217,572	-
N. polaris	870,288	3,771,248
N. spp.	6,708,470	9,428,120

Table 7. (cont'd.)

Date	June 3	June 9
Pinnularia	1,559,266	217,572
P. quadratarea var. *bicontracta*	580,192	+
P. quadratarea var. *bicuneata*	145,048	-
P. quadratarea var. *constricta*	507,668	145,048
P. quadratarea var. *stuxbergii*	145,048	72,524
P. spp.	181,310	-
Pleurosigma	1,414,218	652,716
P. antarcticum	181,310	181,310
P. clevei	145,048	217,572
P. karianum	145,048	-
P. stuxbergii	290,096	145,048
P. spp.	652,716	108,786
Stenoneis	580,192	543,930
S. inconspicua var. *baculus*	580,192	543,930
Tropidoneis	217,572	+
T. maxima	217,572	+
Unidentified	14,577,324	12,184,032
Euglenophyta	580,192	-
Euglena	580,192	-
E. spp.	580,192	-
Pyrrophyta	507,668	145,048
Unidentified	507,668	145,048

Table 8. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5B during June 1971.

Date	June 3	June 9
Sea ice thickness (cm)	160	158
Ice section from top to bottom (cm)	152-160	150-158
Total sea ice microalgae (cells/litre)	16,027,804	12,075,246
Bacillariophyta	15,592,660	11,676,364
Centrales	797,764	580,192
Chaetoceros	36,262	+
C. furcellatus	-	+
C. septentrionalis	36,262	-
C. spp.	-	+
Coscinodiscus	-	+
C. spp.	-	+
Melosira	-	36,262
M. spp.	-	36,262
Thalassiosira	+	36,262
T. nordenskioldii	+	36,262
Unidentified	761,502	507,668
Pennales	14,794,896	11,096,172
Achnanthes	-	145,048
A. spp.	-	145,048
Amphiprora	362,620	471,406
A. gigantea var. *septentrionalis*	36,262	145,048
A. kjellmanii var. *striolata*	145,048	72,524
A. kryophila	+	-
A. spp.	181,310	253,834
Amphora	1,124,122	1,269,170
A. laevis var. *laevissima*	362,620	362,620
A. laevissima var. *minuta*	290,096	181,310
A. spp.	471,406	725,240
Caloneis	+	36,262
C. kryophila	+	36,262
Cocconeis	+	36,262
C. costata	-	+
C. scutellum var. *stauroneiformis*	+	-
C. spp.	-	36,262
Diploneis	145,048	108,786
D. incurvata	-	+
D. lineata	-	+
D. litoralis var. *arctica*	145,048	36,262
D. spp.	-	72,524
Gomphonema	145,048	181,310
G. exiguum var. *pachycladum*	145,048	181,310
G. groenlandicum	+	-

Table 8. (cont'd.)

Date	June 3	June 9
Hantzschia	-	+
H. weyprechtii	-	+
Navicula	4,532,750	1,994,410
N. algida	+	-
N. cluthensis var. *pagophila*	+	+
N. crassirostris	108,786	290,096
N. crucigeroides	145,048	36,262
N. decipiens	+	+
N. digitoradiata	72,524	-
N. directa	+	217,572
N. directa var. *javanica*	36,262	-
N. forcipata	+	+
N. gelida	+	+
N. glacialis	-	+
N. kariana	36,262	+
N. kjellmanii	36,262	+
N. marina	580,192	+
N. obtusa	+	36,262
N. recurvata	+	-
N. siberica	-	+
N. superba	36,262	36,262
N. superba var. *crassa*	+	-
N. transitans	+	+
N. transitans var. *derasa*	+	+
N. transitans var. *incudiformis*	+	+
N. trigonocephala	+	+
N. trigonocephala var. *depressa*	72,524	+
N. valida	+	72,524
N. valida var. *minuta*	-	+
N. spp.	3,408,628	1,305,432
Nitzschia	2,937,222	3,662,462
N. brebissonii var. *borealis*	+	+
N. closterium	761,502	398,882
N. distans var. *erratica*	36,262	36,262
N. gruendleri	-	+
N. hybrida	-	36,262
N. laevissima	-	72,524
N. polaris	1,051,598	1,305,432
N. spp.	1,087,860	1,813,100
Pinnularia	217,572	290,096
P. ambigua	36,262	+
P. quadratarea var. *bicontracta*	72,524	36,262
P. quadratarea var. *constricta*	36,262	+
P. quadratarea var. *stuxbergii*	72,524	72,524
P. spp.	+	181,310

Table 8. (cont'd.)

Date	June 3	June 9
Pleurosigma	253,834	72,524
P. antarcticum	+	+
P. clevei	36,262	-
P. cuspidatum	-	+
P. karianum	-	+
P. stuxbergii	72,524	+
P. stuxbergii var. *minor*	+	-
P. spp.	145,048	72,524
Rhabdonema	-	+
R. spp.	-	+
Stenoneis	+	36,262
S. inconspicua var. *baculus*	+	36,262
Tropidoneis	72,524	36,262
T. maxima	72,524	36,262
Unidentified	5,004,156	2,828,436
Chlorophyta	145,048	-
Unidentified green flagellates	145,048	-
Euglenophyta	290,096	108,786
Euglena	290,096	108,786
E. spp.	290,096	108,786
Pyrrophyta	-	290,096
Unidentified	-	290,096

Table 9. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5B, February 9, 1972.

Sea ice thickness (cm)	145	
Ice section from top to bottom (cm)	0-8	137-145
Total sea ice microalgae (cells/litre)	68,895	1,174,876
Bacillariophyta	29,008	1,105,980
Centrales	21,756	141,420
Chaetoceros	-	3,626
C. septentrionalis	-	3,626
C. spp.	-	+
Coscinodiscus	-	+
C. kuetzingii var. *glacialis*	-	+
Melosira	-	14,504
M. spp.	-	14,504
Thalassiosira	3,626	47,140
T. nordenskioldii	-	7,252
T. spp.	3,626	39,888
Trigonium	10,878	-
T. arcticum	10,878	-
Unidentified	7,252	76,150
Pennales	7,252	964,560
Amphiprora	-	39,888
A. spp.	-	39,888
Amphora	-	21,757
A. spp.	-	21,757
Caloneis	-	+
C. kryophila	-	+
Cocconeis	-	29,009
C. costata	-	+
C. scutellum var. *parva*	-	7,252
C. spp.	-	21,757
Diploneis	-	3,626
D. lineata	-	3,626
Gomphonema	-	+
G. groenlandicum	-	+
Grammatophora	-	3,626
G. arctica	-	3,626
Navicula	-	228,448
N. digitoradiata	-	29,009
N. directa	-	14,504
N. gelida	-	18,131
N. glacialis	-	3,626
N. novadecipiens	-	+
N. superba	-	3,626
N. transitans	-	+
N. transitans var. *erosa*	-	3,626
N. valida	-	7,252
N. spp.	-	148,674

Table 9. (cont'd.)

Ice section from top to bottom (cm)	0-8	137-145
Nitzschia	+	242,953
N. closterium	-	10,878
N. cylindrus	-	14,504
N. frigida	-	21,757
N. laevissima	+	-
N. polaris	-	79,776
N. spp.	-	116,038
Pinnularia	-	29,009
P. quadratarea var. *bicontracta*	-	7,252
P. quadratarea var. *leptostauron*	-	+
P. quadratarea var. *maxima*	-	+
P. quadratarea var. *subcontinua*	-	3,626
P. spp.	-	18,131
Pleurosigma	-	7,252
P. spp.	-	7,252
Rhabdonema	-	3,626
R. arcuatum	-	3,626
Stenoneis	-	25,383
S. inconspicua var. *baculus*	-	25,383
Tropidoneis	-	7,252
T. maxima	-	7,252
Unidentified	7,252	322,731
Chlorophyta	14,504	7,252
Unidentified green flagellates	14,504	7,252
Euglenophyta	-	10,878
Euglena	-	10,878
E. spp.	-	10,878
Pyrrophyta	25,383	50,766
Unidentified	25,383	50,766

Table 10. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5, May 17, 1972.

Sea ice thickness (cm)	191	
Ice section from top to bottom (cm)	0-10	181-191
Total sea ice microalgae (cells/litre)	275,588	35,137,878
Bacillariophyta	61,643	34,086,280
Centrales	3,626	2,139,458
Chaetoceros	3,626	435,144
C. septentrionalis	+	435,144
C. spp.	3,626	-
Coscinosira	+	-
C. oestrupii	+	-
Rhizosolenia	-	253,834
R. spp.	-	253,834
Thalassiosira	+	290,096
T. bioculata var. *exigua*	+	-
T. nordenskioldii	-	290,096
T. spp.	+	+
Unidentified	-	1,160,384
Pennales	58,017	31,946,822
Achnanthes	-	1,668,052
A. spp.	-	1,668,052
Amphiprora	+	652,716
A. gigantea var. *septentrionalis*	+	-
A. kryophila	-	72,524
A. spp.	-	580,192
Amphora	3,626	1,124,122
A. exsecta	-	+
A. laevis var. *laevissima*	-	580,192
A. spp.	3,626	543,930
Bacillaria	+	+
B. paradoxa	+	+
Caloneis	-	+
C. kryophila	-	+
Cocconeis	+	36,262
C. costata	+	145,048
C. scutellum var. *parva*	-	+
C. scutellum var. *stauroneiformis*	-	+
C. spp.	-	217,572
Diploneis	-	72,524
D. lineata	-	72,524
D. litoralis var. *arctica*	-	+
Gomphonema	+	580,192
G. exiguum var. *pachycladum*	+	290,096
G. groenlandicum	-	217,572
G. spp.	-	72,524

Table 10. (cont'd.)

Ice section from top to bottom (cm)	0-10	181-191
Navicula	14,504	4,967,894
N. algida	-	+
N. crassirostris	-	72,524
N. crucigeroides	+	-
N. decipiens	-	72,524
N. digitoradiata	7,252	761,502
N. directa	+	217,572
N. forcipata	-	72,524
N. gelida	+	72,524
N. glacialis	-	+
N. kariana	-	72,524
N. kjellmanii	-	145,048
N. obtusa	+	+
N. oestrupi	-	72,524
N. quadripedis	-	217,572
N. recurvata	3,626	+
N. stuxbergii var. *subglabra*	-	72,524
N. superba	+	72,524
N. superba var. *crassa*	-	145,048
N. superba var. *subacuta*	-	72,524
N. transitans	+	145,048
N. transitans var. *derasa*	+	72,524
N. transitans var. *erosa*	+	217,572
N. transitans var. *incudiformis*	-	+
N. transfuga var. *septentrionalis*	-	72,524
N. trigonocephala	+	-
N. trigonocephala var. *contracta*	-	36,262
N. trigonocephala var. *depressa*	-	72,524
N. valida	+	72,524
N. valida var. *minuta*	-	145,048
N. spp.	3,626	1,994,410
Nitzschia	3,626	11,132,434
N. brebissonii var. *borealis*	-	72,524
N. closterium	-	1,087,860
N. cyclindrus	-	1,341,694
N. diaphana	-	+
N. frigida	-	1,994,410
N. gelida	-	290,096
N. hybrida	-	435,144
N. laevissima	-	+
N. polaris	-	870,288
N. spp.	3,626	5,112,942
Pinnularia	3,626	725,240
P. ambigua	-	+
P. quadratarea var. *bicontracta*	+	145,048

Table 10. (cont'd.)

Ice section from top to bottom (cm)	0-10	181-191
P. quadratarea var. *bicuneata*	-	72,524
P. quadratarea var. *constricta*	-	145,048
P. quadratarea var. *minima*	-	+
P. quadratarea var. *stuxbergii*	+	72,524
P. quadratarea var. *subcontinua*	-	+
P. spp.	3,626	290,096
Plagiogramma	-	+
P. staurophorum	-	+
Pleurosigma	+	942,812
P. antarcticum	-	145,048
P. clevei	-	145,048
P. stuxbergii var. *minor*	-	72,524
P. spp.	+	580,192
Rhabdonema	+	+
R. arcuatum	-	+
R. minutum	+	+
Stenoneis	+	145,048
S. inconspicua var. *baculus*	+	145,048
Synedra	+	-
S. tabulata var. *fasciculata*	+	-
Tropidoneis	-	435,144
T. maxima	-	435,144
Unidentified	32,635	9,464,382
Chlorophyta	-	543,930
Unidentified green flagellates	-	543,930
Chrysophyta	137,795	-
Phaeocystis	137,795	-
P. pouchetii	137,795	-
Euglenophyta	-	217,572
Euglena	-	217,572
E. proxima	-	217,572
Pyrrophyta	76,150	290,096
Unidentified	76,150	290,096

Table 11. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5, March 22, 1973.

Sea-ice thickness (cm)	168					
Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	158-168
Total sea ice microalgae (cells/litre)	587,434	431,507	551,168	645,447	1,486,720	14,113,127
Bacillariophyta	543,920	398,872	493,149	576,550	1,446,833	13,823,032
Centrales	166,801	21,756	47,139	47,139	47,139	362,617
Chaetoceros	47,139	-	14,504	10,878	10,878	72,523
C. fragilis	+	-	-	-	-	-
C. septentrionalis	32,635	-	14,504	3,626	3,626	43,514
C. spp.	14,504	-	-	7,252	7,252	29,009
Coscinodiscus	3,626	-	-	-	-	-
C. spp.	3,626	-	-	-	-	-
Coscinosira	14,504	3,626	3,626	+	-	-
C. oestrupii	14,504	3,626	3,626	+	-	-
Melosira	-	-	+	-	-	-
M. arctica	-	-	+	-	-	-
Rhizosolenia	-	-	-	-	-	-
R. hebetata forma hiemalis	-	-	-	-	-	+
Thalassiosira	14,504	-	-	10,878	3,626	29,008
T. bioculata var. *exigua*	+	-	-	-	-	-
T. decipiens	+	-	-	-	-	-
T. gravida	7,252	-	-	-	-	-
T. nordenskioldii	-	-	-	+	3,626	14,504
T. spp.	7,252	-	-	10,878	+	14,504
Trigonium	7,252	7,252	7,252	3,626	-	-
T. arcticum	7,252	7,252	7,252	3,626	-	-
Unidentified	79,776	10,878	21,757	21,757	32,635	261,086
Pennales	377,119	377,116	446,010	529,411	1,399,694	13,460,415
Achnanthes	21,757	-	-	-	25,383	-
A. taeniata	21,757	-	-	-	25,383	-
Amphiprora	+	14,504	47,139	29,008	54,392	580,189

Table 11. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	158-168
A. concilians	-	7,252	3,626	10,878	21,757	159,552
A. gigantea var. *septentrionalis*	-	-	3,626	+	3,626	58,019
A. kjellmanii var. *striolata*	+	3,626	10,878	7,252	3,626	159,552
A. kryophila	-	3,626	10,878	3,626	7,252	43,514
A. spp.	-	-	18,131	7,252	18,131	159,552
Amphora	18,131	7,252	10,878	18,130	36,261	159,551
A. laevis var. *laevissima*	-	-	7,252	3,626	10,878	43,514
A. laevissima var. *minuta*	-	-	-	-	7,252	14,504
A. spp.	18,131	7,252	3,626	14,504	18,131	101,533
Bacillaria	-	+	7,252	+	7,252	29,009
B. paradoxa	-	+	7,252	+	7,252	29,009
Caloneis	-	-	+	-	+	+
C. kryophila	-	-	+	-	-	+
C. semiinflata	-	-	-	-	+	-
Cocconeis	18,130	-	-	-	-	+
C. placentula var. *euglypta*	+	-	-	-	-	-
C. scutellum var. *parva*	3,626	-	-	-	-	-
C. scutellum var. *stauroneiformis*	14,504	-	-	-	-	+
Diploneis	+	+	7,252	14,504	58,019	217,572
D. litoralis var. *arctica*	+	+	7,252	14,504	58,019	217,572
D. litoralis var. *clathrata*	-	+	-	-	-	-
Gomphonema	3,626	10,878	29,009	29,009	21,757	391,628
G. exiguum var. *pachycladum*	3,626	3,626	25,383	21,757	18,131	377,124
G. spp.	-	7,252	3,626	7,252	3,626	14,504
Hantzschia	-	-	-	-	-	14,504
H. weyprechtii	-	-	-	-	-	14,504
Navicula	83,401	58,018	126,914	134,166	195,808	1,871,102
N. algida	-	-	-	-	-	14,504
N. crassirostris	-	+	3,626	-	-	29,009
N. crucigeroides	3,626	+	7,252	3,626	7,252	14,504
N. decipiens	+	-	-	-	+	14,504
N. digitoradiata	3,626	+	3,626	7,252	21,757	43,514

Table 11. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	158-168
N. directa	+	18,131	21,757	29,009	14,504	14,504
N. gelida	+	+	3,626	7,252	10,878	58,019
N. glacialis	+	-	-	-	-	14,504
N. imperfecta	-	-	-	-	-	43,514
N. kariana var. *detersa*	-	+	-	+	7,252	14,504
N. kjellmanii	-	-	3,626	3,626	+	14,504
N. novadecipiens	-	-	-	-	-	+
N. obtusa	-	-	-	-	+	+
N. oestrupi	+	+	-	-	-	-
N. pygmaea	-	-	+	-	-	-
N. quadripedis	39,888	3,626	3,626	-	14,504	884,792
N. recurvata	7,252	+	10,878	3,626	3,626	43,514
N. salinarum	+	-	-	-	-	-
N. siberica	-	-	-	-	7,252	14,504
N. stuxbergii var. *subglabra*	-	-	-	-	-	+
N. subinflata	+	-	-	-	-	-
N. superba	-	-	-	3,626	-	14,504
N. superba var. *crassa*	-	+	-	-	+	-
N. superba var. *elliptica*	-	+	-	-	-	14,504
N. superba var. *subacuta*	-	-	-	+	-	14,504
N. transfuga var. *septentrionalis*	-	-	-	-	-	14,504
N. transitans	-	-	+	7,252	7,252	29,009
N. transitans var. *derasa*	-	-	3,626	+	3,626	29,009
N. transitans var. *erosa*	-	-	-	-	-	14,504
N. transitans var. *incudiformis*	3,626	3,626	-	3,626	10,878	-
N. trigonocephala	-	-	-	-	+	+
N. trigonocephala var. *depressa*	-	-	3,626	-	7,252	14,504
N. valida	+	3,626	3,626	3,626	7,252	14,504
N. valida var. *minuta*	-	-	+	3,626	10,878	14,504
N. spp.	25,383	29,009	58,019	58,019	61,645	478,658

Table 11. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	158-168
Nitzschia	141,420	221,194	130,539	152,297	688,974	8,499,809
N. acicularis	+	+	7,252	7,252	7,252	-
N. angularis	-	54,393	-	-	-	-
N. brebissonii var. *borealis*	-	-	3,626	3,626	-	14,504
N. closterium	7,252	3,626	-	-	7,252	188,562
N. cylindrus	43,514	7,252	3,626	21,757	39,888	565,687
N. diaphana	+	7,252	+	+	32,635	+
N. frigida	-	-	29,009	18,131	130,543	768,754
N. gelida	-	3,626	-	-	-	+
N. gruendleri	+	-	7,252	3,626	7,252	72,524
N. hybrida	-	14,504	3,626	14,504	29,009	377,124
N. laevissima	-	7,252	3,626	3,626	18,131	72,524
N. lecointei	-	-	3,626	+	7,252	29,009
N. linearis var. *tenuis*	-	-	-	7,252	58,019	275,591
N. longissima	-	-	-	-	21,757	-
N. polaris	18,131	47,140	32,635	29,009	108,786	5,149,204
N. seriata	+	7,252	3,626	7,252	-	-
N. spp.	72,523	68,897	32,635	36,262	221,198	986,326
Pinnularia	-	3,626	10,878	36,260	50,764	435,138
P. ambigua	-	-	-	-	-	29,009
P. quadratarea	-	-	+	-	+	-
P. quadratarea var. *bicontracta*	-	-	+	+	3,626	29,009
P. quadratarea var. *bicuneata*	-	-	3,626	+	-	-
P. quadratarea var. *constricta*	-	+	3,626	7,252	3,626	29,009
P. quadratarea var. *densestriata*	-	-	-	-	-	+
P. quadratarea var. *leptostauron*	-	-	+	-	-	+
P. quadratarea var. *minima*	-	-	-	-	+	-
P. quadratarea var. *stuxbergii*	-	-	-	-	3,626	29,009
P. quadratarea var. *subconstricta*	-	-	-	-	3,626	-
P. spp.	-	3,626	3,626	3,626	-	29,009

Table 11. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	158-168
Pleurosigma	7,252	7,252	21,756	25,383	36,260	290,093
P. antarcticum	-	3,626	3,626	3,626	3,626	43,514
P. clevei	-	-	7,252	7,252	7,252	43,514
P. cuspidatum	-	-	3,626	-	3,626	14,504
P. stuxbergii	3,626	+	3,626	3,626	3,626	101,533
P. stuxbergii var. *minor*	3,626	-	-	3,626	3,626	72,524
P. spp.	+	3,626	3,626	7,252	14,504	14,504
Stenoneis	-	-	+	+	3,626	+
S. inconspicua var. *baculus*	-	-	+	+	3,626	+
Synedra	3,626	-	-	-	-	-
S. tabulata var. *fasciculata*	3,626	-	-	-	-	-
S. spp.	+	-	-	-	-	-
Tropidoneis	-	3,626	+	3,626	21,757	14,504
T. maxima	-	3,626	+	3,626	21,757	14,504
Unidentified	79,776	50,766	54,393	87,028	199,441	957,316
Chlorophyta	-	3,626	-	-	7,252	-
Unidentified green flagellates	-	3,626	-	-	7,252	-
Pyrrophyta	43,514	29,009	58,019	68,897	32,635	290,095
Peridinium	-	-	-	-	-	130,543
P. spp.	-	-	-	-	-	130,543
Prorocentrum	-	-	-	-	-	14,504
P. ovalis	-	-	-	-	-	14,504
Unidentified	43,514	29,009	58,019	68,897	32,635	145,048

Table 12. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5B, March 22, 1973.

Sea ice thickness (cm)	181					
Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	171-181
Total sea ice microalgae (cells/litre)	496,784	663,586	757,862	797,750	924,662	12,249,270
Bacillariophyta	362,615	543,922	663,581	725,227	884,774	11,886,652
Centrales	83,401	112,412	141,419	199,439	119,662	884,790
Chaetoceros	50,766	76,150	76,150	58,019	10,878	14,504
C. borealis	7,252	-	-	+	-	-
C. septentrionalis	39,888	58,019	72,524	39,888	3,626	14,504
C. spp.	3,626	18,131	3,626	18,131	7,252	-
Coscinodiscus	-	+	-	+	+	-
C. kuetzingii var. *glacialis*	-	-	-	-	+	-
C. lacustris var. *septentrionalis*	-	-	-	-	+	-
C. spp.	-	+	-	+	-	-
Coscinosira	+	-	7,252	-	+	-
C. oestrupii	+	-	7,252	-	+	-
Melosira	-	-	14,504	7,252	14,504	-
M. arctica	-	-	14,504	7,252	10,878	-
M. spp.	-	-	-	-	3,626	-
Thalassiosira	-	-	10,878	25,383	18,131	493,162
T. bioculata var. *exigua*	-	-	+	+	+	-
T. nordenskioldii	-	-	-	+	+	377,124
T. spp.	-	-	10,878	25,383	18,131	116,038
Trigonium	-	-	+	10,878	7,252	-
T. arcticum	-	-	+	10,878	7,252	-
Unidentified	32,635	36,262	32,635	97,907	68,897	377,124
Pennales	279,214	431,510	522,162	525,788	765,112	11,001,862
Achnanthes	-	-	14,504	+	10,878	406,133
A. delicatula	-	-	-	+	-	-
A. taeniata	-	-	14,504	-	-	246,581
A. spp.	-	-	-	-	10,878	159,552

Table 12. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	173-181
Amphiprora	3,626	3,626	18,130	47,139	32,634	710,732
A. concilians	-	-	3,626	7,252	3,626	348,115
A. gigantea var. *septentrionalis*	-	-	-	-	-	58,019
A. kjellmanii var. *kariana*	-	-	+	-	-	14,504
A. kjellmanii var. *striolata*	3,626	3,626	3,626	7,252	7,252	101,533
A. kryophila	-	-	3,626	10,878	7,252	101,533
A. spp.	-	-	7,252	21,757	14,504	87,028
Amphora	-	-	7,252	10,878	50,765	362,619
A. laevis var. *laevissima*	-	-	-	3,626	7,252	188,562
A. laevissima var. *minuta*	-	-	-	+	14,504	58,019
A. spp.	-	-	7,252	7,252	29,009	116,038
Bacillaria	-	-	-	-	+	43,514
B. paradoxa	-	-	-	-	+	43,514
Caloneis	-	-	-	-	-	+
C. kryophila	-	-	-	-	-	+
Cocconeis	+	3,626	3,626	3,626	14,504	43,513
C. scutellum	-	-	-	-	3,626	14,504
C. scutellum var. *parva*	-	+	3,626	-	-	-
C. spp.	+	3,626	-	3,626	10,878	29,009
Diploneis	3,626	7,252	10,878	14,504	36,261	101,533
D. lineata	-	-	-	-	+	-
D. litoralis var. *arctica*	3,626	7,252	7,252	3,626	32,635	101,533
D. spp.	-	-	3,626	10,878	3,626	-
Gomphonema	10,878	10,878	10,878	10,878	10,878	493,162
G. exiguum var. *pachycladum*	10,878	10,878	10,878	10,878	10,878	406,134
G. spp.	-	+	+	-	-	87,028
Grammatophora	+	-	-	-	-	-
G. angulosa	+	-	-	-	-	-
Navicula	39,887	61,644	79,774	90,652	145,044	1,000,821
N. crassirostris	-	-	-	7,252	3,626	+
N. crucigeroides	-	-	+	3,626	7,252	130,543

Table 12. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	173-181
N. decipiens	-	-	-	-	3,626	101,533
N. digitoradiata	-	3,626	10,878	7,252	14,504	14,504
N. directa	3,626	7,252	10,878	10,878	14,504	101,533
N. forcipata	-	-	-	+	+	-
N. gastrum	-	-	-	-	+	-
N. gelida	-	-	3,626	3,626	3,626	58,019
N. glacialis	-	-	3,626	3,626	-	43,514
N. imperfecta	-	-	-	-	3,626	+
N. kariana	-	-	-	3,626	3,626	58,019
N. kariana var. *detersa*	-	-	-	-	-	14,504
N. kjellmanii	-	-	-	3,626	3,626	29,009
N. lineola	-	-	+	-	-	-
N. novadecipiens	-	-	3,626	+	-	14,504
N. oestrupi	-	-	-	-	-	+
N. quadripedis	-	-	-	-	-	58,019
N. recurvata	3,626	-	+	-	+	29,009
N. superba	-	-	-	-	-	14,504
N. superba var. *crassa*	-	-	-	-	-	+
N. superba var. *subacuta*	-	-	-	-	+	58,019
N. transfuga var. *septentrionalis*	-	-	-	-	-	+
N. transitans	-	-	-	7,252	3,626	29,009
N. transitans var. *derasa*	3,626	-	-	+	+	+
N. transitans var. *erosa*	-	-	-	-	-	14,504
N. transitans var. *incudiformis*	-	-	3,626	+	+	+
N. trigonocephala	-	3,626	-	-	-	58,019
N. trigonocephala var. *depressa*	-	-	-	-	3,626	43,514
N. valida	-	-	3,626	3,626	3,626	43,514
N. valida var. *minuta*	-	-	-	+	7,252	29,009
N. spp.	29,009	47,140	39,888	36,262	68,898	58,019
Nitzschia	119,664	213,942	242,952	195,812	264,709	5,642,361
N. acicularis	-	-	-	-	3,626	-
N. angularis	-	7,252	-	-	-	-

Table 12. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	173-181
N. brebissonii var. *borealis*	-	-	-	-	-	101,533
N. closterium	-	-	10,878	-	18,131	261,086
N. cylindrus	39,888	58,019	90,655	65,271	50,766	391,629
N. diaphana	-	-	-	3,626	-	58,019
N. distans var. *erratica*	-	-	7,252	7,252	-	-
N. frigida	-	-	-	-	-	116,038
N. gelida	-	-	+	7,252	7,252	159,552
N. gruendleri	-	-	-	-	-	101,533
N. hybrida	-	14,504	10,878	+	21,757	101,533
N. laevissima	3,626	10,878	+	+	10,878	145,048
N. lecointei	-	-	3,626	3,626	-	29,009
N. linearis	-	-	-	-	-	304,600
N. polaris	54,393	39,888	39,888	39,888	61,645	2,393,292
N. seriata	-	10,878	14,504	10,878	7,252	188,562
N. spp.	21,757	72,523	65,271	58,019	83,402	1,290,927
Pinnularia	-	-	7,252	3,626	7,252	65,270
P. ambigua	-	-	-	+	+	29,009
P. quadratarea var. *bicontracta*	-	-	-	+	3,626	+
P. quadratarea var. *bicuneata*	-	-	-	3,626	+	-
P. quadratarea var. *constricta*	-	-	3,626	+	-	14,504
P. quadratarea var. *cuneata*	-	-	-	+	-	-
P. quadratarea var. *densestriata*	-	-	-	+	-	-
P. quadratarea var. *minima*	-	-	+	+	-	+
P. quadratarea var. *stuxbergii*	-	-	-	+	+	+
P. quadratarea var. *subconstricta*	-	-	3,626	-	-	-
P. quadratarea var. *subcontinua*	-	-	+	-	-	-
P. spp.	-	-	+	-	3,626	21,757
Plagiogramma	-	+	-	-	-	-
P. staurophorum	-	+	-	-	-	-
Pleurosigma	3,626	7,252	14,504	7,252	14,504	580,190
P. antarcticum	-	-	7,252	7,252	3,626	72,524
P. clevei	-	-	3,626	+	-	87,028

Table 12. (cont'd.)

Ice section from top to bottom (cm)	0-10	35-45	70-80	105-115	140-150	173-181
P. cuspidatum	-	-	-	-	-	29,009
P. stuxbergii	-	-	-	-	-	58,019
P. stuxbergii var. *minor*	3,626	-	+	-	3,626	188,562
P. spp.	-	7,252	3,626	+	7,252	145,048
Stenoneis	-	-	-	3,626	+	43,514
S. inconspicua var. *baculus*	-	-	-	3,626	+	43,514
Synedra	+	+	+	+	-	-
S. tabulata	-	-	-	+	-	-
S. tabulata var. *fasciculata*	+	-	-	+	-	-
S. spp.	-	+	+	+	-	-
Tropidoneis	-	-	3,626	7,252	+	130,543
T. maxima	-	-	3,626	7,252	+	130,543
Unidentified	97,907	123,290	108,786	130,543	177,683	1,377,956
Chrysophyta	-	3,626	-	-	-	-
Phaeocystis	-	3,626	-	-	-	-
P. pouchetii	-	3,626	-	-	-	-
Pyrrophyta	134,169	116,038	94,281	72,523	39,888	362,618
Goniaulax	36,262	18,131	21,757	14,504	3,626	43,514
G. spp.	36,262	18,131	21,757	14,504	3,626	43,514
Prorocentrum	-	-	-	-	-	14,504
P. ovalis	-	-	-	-	-	14,504
Unidentified	97,907	97,907	72,524	58,019	36,262	304,600

Table 13. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5, May 29, 1973.

Sea ice thickness (cm)			195		
Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	187-195
Total sea ice microalgae (cells/litre)	844,888	1,047,957	1,664,399	1,653,528	43,079,256
Bacillariophyta	714,346	921,042	1,483,091	1,359,807	42,390,278
Centrales	83,400	108,784	61,644	72,522	3,299,842
Chaetoceros	7,252	10,878	+	3,626	507,668
C. septentrionalis	7,252	3,626	+	3,626	362,620
C. spp.	-	7,252	-	-	145,048
Coscinosira	+	3,626	+	-	+
C. oestrupii	+	3,626	+	-	+
Melosira	-	-	7,252	-	36,262
M. arctica	-	-	7,252	-	-
M. spp.	-	-	-	-	36,262
Thalassiosira	14,504	25,383	10,878	14,504	398,882
T. bioculata var. *exigua*	-	-	-	-	36,262
T. gravida	-	-	3,626	-	-
T. nordenskioldii	10,878	3,626	-	+	72,524
T. spp.	3,626	21,757	7,252	14,504	290,096
Rhizosolenia	-	-	-	-	108,786
R. spp.	-	-	-	-	108,786
Trigonium	10,878	3,626	-	3,626	-
T. arcticum	10,878	3,626	-	3,626	-
Unidentified	50,766	65,271	43,514	50,766	2,248,244
Pennales	630,946	812,258	1,421,447	1,287,285	39,090,436
Achnanthes	7,252	3,626	18,131	10,878	145,048
A. delicatula	3,626	-	-	-	-
A. spp.	3,626	3,626	18,131	10,878	145,048
Amphiprora	3,626	32,634	76,148	36,261	1,196,646
A. concilians	3,626	3,626	7,252	10,878	580,192
A. gigantea var. *septentrionalis*	-	7,252	3,626	+	+

Table 13. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	187-195
A. kjellmanii var. *kariana*	-	+	-	-	72,524
A. kjellmanii var. *striolata*	+	+	10,878	+	145,048
A. kryophila	-	14,504	32,635	3,626	145,048
A. spp.	-	7,252	21,757	21,757	253,834
Amphora	25,382	10,878	87,028	58,019	1,668,052
A. eunotia	-	-	-	-	72,524
A. exsecta	-	-	-	-	253,834
A. laevis var. *laevissima*	14,504	3,626	43,514	18,131	942,812
A. laevissima var. *minuta*	-	-	7,252	21,757	108,786
A. spp.	10,878	7,252	36,262	18,131	290,096
Caloneis	-	-	-	-	+
C. kryophila	-	-	-	-	+
Cocconeis	10,878	21,757	3,626	7,252	36,262
C. costata	-	-	-	3,626	+
C. scutellum var. *parva*	+	3,626	3,626	-	+
C. scutellum var. *stauroneiformis*	+	-	-	-	+
C. spp.	10,878	18,131	-	3,626	36,262
Diploneis	21,757	10,878	10,878	21,757	145,048
D. lineata	-	-	+	-	+
D. litoralis var. *arctica*	21,757	7,252	7,252	21,757	145,048
D. spp.	-	3,626	3,626	-	-
Eunotia	-	+	-	-	-
E. spp.	-	+	-	-	-
Gomphonema	21,757	21,757	36,261	79,775	2,175,720
G. exiguum	-	-	-	-	72,524
G. exiguum var. *pachycladum*	18,131	18,131	32,635	39,888	2,030,672
G. groenlandicum	-	+	3,626	14,504	72,524
G. spp.	3,626	3,626	-	25,383	-
Hantzschia	-	-	-	-	145,048
H. weyprechtii	-	-	-	-	145,048

Table 13. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	187-195
Navicula	177,680	105,157	355,358	326,353	6,962,304
N. algida	-	-	+	-	72,524
N. cancellata	-	3,626	-	-	-
N. cluthensis	+	-	-	-	-
N. crassirostris	7,252	-	39,888	-	-
N. crucigeroides	-	3,626	14,504	3,626	145,048
N. decipiens	-	-	-	3,626	145,048
N. digitoradiata	3,626	-	14,504	47,140	181,310
N. directa	18,131	21,757	50,766	18,131	398,882
N. forcipata	3,626	+	-	-	72,524
N. gelida	3,626	+	10,878	10,878	72,524
N. glacialis	7,252	-	-	-	-
N. imperfecta	-	-	3,626	-	145,048
N. kariana	3,626	-	-	14,504	+
N. kjellmanii	-	-	14,504	3,626	+
N. marina	-	3,626	3,626	-	+
N. novadecipiens	-	-	7,252	+	+
N. obtusa	-	-	-	-	+
N. oestrupi	-	-	-	-	+
N. quadripedis	-	-	7,252	18,131	435,144
N. recurvata	14,504	7,252	14,504	3,626	108,786
N. spicula	-	3,626	3,626	-	36,262
N. stuxbergii var. *subglabra*	-	-	-	-	+
N. subinflata	-	+	-	-	-
N. superba	-	3,626	3,626	3,626	145,048
N. superba var. *crassa*	-	+	7,252	-	580,192
N. superba var. *subacuta*	-	-	-	-	108,786
N. transfuga var. *septentrionalis*	-	-	-	-	+
N. transitans	10,878	+	18,131	+	145,048
N. transitans var. *derasa*	-	+	+	+	+
N. transitans var. *erosa*	-	-	-	3,626	-

Table 13. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	187-195
N. transitans var. *incudiformis*	3,626	7,252	10,878	3,626	+
N. trigonocephala	3,626	-	3,626	-	72,524
N. trigonocephala var. *contracta*	-	-	3,626	-	36,262
N. trigonocephala var. *depressa*	3,626	-	3,626	3,626	72,524
N. valida	-	+	10,878	7,252	+
N. valida var. *minuta*	3,626	+	7,252	7,252	326,358
N. spp.	90,655	50,766	101,533	174,057	3,662,462
Nitzschia	177,681	409,757	478,653	387,999	18,421,096
N. acicularis	-	3,626	3,626	-	-
N. brebissonii var. *borealis*	3,626	+	7,252	-	217,572
N. closterium	3,626	25,383	3,626	21,757	2,610,864
N. cylindrus	58,019	54,393	32,635	29,009	1,740,576
N. diaphana	-	10,878	14,504	10,878	616,454
N. distans var. *erratica*	-	-	-	-	362,620
N. frigida	-	105,159	126,917	39,888	942,812
N. gelida	-	-	10,878	3,626	398,882
N. gruendleri	-	-	25,383	21,757	145,048
N. hybrida	7,252	18,131	36,262	3,626	1,377,956
N. laevissima	-	3,626	10,878	7,252	145,048
N. lecointei	-	-	+	+	72,524
N. linearis	-	-	-	-	290,096
N. polaris	50,766	29,009	54,393	68,897	4,423,964
N. seriata	-	-	-	7,252	-
N. spp.	54,392	159,552	152,299	174,057	5,076,680
Pinnularia	43,512	-	39,887	36,260	797,764
P. ambigua	-	-	-	3,626	36,262
P. quadratarea var. *bicontracta*	10,878	-	+	3,626	72,524
P. quadratarea var. *bicuneata*	3,626	-	+	3,626	36,262
P. quadratarea var. *constricta*	+	-	18,131	+	108,786
P. quadratarea var. *leptostauron*	+	-	-	3,626	36,262
P. quadratarea var. *minima*	-	-	-	-	+

Table 13. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	187-195
P. quadratarea var. *stuxbergii*	14,504	-	7,252	10,878	36,262
P. quadratarea var. *subconstricta*	-	-	+	-	-
P. semiinflata var. *decipiens*	-	-	-	-	72,524
P. spp.	14,504	-	14,504	10,878	398,882
Plagiogramma	+	-	-	-	-
P. staurophorum	+	-	-	-	-
Pleurosigma	+	39,888	61,644	39,888	942,812
P. antarcticum	+	18,131	29,009	18,131	326,358
P. clevei	-	-	3,626	3,626	108,786
P. karianum	-	-	-	+	-
P. stuxbergii	-	3,626	3,626	-	145,048
P. stuxbergii var. *minor*	-	+	-	-	108,786
P. spp.	+	18,131	25,383	18,131	253,834
Stenoneis	-	-	7,252	3,626	+
S. inconspicua var. *baculus*	-	-	7,252	3,626	+
Synedra	3,626	-	-	-	-
S. hyperborea	3,626	-	-	-	-
Tropidoneis	-	7,252	18,131	18,131	362,620
T. maxima	-	7,252	18,131	18,131	362,620
Unidentified	137,795	148,674	228,450	261,086	6,092,016
Chlorophyta	-	29,009	14,504	7,252	145,048
Unidentified green flagellates	-	29,009	14,504	7,252	145,048
Chrysophyta	32,635	25,383	101,533	261,086	-
Phaeocystis	32,635	25,383	101,533	261,086	-
P. pouchetii	32,635	25,383	101,533	261,086	-
Euglenophyta	-	-	-	-	72,524
Euglena	-	-	-	-	72,524
E. spp.	-	-	-	-	72,524

Table 13. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	187-195
Pyrrophyta	97,907	72,523	65,271	25,383	471,406
Goniaulax	39,888	-	-	-	-
G. spp.	39,888	-	-	-	-
Prorocentrum	-	3,626	-	-	-
P. sp.	-	3,626	-	-	-
Unidentified	58,019	68,897	65,271	25,383	471,406

Table 14. Quantitative composition and vertical distribution of sea ice microalgae in Frobisher Bay at Station 5B, May 29, 1973.

Sea ice thickness (cm)			200		
Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	192-200
Total sea ice microalgae (cells/litre)	576,558	823,137	1,519,359	1,171,247	37,531,170
Bacillariophyta	290,089	750,614	1,022,571	1,124,107	37,168,550
Centrales	68,896	286,466	152,297	141,419	2,900,960
Chaetoceros	3,626	134,168	21,757	-	145,048
C. fragilis	-	94,281	-	-	-
C. septentrionalis	-	14,504	21,757	-	145,048
C. spp.	3,626	25,383	-	-	-
Coscinodiscus	-	-	+	+	-
C. spp.	-	-	+	+	-
Coscinosira	-	+	3,626	+	-
C. oestrupii	-	+	3,626	+	-
Melosira	7,252	7,252	29,009	14,504	72,524
M. arctica	3,626	-	25,383	14,504	+
M. spp.	3,626	7,252	3,626	-	72,524
Rhizosolenia	7,252	-	-	-	-
R. spp.	7,252	-	-	-	-
Thalassiosira	7,252	54,392	21,756	21,756	652,716
T. bioculata var. *exigua*	+	-	3,626	3,626	-
T. decipiens	+	+	3,626	3,626	-
T. gravida	+	7,252	-	-	-
T. nordenskioldii	+	7,252	3,626	-	652,716
T. spp.	7,252	39,888	10,878	14,504	+
Trigonium	3,626	7,252	7,252	7,252	-
T. arcticum	3,626	7,252	7,252	7,252	-
Unidentified	39,888	83,402	68,897	97,907	2,030,672
Pennales	221,193	464,148	870,274	982,688	34,267,590
Achnanthes	-	29,009	36,261	43,514	290,096
A. delicatula	-	-	-	-	145,048
A. taeniata	-	-	14,504	-	-
A. spp.	-	29,009	21,757	43,514	145,048

Table 14. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	192-200
Amphiprora	25,382	7,252	61,643	246,580	1,232,908
A. concilians	-	3,626	10,878	10,878	435,144
A. gigantea var. *septentrionalis*	-	-	+	14,504	+
A. kjellmanii var. *kariana*	-	-	-	-	+
A. kjellmanii var. *striolata*	3,626	+	14,504	58,019	145,048
A. kryophila	10,878	-	25,383	54,393	217,572
A. spp.	10,878	3,626	10,878	108,786	435,144
Amphora	-	10,878	18,130	14,504	1,595,528
A. eunotia	-	-	-	-	290,096
A. laevis var. *laevissima*	-	3,626	3,626	14,504	217,572
A. laevissima var. *minuta*	-	-	+	-	217,572
A. spp.	-	7,252	14,504	-	870,288
Bacillaria	-	-	3,626	-	-
B. paradoxa	-	-	3,626	-	-
Caloneis	-	-	14,504	-	+
C. kryophila	-	-	14,504	-	+
Cocconeis	3,626	7,252	7,252	3,626	362,620
C. costata	3,626	-	-	-	72,524
C. scutellum var. *parva*	-	7,252	-	-	72,524
C. scutellum var. *stauroneiformis*	-	-	3,626	-	-
C. spp.	-	-	3,626	3,626	217,572
Diploneis	3,626	+	10,878	29,009	435,144
D. litoralis var. *arctica*	3,626	+	7,252	29,009	435,144
D. lineata	+	-	-	-	-
D. spp.	-	-	3,626	-	-
Gomphonema	7,252	7,252	3,626	18,131	1,740,576
G. exiguum var. *pachycladum*	7,252	7,252	3,626	18,131	1,523,004
G. groenlandicum	-	-	-	-	217,572
Navicula	21,757	36,261	145,044	134,166	6,345,850
N. algida	-	-	-	-	+
N. cluthensis var. *pagophila*	+	+	-	-	-

Table 14. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	192-200
N. crassirostris	-	-	+	-	145,048
N. crucigeroides	-	3,626	-	3,626	362,620
N. decipiens	-	-	3,626	-	72,524
N. digitoradiata	-	3,626	10,878	14,504	580,192
N. directa	-	+	18,131	10,878	362,620
N. forcipata	-	-	+	-	+
N. gelida	-	+	14,504	7,252	290,096
N. glacialis	-	-	-	+	145,048
N. imperfecta	-	-	3,626	3,626	108,786
N. kariana	-	+	3,626	+	217,572
N. kjellmanii	-	-	3,626	-	72,524
N. lineola	-	-	+	-	+
N. marina	-	-	-	-	72,524
N. novadecipiens	+	-	-	-	-
N. obtusa	-	-	-	-	+
N. oestrupi	-	-	+	-	72,524
N. recurvata	+	3,626	7,252	+	+
N. stuxbergii var. *subglabra*	-	-	+	-	-
N. subinflata	-	-	+	+	+
N. superba	-	-	-	+	+
N. superba var. *crassa*	-	-	+	-	+
N. superba var. *elliptica*	-	-	-	-	72,524
N. superba var. *subacuta*	-	-	-	-	217,572
N. transitans	-	+	10,878	3,626	145,048
N. transitans var. *derasa*	-	-	-	-	+
N. transitans var. *erosa*	-	+	-	-	72,524
N. transitans var. *incudiformis*	-	+	+	+	+
N. transfuga var. *septentrionalis*	-	-	-	-	+
N. trigonocephala	+	-	+	-	+
N. trigonocephala var. *contracta*	-	-	-	-	+
N. trigonocephala var. *depressa*	-	+	+	+	72,524

Table 14. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	192-200
N. valida	-	-	7,252	3,626	+
N. valida var. *minuta*	3,626	+	3,626	+	290,096
N. spp.	18,131	25,383	58,019	87,028	2,973,484
Nitzschia	58,017	188,561	300,973	195,812	15,084,992
N. acicularis	-	-	-	-	435,144
N. angularis	-	-	36,262	-	-
N. brebissonii var. *borealis*	-	-	-	-	72,524
N. closterium	3,626	3,626	25,383	25,383	942,812
N. cylindrus	32,635	94,281	108,786	50,766	1,232,908
N. diaphana	-	3,626	3,626	+	652,716
N. frigida	-	-	-	18,131	942,812
N. gelida	-	-	+	10,878	217,572
N. hybrida	3,626	7,252	3,626	+	1,087,860
N. laevissima	-	-	+	3,626	725,240
N. longissima	3,626	-	25,383	10,878	217,572
N. polaris	7,252	21,757	18,131	3,626	3,988,820
N. seriata	-	-	3,626	-	72,524
N. spp.	7,252	58,019	76,150	72,524	4,496,488
Pinnularia	-	+	14,504	14,504	290,096
P. ambigua	-	-	-	3,626	145,048
P. quadratarea var. *bicontracta*	-	+	+	+	72,524
P. quadratarea var. *bicuneata*	-	+	3,626	3,626	72,524
P. quadratarea var. *constricta*	-	-	-	-	+
P. quadratarea var. *minima*	-	-	+	+	-
P. quadratarea var. *stuxbergii*	-	-	7,252	7,252	+
P. semiinflata var. *decipiens*	-	-	-	-	+
P. spp.	-	-	3,626	-	-
Pleurosigma	-	10,878	7,252	21,756	1,015,336
P. antarcticum	-	3,626	7,252	7,252	217,572
P. clevei	-	-	-	3,626	145,048
P. stuxbergii	-	+	-	-	145,048
P. stuxbergii var. *minor*	-	-	+	-	72,524
P. spp.	-	7,252	-	10,878	435,144

Table 14. (cont'd.)

Ice section from top to bottom (cm)	0-8	36-44	106-114	141-149	192-200
Stenoneis	-	-	+	-	72,524
S. inconspicua var. *baculus*	-	-	+	-	72,524
Synedra	-	-	+	+	+
S. camtschatica var. *finnamarchica*	-	-	-	+	-
S. tabulata	-	-	-	+	-
S. tabulata var. *fasciculata*	-	-	+	+	+
S. spp.	-	-	+	-	-
Tropidoneis	3,626	-	+	3,626	217,572
T. maxima	3,626	-	+	3,626	217,572
Unidentified	97,907	166,805	246,581	257,460	5,584,348
Chlorophyta	3,626	-	61,645	-	-
Unidentified green flagellates	3,626	-	61,645	-	-
Chrysophyta	203,067	10,878	351,741	-	-
Phaeocystis	203,067	10,878	351,741	-	-
P. pouchetii	203,067	10,878	351,741	-	-
Pyrrophyta	79,776	61,645	83,402	47,140	362,620
Prorocentrum	3,626	3,626	-	3,626	-
P. ovalis	3,626	3,626	-	3,626	-
Unidentified	76,150	58,019	83,402	43,514	362,620

Table 15. Quantitative composition of sea ice microalgae and phytoplankton in the underlying surface water in Frobisher Bay at Station 5B, March 23, 1977.

Sea ice thickness (cm)	180	
Sample type	Ice bottom 5 cm	Surface water
Total sea ice microalgae or phytoplankton (cells/litre)	7,397,448	37,109
Bacillariophyta	7,107,352	35,409
Centrales	471,406	3,200
Chaetoceros	145,048	400
C. borealis	+	-
C. septentrionalis	-	100
C. spp.	145,048	300
Coscinodiscus	-	1,400
C. spp.	-	1,400
Coscinosira	+	-
C. oestrupii	+	-
Melosira	36,262	-
M. arctica	+	-
M. spp.	36,262	-
Thalassiosira	108,786	-
T. nordenskioldii	36,262	-
T. spp.	72,524	-
Trigonium	36,262	400
T. arcticum	36,262	400
Unidentified	145,048	1,000
Pennales	6,635,946	32,209
Achnanthes	36,262	900
A. spp.	36,262	900
Amphiprora	253,834	-
A. concilians	72,524	-
A. gigantea var. *septentrionalis*	36,262	-
A. kjellmanii var. *kariana*	+	-
A. kjellmanii var. *striolata*	36,262	-
A. spp.	108,786	-
Amphora	290,096	400
A. laevis var. *laevissima*	36,262	-
A. spp.	253,834	400
Bacillaria	36,262	-
B. paradoxa	36,262	-
Cocconeis	326,358	300
C. scutellum var. *parva*	36,262	100
C. scutellum var. *stauroneiformis*	+	200
C. spp.	290,096	-
Diploneis	72,524	-
D. lineata	36,262	-
D. litoralis var. *arctica*	36,262	-

Table 15. (cont'd.)

Sample type	Ice bottom	Surface water
Fragilaria	253,834	300
F. spp.	253,834	300
Gomphonema	145,048	-
G. exiguum var. *pachycladum*	36,262	-
G. spp.	108,786	-
Licmophora	-	100
L. spp.	-	100
Navicula	1,559,266	800
N. crassirostris	+	-
N. crucigeroides	72,524	-
N. decipiens	-	+
N. digitoradiata	36,262	-
N. directa	362,620	-
N. forcipata	+	-
N. gastrum	36,262	-
N. gelida	+	-
N. imperfecta	36,262	-
N. kariana	36,262	100
N. kjellmanii	36,262	-
N. novadecipiens	+	-
N. recurvata	36,262	-
N. superba var. *crassa*	+	-
N. transfuga var. *plagiostoma*	+	-
N. transitans	108,876	-
N. transitans var. *derasa*	+	-
N. transitans var. *incudiformis*	+	-
N. trigonocephala	+	-
N. trigonocephala var. *depressa*	+	-
N. valida	72,524	-
N. valida var. *minuta*	217,572	-
N. spp.	507,668	700
Nitzschia	2,103,196	400
N. brebissonii var. *borealis*	108,786	-
N. closterium	145,048	-
N. cylindrus	217,572	-
N. diaphana	+	-
N. frigida	326,358	-
N. grunowii	253,834	100
N. hybrida	72,524	-
N. laevissima	108,786	-
N. lecointei	+	-
N. polaris	326,358	-
N. seriata	108,786	-
N. spp.	435,144	300

Table 15. (cont'd.)

Sample type	Ice bottom	Surface water
Pinnularia	36,262	-
P. quadratarea var. *bicontracta*	36,262	-
P. quadratarea var. *minima*	+	-
Pleurosigma	398,882	-
P. clevei	253,834	-
P. cuspidatum	72,524	-
P. karianum	+	-
P. stuxbergii var. *minor*	36,262	-
P. spp.	36,262	-
Synedra	+	-
S. camtschatica var. *finnamarchica*	+	-
S. spp.	+	-
Tropidoneis	+	-
T. maxima var. *dubia*	+	-
Unidentified	1,124,122	29,009
Chlorophyta	145,048	200
Unidentified green flagellates	145,048	200
Pyrrophyta	145,048	1,500
Unidentified	145,048	1,500

Table 16. Quantitative composition and vertical distribution of sea ice microalgae and phytoplankton in the underlying water in Frobisher Bay at Station 1, May 3, 1978.

Sea ice thickness (cm) 185

Sample type	Ice core			Seawater depth (m)					
	Top 5cm	Middle 5cm	Bottom 5cm	0	5	10	15	20	25
Total sea ice microalgae or phytoplankton (cells/litre)	576,556	765,119	72,270,116	1,958,141	184,932	170,426	105,156	105,156	76,147
Bacillariophyta	547,547	743,362	71,508,664	1,958,141	181,306	159,548	105,156	105,156	76,147
Centrales	224,822	36,261	1,523,004	18,130	58,018	25,382	10,878	36,261	14,504
Chaetoceros	58,018	3,626	290,096	7,252	10,878	7,252	-	14,504	-
C. furcellatus	32,635	-	-	-	-	-	-	3,626	-
C. septentrionalis	-	3,626	-	-	-	-	-	-	-
C. spp.	25,383	-	290,096	7,252	10,878	7,252	-	10,878	-
Melosira	-	-	-	-	-	3,626	-	-	-
M. spp.	-	-	-	-	-	3,626	-	-	-
Thalassiosira	47,140	-	-	-	7,252	-	-	-	-
T. spp.	47,140	-	-	-	7,252	-	-	-	-
Unidentified	119,664	32,635	1,232,908	10,878	39,888	14,504	10,878	21,757	14,504
Pennales	322,725	707,101	69,985,660	1,940,011	123,288	134,166	94,278	68,895	61,643
Achnanthes	-	-	1,523,004	-	-	-	-	-	-
A. spp.	-	-	1,523,004	-	-	-	-	-	-
Amphiprora	7,252	18,130	1,015,336	7,252	3,626	-	-	-	-
A. kjellmanii var. *striolata*	-	7,252	145,048	3,626	-	-	-	-	-
A. kryophila	-	3,626	507,668	-	-	-	-	-	-
A. spp.	7,252	7,252	362,620	3,626	3,626	-	-	-	-
Amphora	21,756	7,252	362,620	-	-	-	-	-	-
A. laevis var. *laevissima*	3,626	3,626	145,048	-	-	-	-	-	-
A. proteus	10,878	-	-	-	-	-	-	-	-
A. spp.	7,252	3,626	217,572	-	-	-	-	-	-
Cocconeis	50,766	-	72,524	-	-	-	-	-	3,626
C. scutellum var. *parva*	29,009	-	-	-	-	-	-	-	3,626
C. spp.	21,757	-	72,524	-	-	-	-	-	-
Diploneis	-	18,131	-	-	3,626	3,626	-	-	3,626
D. litoralis var. *arctica*	-	18,131	-	-	3,626	3,626	-	-	3,626
Fragilaria	-	-	-	1,196,646	-	-	-	-	-
F. spp.	-	-	-	1,196,646	-	-	-	-	-
Gomphonema	7,252	7,252	2,538,340	43,514	7,252	7,252	3,626	-	-
G. exiguum var. *pachycladum*	3,626	7,252	2,103,196	43,514	3,626	7,252	3,626	-	-
G. groenlandicum	3,626	-	217,572	-	-	-	-	-	-
G. spp.	-	-	217,572	-	3,626	-	-	-	-
Navicula	50,766	159,552	3,481,152	36,261	7,252	14,504	14,504	14,504	10,878
N. crucigeroides	-	-	72,524	-	-	-	-	-	-
N. digitoradiata	3,626	3,626	36,262	-	-	-	-	-	-
N. directa	-	18,131	18,310	-	-	-	-	-	-
N. kjellmanii	-	3,626	36,262	-	-	-	-	-	-
N. marina	-	-	72,524	3,626	-	-	-	-	-
N. quadripedis	-	-	1,523,004	7,252	-	-	-	-	7,252

Table 16. (cont'd.)

Sample type	Ice core			Seawater depth (m)					
	Top 5cm	Middle 5cm	Bottom 5cm	0	5	10	15	20	25
N. superba var. *subacuta*	-	3,626	-	-	-	-	-	-	-
N. transitans	-	-	36,262	-	-	-	-	-	-
N. spp.	47,140	130,543	1,523,004	25,383	7,252	14,504	14,504	14,504	3,626
Nitzschia	58,017	304,598	40,250,820	507,665	61,644	76,149	61,644	36,260	25,382
N. closterium	3,626	14,504	36,262	-	-	-	-	-	-
N. cylindrus	29,009	54,393	2,538,340	32,635	-	65,271	10,878	10,878	14,504
N. distans var. *erratica*	-	-	1,450,480	-	-	-	-	-	-
N. frigida	-	-	4,714,060	141,421	21,757	-	-	-	-
N. gelida	-	-	145,048	-	-	-	-	-	-
N. grunowii	-	-	7,796,330	-	-	-	-	-	-
N. hybrida	-	3,626	-	-	-	-	-	3,626	-
N. laevissima	-	3,626	181,310	-	-	-	-	-	-
N. lecointei	7,252	7,252	-	-	-	-	-	-	-
N. linearis	-	-	108,786	-	-	-	-	-	-
N. polaris	3,626	29,009	6,309,588	50,766	10,878	3,626	14,504	14,504	7,252
N. spp.	14,504	192,188	16,970,616	282,843	29,009	7,252	36,262	7,252	3,626
Pinnularia	-	14,504	326,358	-	-	-	-	-	-
P. quadratarea var. *bicontracta*	-	-	72,524	-	-	-	-	-	-
P. quadratarea var. *stuxbergii*	-	7,252	72,524	-	-	-	-	-	-
P. spp.	-	7,252	181,310	-	-	-	-	-	-
Pleurosigma	-	21,756	362,620	3,626	-	-	-	-	-
P. clevei	-	3,626	-	-	-	-	-	-	-
P. stuxbergii	-	3,626	145,048	-	-	-	-	-	-
P. spp.	-	14,504	217,572	3,626	-	-	-	-	-
Stenoneis	-	-	108,786	-	-	-	-	-	-
S. inconspicua var. *baculus*	-	-	108,786	-	-	-	-	-	-
Synedra	7,252	-	-	-	-	-	-	-	-
S. spp.	7,252	-	-	-	-	-	-	-	-
Tropidoneis	-	-	-	3,626	-	-	-	-	-
T. maxima var. *dubia*	-	-	-	3,626	-	-	-	-	-
Unidentified	119,664	155,926	19,944,100	141,421	39,888	32,635	14,504	18,131	18,131
Chlorophyta	-	-	108,786	-	-	-	-	-	-
Unidentified green flagellates	-	-	108,786	-	-	-	-	-	-
Euglenophyta	-	-	435,144	-	3,626	-	-	-	-
Euglena	-	-	435,144	-	3,626	-	-	-	-
E. spp.	-	-	435,144	-	3,626	-	-	-	-
Pyrrophyta	29,009	21,757	217,572	-	-	10,878	-	-	-
Unidentified	29,009	21,757	217,572	-	-	10,878	-	-	-

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