



Ministry education and Science of Republic of Kazakhstan
Karaganda State University named after academician Ye.A.
Buketov

Biological and geographical faculty

Botany Department

Course – Botany
Specialty - 5B011300 – «Biology»

Lecture № 11

Algae. Division: Chlorophyta and Charophyta

(1 hour)

Lecturer: candidate of biological science, associated
professor

Ishmuratova Margarita Yulaevna



Plan of lecture:

1 General characteristic and systematic of green algae.

2 General characteristic and systematic of chara algae.

Main literatures:

- 1 Еленевский А.Г., Соловьев М.П., Тихомиров В.Н. Ботаника: систематика высших, или наземных, растений. 2 изд. - М.: Academia, 2001. - 429 с.
- 2 Нестерова С.Г. Лабораторный практикум по систематике растений. - Алматы: Қазақ ун-ті, 2011. - 220 с.
- 3 Родман А.С. Ботаника. – М.: Колос, 2001. - 328 с.

Additional literatures:

- 1 Абдрахманов О.А. Систематика низших растений. – Караганда: Изд-во КарГУ, 2009. - 188 с.
- 2 Билич Г.Л., Крыжановский В.А. Биология. Т. 2: Ботаника. - М.: Оникс 21 век, 2002. - 543 с.
- 3 Абдрахманов О.А. Практические работы по систематике низших растений. Ч. 2. Грибы и водоросли. – Караганда: Изд-во КарГУ, 2001. - 144 с.
- 4 Абдрахманов О.А. Лабораторный практикум по бактериям и водорослям. Учебное пособие. - Алматы: Казакадем образование, 2000. - 130 с.

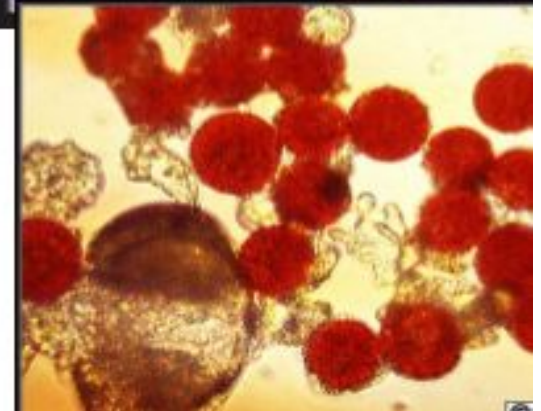
Green Algae

- Phylum Chlorophyta and Charophyceans
- ~ 17,000 described species
- Key traits:
- Chloroplasts similar to those found in plants
- Chlorophyll a & b
- Color not masked by carotenoids, so green

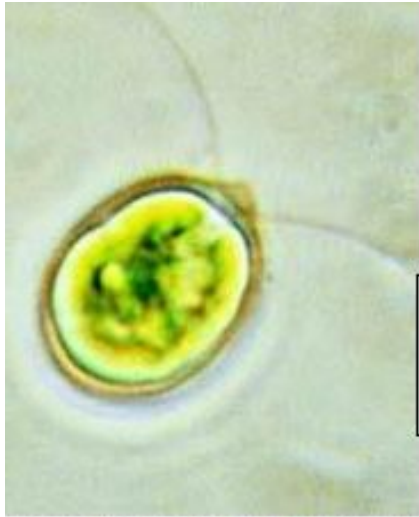
Green Algae

Lifestyle

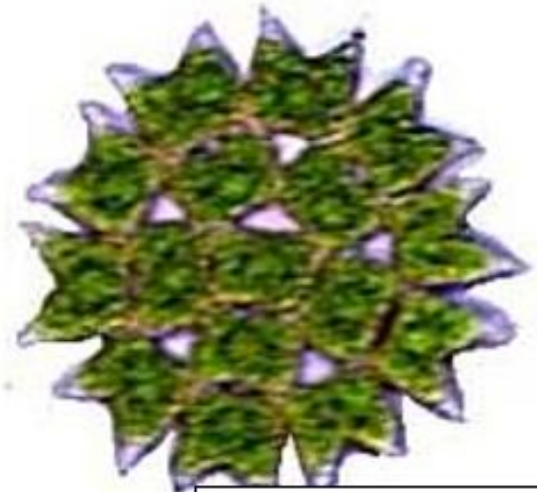
- Highly diverse
- Freshwater and marine
 - Some planktonic
- Some terrestrial
 - *Chlamydomonas nivalis*
- Mutualisms
 - Lichen
 - Sponges, freshwater protozoa



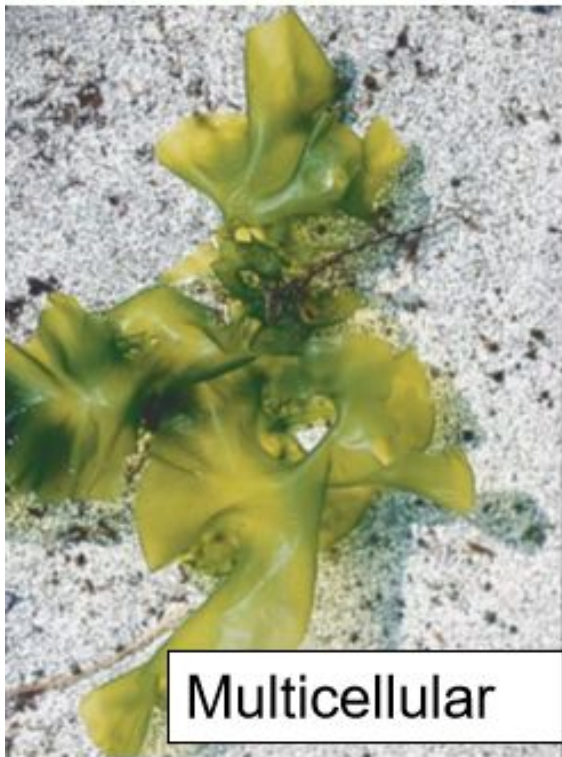
Green Algae



Unicellular w/two
flagella



Unicellular,
colonial



Multicellular



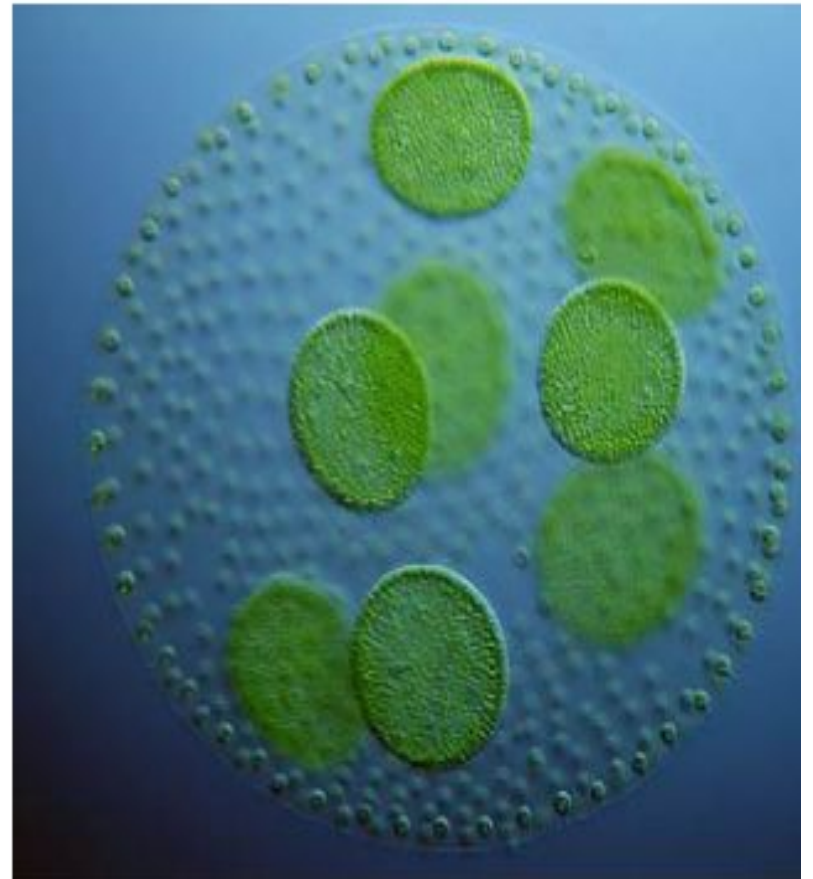
Unicellular, multinucleate,
filamentous

Some species of green algae



Green Algae

Is *Volvox* a colonial species or a multicellular organism?



Ulotrix



Ulva



Colony of volvox



Some species from Charophyta algae



Table 1. Some major divisions of algae

Division	Vegetative structure	Reproduction	Pigments
Euglenophyta (euglenas)	Unicellular or a few colonial; flagellate, no cell wall	Asexual only	Chlorophyll <i>a, b</i>
Bacillariophyta (diatoms)	Unicellular or colonial; silica cell wall forming a box	Asexual; sexual by cells dividing by meiosis to form gametes	Chlorophyll <i>a, c</i> ; brown pigments
Pyrrophyta or Dinophyta (dinoflagellates)	Unicellular or filamentous; cellulose cell wall	Asexual; sexual occasional	Chlorophyll <i>a, c</i> or none (heterotrophic)
Rhodophyta (red algae)	Multicellular (a few unicellular); cellulose cell wall	Asexual and sexual, some involving three generations	chlorophyll <i>a</i> ; red and purple pigments; unusual storage products
Phaeophyta (brown algae)	Multicellular; cellulose cell wall	Asexual and sexual, involving alternation of generations	chlorophyll <i>a, c</i> ; brown pigments; unusual storage products
Chlorophyta (green algae)	Unicellular and multicellular; some large and complex; cellulose cell wall; a few flagellate; huge and variable group	Asexual and sexual; zygote usually dividing by meiosis after fertilization	chlorophyll <i>a, b</i> ; many other pigments and storage products like those of land plants

Control questions:

- 1 Make the characteristics of green and chara algae.
- 2 Which life forms are usual for green algae?
- 3 Which life forms are usual for chara algae?
- 4 Why did chara algae extract in separate group of algae?
- 5 Which practical uses have green and chara algae?
- 6 What kind of pigments has green algae?
- 7 Describe similar signs of green and chara algar.

Test questions:

Sphere of use of green algae:

- A) source of protein
- B) production of calcium
- C) de-toxication of heavy metal
- Д) as a food
- E) production of medical preparations
- F) As decorative plants

Colonial species of green algae:

- A) chrysomonad
- B) diatomea
- C) volvox
- Д) chara
- E) ulotrix