

**Diversity, structure and abundance  
phytoplankton of the eastern Gulf of Finland  
under antropogenous stress**

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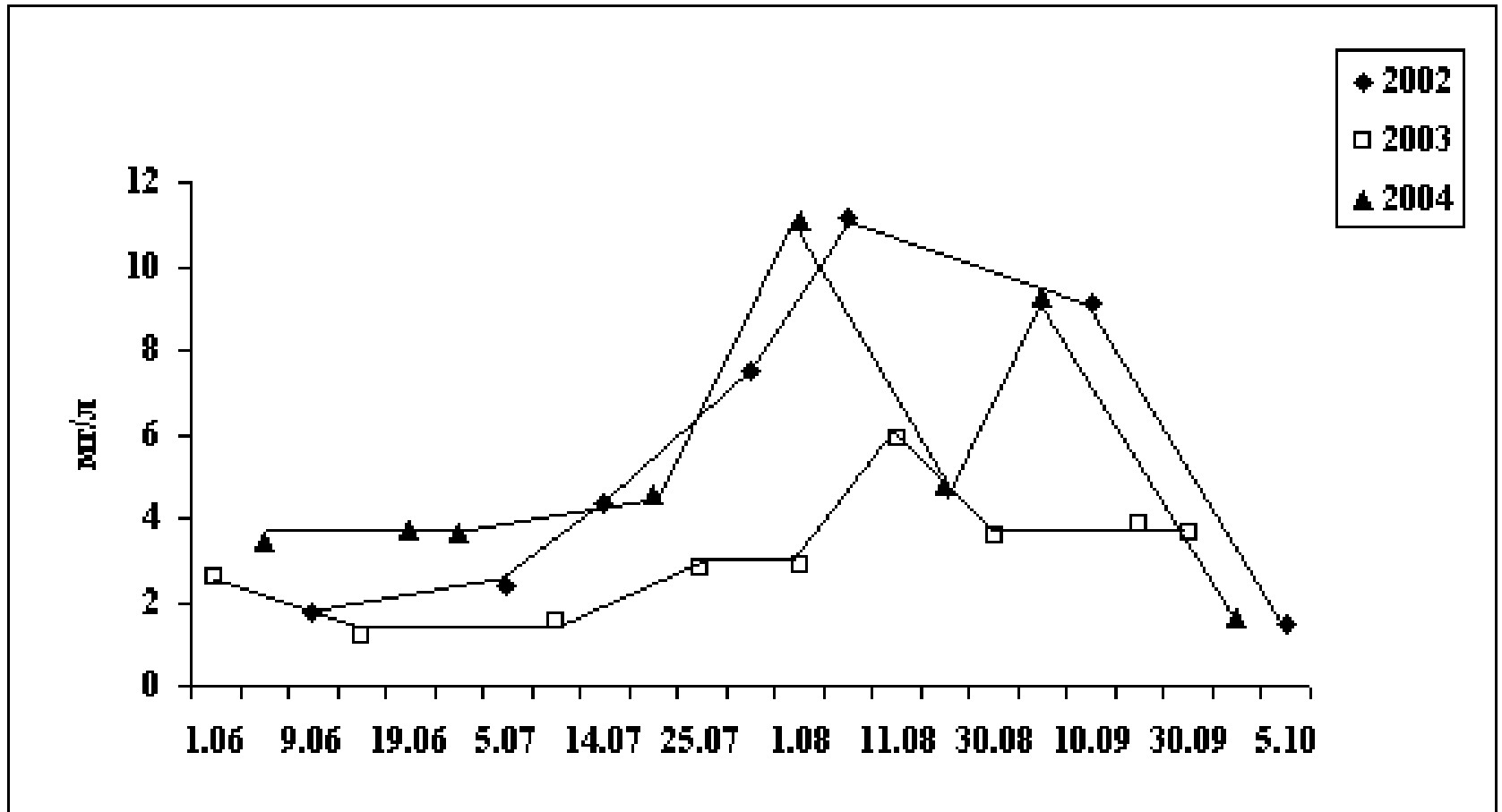


**Max. number (10<sup>3</sup> · cells · l<sup>-1</sup>) of dominant phytoplankton species,  
2002-2004, st. 21**

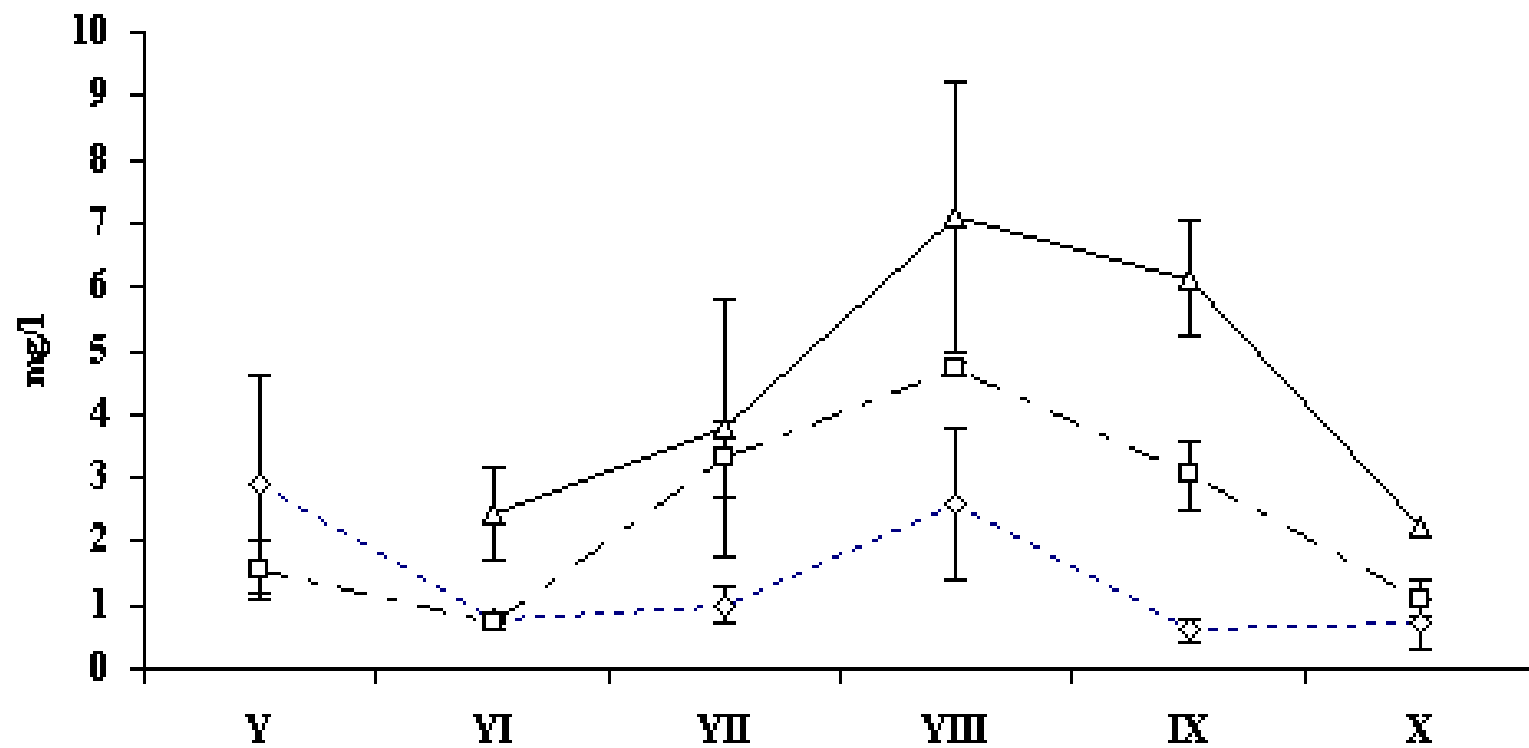
<i>Species</i>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>Cyanophyta</b>			
<i>Anabaena circinalis Rabenh.</i>	2,9	1,5	0,7
<i>A.flos-aquae (Lyngb.)Breb.</i>	10,8	5,9	21
<i>Aphanizomenon flos-aquae(L.) Ralfs</i>	67,2	5,8	13,3
<i>Aph.gracilis Lemm.</i>	-	2,8	2,2
<i>Aphanothece clathrata W. et G. West</i>	6,4	4,2	23,3
<i>Limnothrix planctonica (Wolosz.) Meff.</i>	51,7	14,1	8,8
<i>Microcystis pulverea (Wood.) Forti</i>	76,5	33,2	13
<i>Planktolyngbya limnetica(W. West) Anagn. Komarek</i>	4,1	54,5	5,3
<i>Planktothrix agardhii (Gom.)Anagn. a. Komarek</i>	29,5	15,9	25,9
<i>Snowella lacustris (Chod.)Komarek a. Hindak</i>	3,8	1,1	2,2

<b>Bacillariophyta</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
<i>Aulacosira islandica O.Mull.</i>	0,3	0,2	1,9
<i>Skeletonema costatum (Grev.) Cl.</i>	-	1,2	-
<i>Skeletonema subsalsum (Cl.)Bethge</i>	2,8	9,6	2,4
<b>Cryptophyta + Dinophyta</b>			
<i>Chroomonas acuta Uterm.</i>	0,9	0,6	5,6
<i>Cryptomonas erosa Ehr. + C.marssonii Skuja</i>	0,2	0,3	0,4
<b>Chlorophyta</b>			
<i>Dictyosphaerium pulchellum Wood</i>	2,6	3,5	4,1
<i>Mougeotia sp.</i>	0,4	0,1	0,2
<i>Monoraphidium contortum (Thur.) Kom.- Leg.</i>	1584	54	350

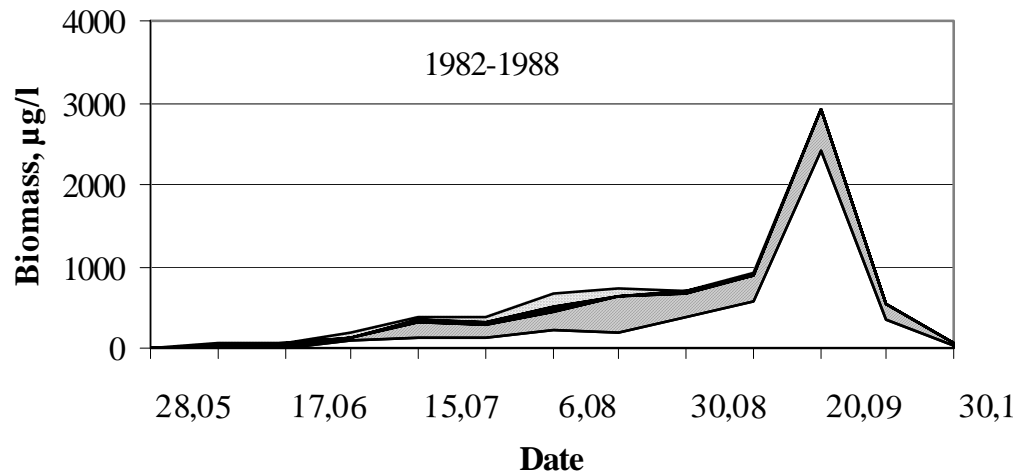
## Seasonal dynamics of the total biomass phytoplankton



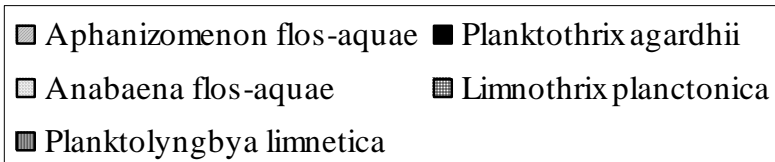
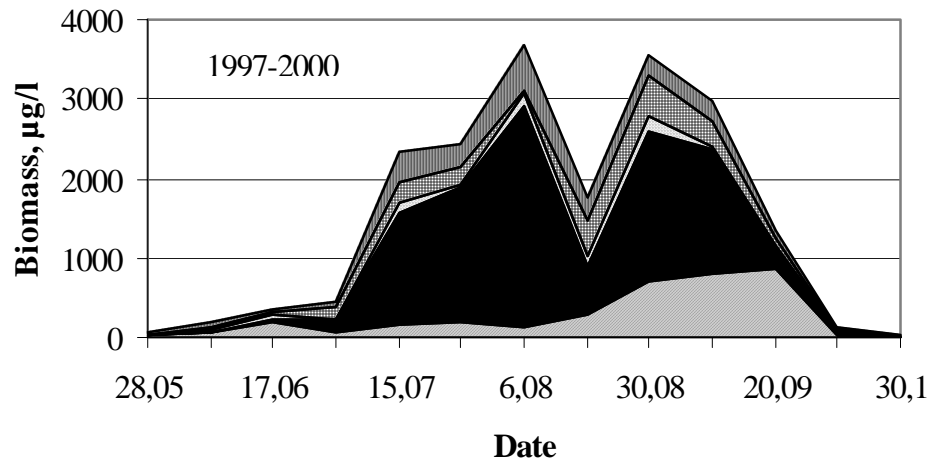
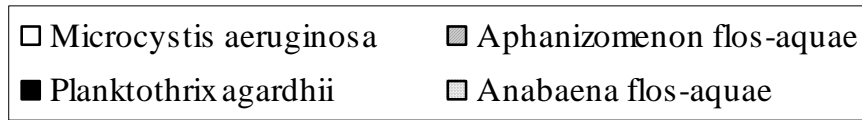
st.21



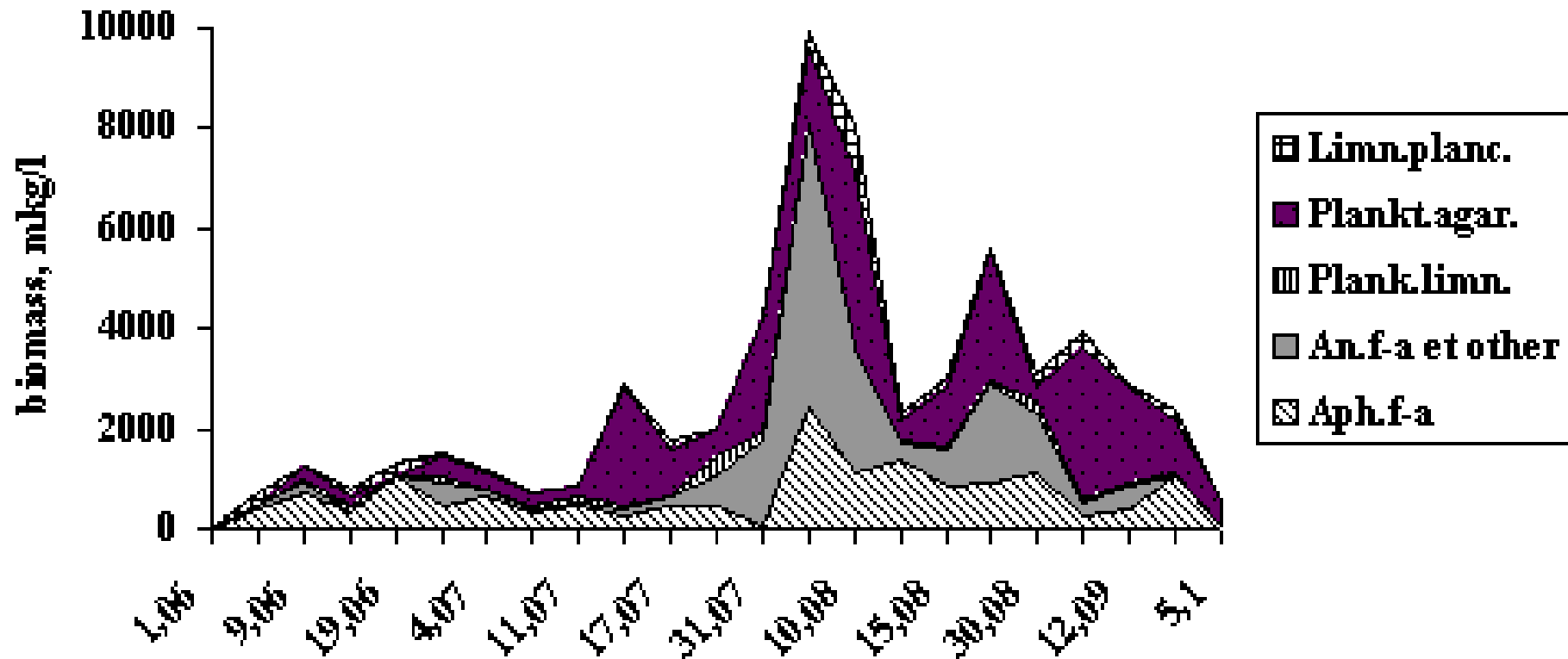
---◇--- 1982-1988    -□- 1997-2000    —△— 2002-2004



## Seasonal dynamics of blue-green algae at the top of the eastern Gulf of Finland in different years



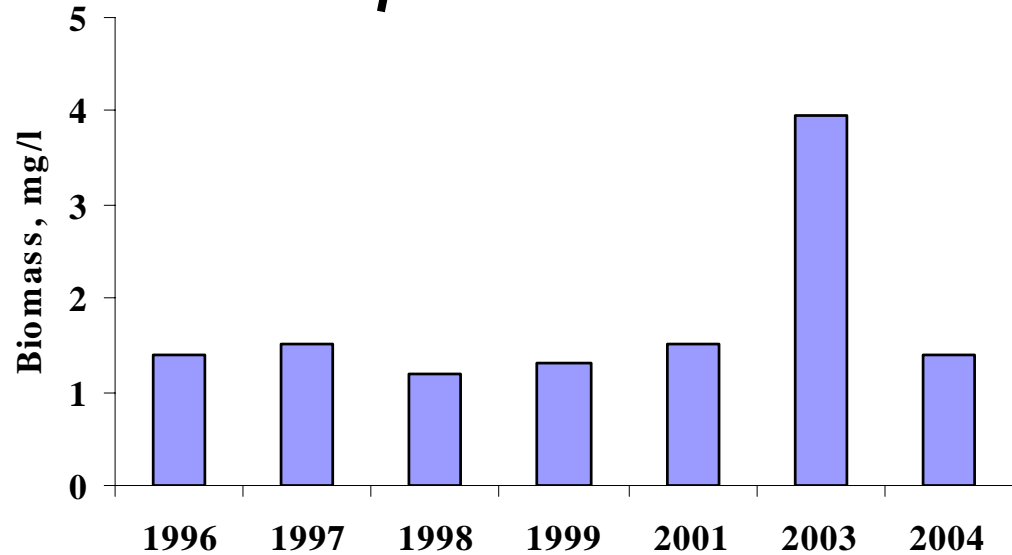
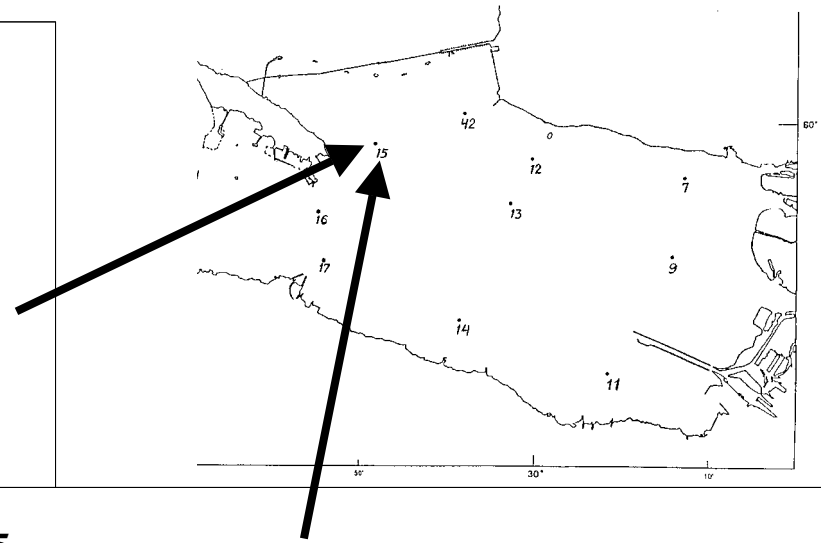
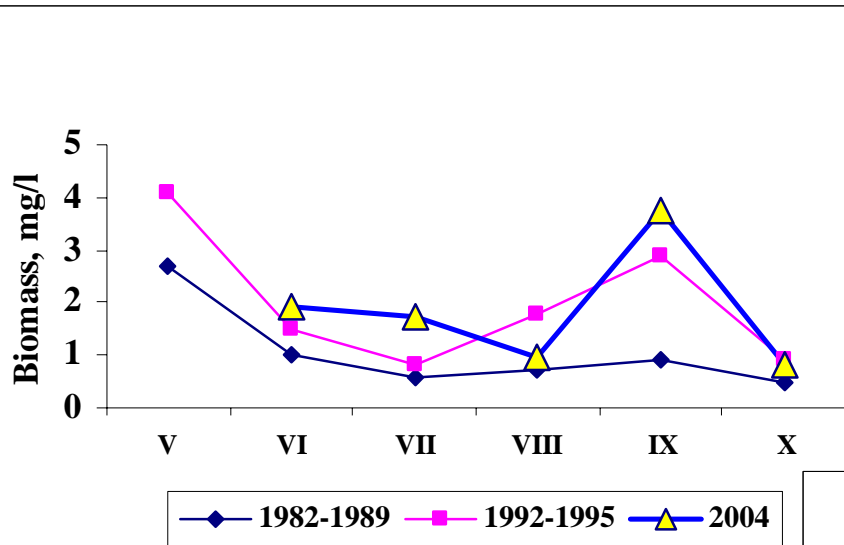
## Seasonal dynamics of dominant Cyanophyta species, 2002-2004



**Biomass Skeletonema subsalsum, in July-August, st.21,**

<b>Year</b>	<b>1983</b>	<b>1984</b>	<b>1985</b>	<b>1986</b>	<b>1987</b>	<b>1988</b>	<b>Mean</b>
<b>Biomass,</b>							
<b>mg/l</b>	<b>0,53</b>	<b>1,04</b>	<b>1,06</b>	<b>1,67</b>	<b>0,99</b>	<b>0,4</b>	<b>0,96</b>
<b>% of total</b>	<b>27,2</b>	<b>48,7</b>	<b>53,1</b>	<b>36,5</b>	<b>78,7</b>	<b>33,1</b>	<b>48,2</b>
<b>biomass</b>							
<b>Year</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	
<b>Biomass,</b>							
<b>mg/l</b>	<b>0,17</b>	<b>0,06</b>	<b>1,24</b>	<b>0,39</b>	<b>0,6</b>	<b>0,82</b>	<b>0,55</b>
<b>% of total</b>	<b>6,7</b>	<b>1,4</b>	<b>27,4</b>	<b>11,8</b>	<b>18,7</b>	<b>25,4</b>	<b>15,3</b>
<b>biomass</b>							

# Dynamics of the phytoplankton biomass in midsummer in the north-western part of the Neva Bay (st.15)



**The species of the phytoplankton are constants at present, but were not recorded in 1980-s**

**Lemmermaniella pallida (Lemm.) Elenkin**

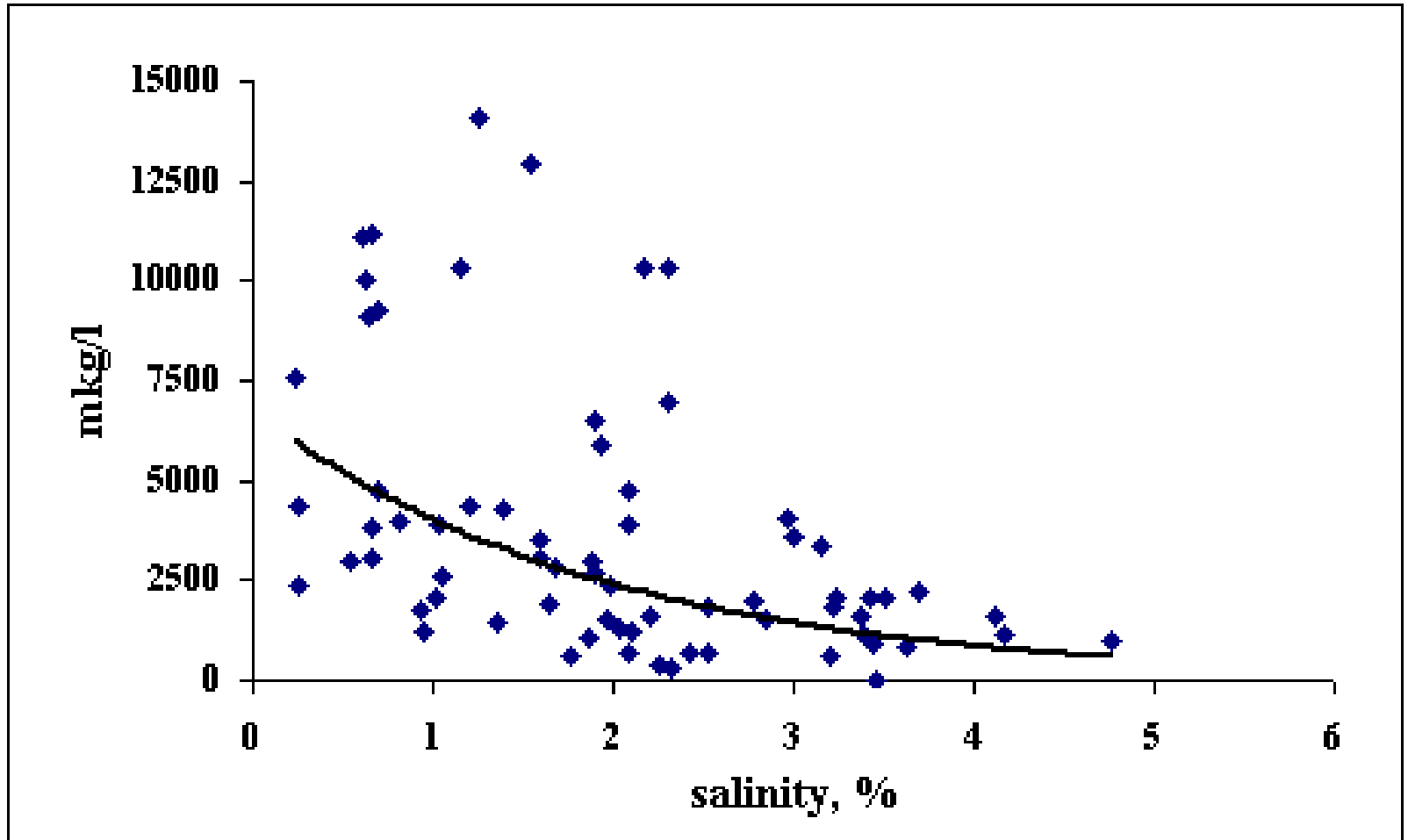
**Romeria gracilis Koszw.**

**Pseudoanabaena limnetica (Lemm.) Komarek**

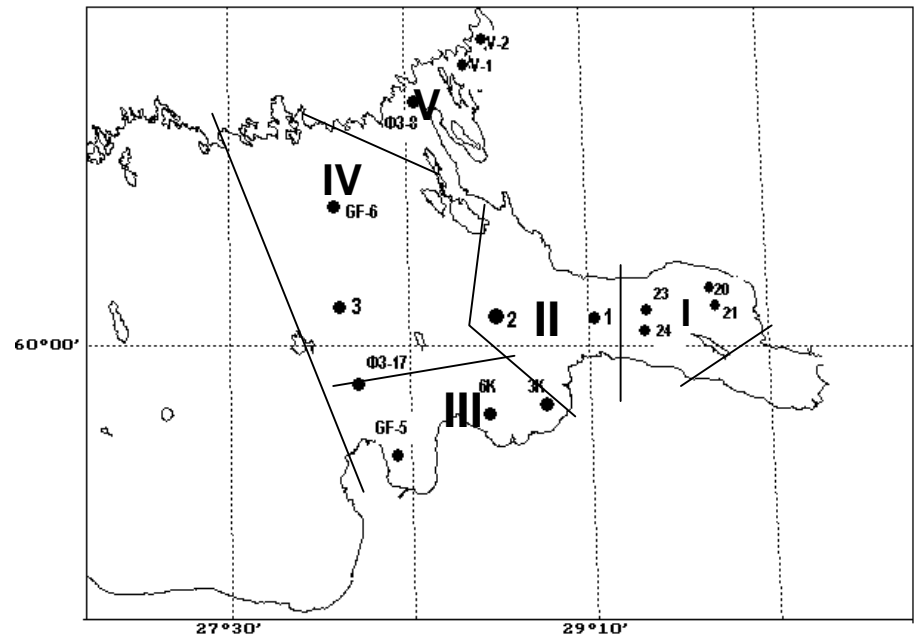
## Phytoplankton, st.21

	<b>2002</b>	<b>2003</b>	<b>2004</b>
<b>Salinity, ‰</b>	<b>0,66± 0,11</b>	<b>1,58± 0,19</b>	<b>0,62± 0,11</b>
<b>Total biomass, mg/l</b>	<b>5,41± 1,47</b>	<b>3,04± 0,95</b>	<b>5,21± 1,15</b>
<b>Biomass of blue-green algae, mg/l</b>	<b>3,95± 0,92</b>	<b>1,83± 0,31</b>	<b>3,36± 1,34</b>
<b>% P.agardhii in biomass blue-green algae</b>	<b>49,7± 7,5</b>	<b>20,3± 6,3</b>	<b>38,6± 11,3</b>
<b>% Anabaena + Aphanizomenon in biomass of blue-green allgae</b>	<b>39,5± 8,8</b>	<b>59,9± 5,8</b>	<b>36,8± 10</b>

## Relationship between salinity and biomass phytoplankton



# Phytoplankton in the eastern Gulf of Finland in midsummer 2003-2005



Zones		Biomass, mg/l	Number of species	H
West. part Neva Bay		$3,86 \pm 0,68$	$52 \pm 6,1$	$3,9 \pm 0,14$
1		$4,05 \pm 0,61$	$41 \pm 5,5$	$3,24 \pm 0,01$
II		$2,51 \pm 0,55$	$26 \pm 3,1$	$3,39 \pm 0,24$
III		$2,28 \pm 0,59$	$25 \pm 0,73$	$3,44 \pm 0,12$
IV		$2,17 \pm 0,5$	$23 \pm 6,3$	$3,13 \pm 0,2$
Y		$11,77 \pm 1,6$	$32 \pm 7,4$	$2,77 \pm 0,17$

# Conclusions

- Species composition of the phytoplankton is the integrated index of quality water.
- At present the role of blue-green algae in the eastern Gulf of Finland considerably increased as compared with 1980's;
- The role of algae *Pl. agardhii*, as indicator of organic pollution became particularly important. This alga spread over the entire Gulf of Finland and occurred in both fresh and brackish waters.
- The average seasonal biomass of the shallow-water region of the eastern Gulf of Finland in 2002-2004 was approximately 4,5 mg/l. The seasonal development of phytoplankton for a long period (from July to October) was high.
- High intensity of eutrophication and blue-green blooms were observed in the open waters of the Neva estuary, especially in the Vyborg Bay;
- Species that were predominant in the 1980s and lost their advantage in the 1990s, regained their dominant position.