

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 № 27

## **Class Monocotyledones. Division Poales (Graminales)**

(1 hour)

Lecturer: candidate of biological science, associated  
professor

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# **Plan of lecture:**

- 1 Family Melanthiaceae.**
- 2 Family Liliaceae.**
- 3 Family Alliaceae.**
- 4 Family Convallariaceae.**
- 5 Family Asparagaceae.**
- 6 Family Orchidaceae.**
- 7 Family Poaceae.**

## **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 Билич Г.Л., Крыжановский В.А. Биология. Т. 2: Ботаника. - М.: Оникс 21 век, 2002. - 543 с.
- 2 Ишмуратова М.Ю. Систематика и интродукция растений (курс лекций). - Караганда: РИО Болашак-Баспа, 2015. - 100 с.
- 3 Тусупбекова Г.Т. Основы естествознания. Ч. 1. Ботаника. – Астана: Фолиант, 2013. – 321 с.

# Family *Melanthiaceae*

Family includes 47 genera and about 400 species.

**Spreading** – Eastern Asia and Northern America.

**Life forms** – perennial grassy plants with bulbs and rhizomes.

**Flowering formula** - \*P(6) A6 G(3)

**Pollination** – by insects.

**Important genera** - *Veratrum* and *Colchicum*.

**Practical uses:** Medical and poison.



Veratrum  
lobelianum



Colchicum

# Family *Liliaceae*

Family consists from 10 genera and 470 species.

**Spreading** – continental and sub-tropical zones of Eurasia and Northern America.

**Life forms** – perennial grassy bulb plants.

**Flowering formula** - \*P<sub>6</sub> A<sub>3+3</sub> G(3)

**Pollination** – by insects

**Important genera** - *Tulipa*, *Gagea*, *Lilium*, *Fritillaria*.

**Practical uses:** decorative, medical, meadow plants.



Lilium margadon



Fritillaria ruthenica

# Family *Alliaceae*

Family includes 32 genera and 750 species.

**Spreading** – Eurasia and Northern America.

**Life forms** - perennial grassy bulb plants.

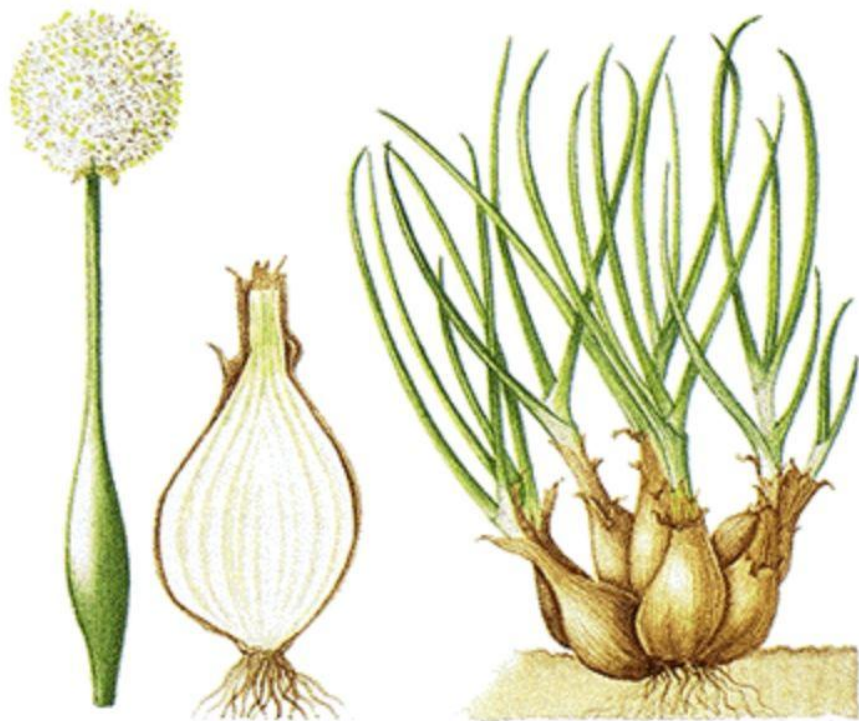
**Flowering formula** -  $*P_{3+3} A (6) G (3)$

**Pollination** – by insects.

**Important genera** - *Allium*.

**Practical uses:** medical and food plants.





Allium schalot



Allium sativum

# Family *Convallariaceae*

Family includes 23 genera and about 2300 species.

Spreading – Eurasia and Northern America.

Life forms – perennial grassy rhizome plants.

Flowering formula –  $*P(3) A 4-6 G(2-3)$

Pollination – by insects

Important genera - *Convallaria*, *Polygonatum*, *Maianthemum*.

Practical uses – decorative and medical plants.



*Convallaria majalis*



*Maianthemum*



*Polygonatum*

# Family *Asparagaceae*

Small family, includes 2 genera and about 300 species.

**Spreading** – arid zones of world.

**Life form** – rhizome grassy plants with woody stalks.

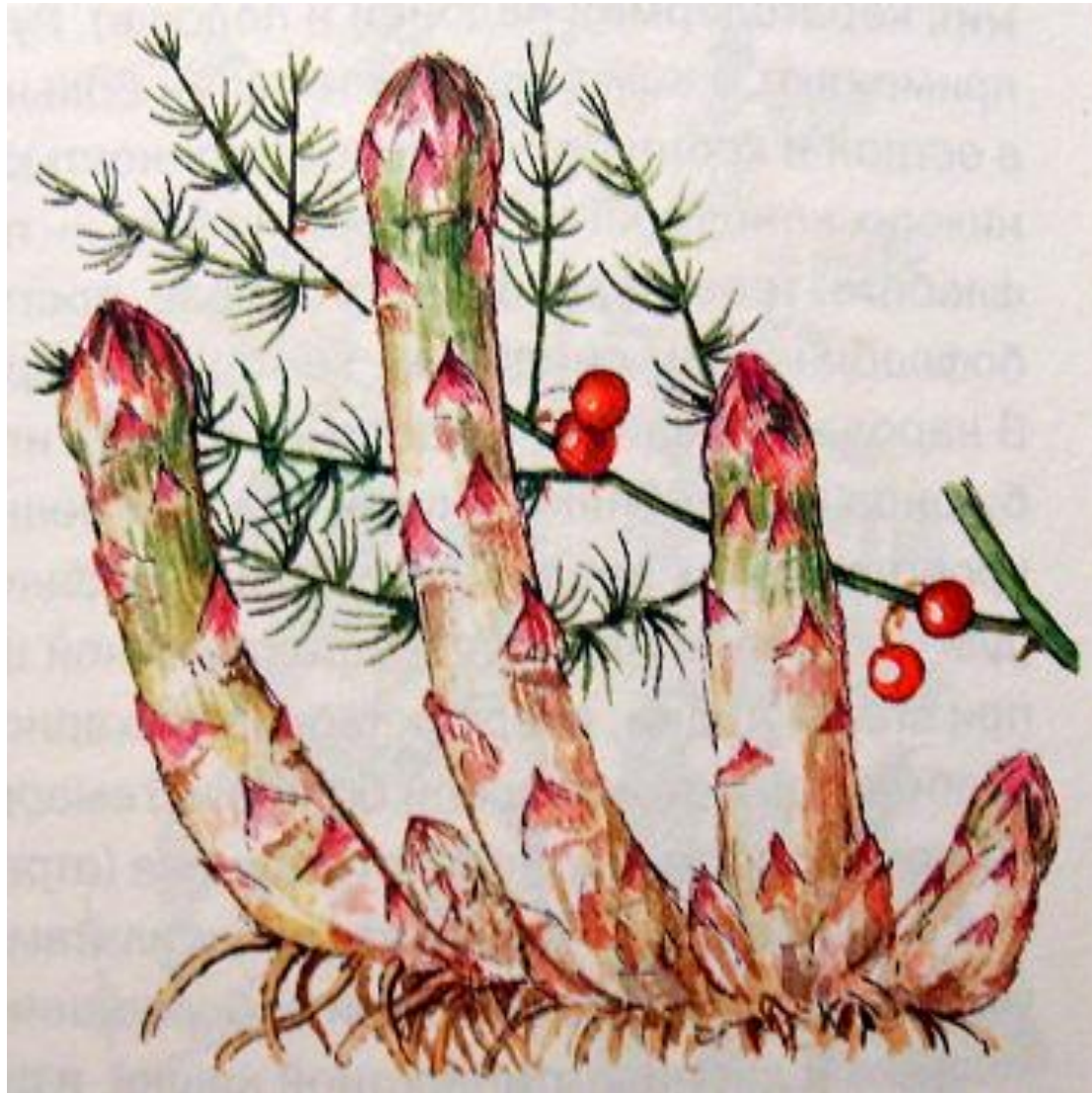
**Flowering formula** – \* P<sub>6</sub> A<sub>6</sub> G<sub>(3)</sub>

**Pollination** – by insects.

**Important genus** – *Asparagus*.

**Practical uses** – food, decorative and medical plants.





**Asparagus officinalis**

# **Family *Orchidaceae***

A very large family, includes about 800 genera and until 30 000 species.

**Spreading** – all climate zone and continents.

**Life forms** – perennial micro trophic; sometimes non-chlorophyll grassy plants; in tropic zone – epiphytes with air roots; in continental zone – with bulbs and rhizomes.

**Flowering formula** -  $\uparrow P_3 A_{1-2} G (3)$

**Pollination** – by insects.

**Important genera** – *Orchis*, *Cypripedium*.

**Practical uses** – decorative and medical plants.



**Cypripedium**



**Orchis fuschi**

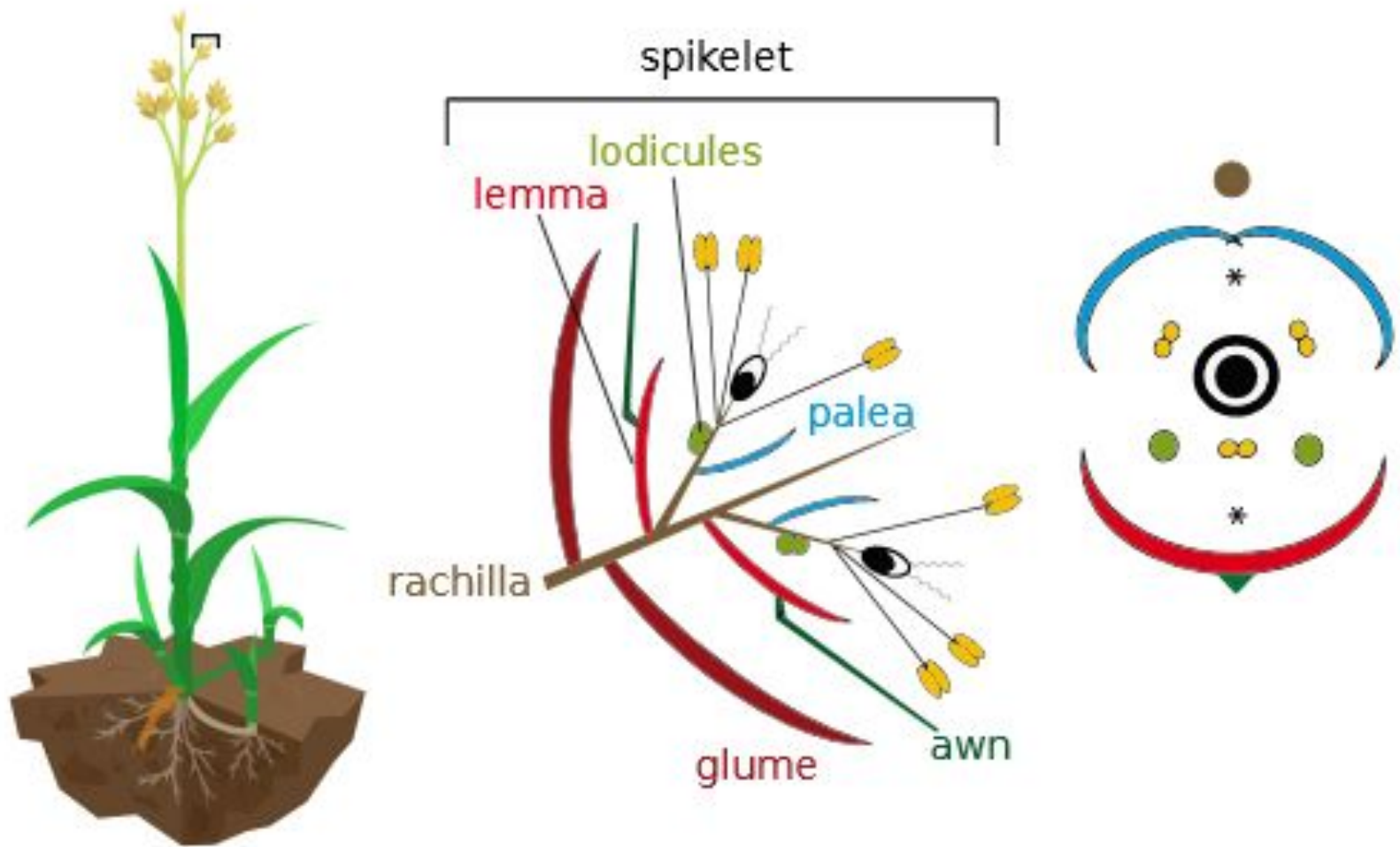
## Gramineae, or Poaceae—grass family

Belong to liliids (Liliidae, monocots). Approximately 8,000 species distributed throughout the world, but most genera concentrate in tropics. Prefer dry, sunny places. Often form turf (tussocks)—compact structures where old grass stems, rhizomes, roots, and soil parts are intermixed. Grasses form grasslands—specific ecological communities widely represented on Earth (for example, North American prairies are grasslands). Stems of grasses are usually hollow and round. Leaves with sheaths.

Flowers reduced, wind-pollinated, usually bisexual, form complicated spikelets. Each spikelet bears two *glumes*; each flower has *lemma* and *palea* scales. Perianth is reduced to lodicules. Stamens from 6 to 1 (most often 3), with large anthers. Flower formula is

$$\uparrow P_{0-3} A_{0-3+2-3} \underline{G_{(2)}}$$





Gramineae: one plant, scheme of spikelet and flower diagram.

Fruit is a *caryopsis*; it includes flower scales. Seed contains embryo with *coleoptile*, *coleorhiza* and *scutellum* .

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Most primitive grasses are bamboos (Bambusoideae subfamily). There are many other subfamilies. Two are especially economically important:

- Poid (Pooideae) grasses usually are  $C_3$  plants, wheat (*Triticum*), rice (*Oryza*), barley (*Hordeum*) and rye (*Secale*) belong to this group.
- Panicoid (Panicoideae) grasses are mostly  $C_4$  plants like corn (*Zea*), sorghum (*Sorghum*) and sugarcane (*Saccharum*).



**Avena sativa**



**Zea mays**

## **Control questions:**

- 1 Note the typical signs of Melanthiaceae family.
- 2 Note the typical signs of Liliaceae family.
- 3 Note the type of flower and inflorescences of species from Alliaceae family.
- 4 How do we use some species from Liliaceae family?
- 5 How do we use some species from Asparagaceae family?
- 6 Which species from Asparagaceae family was include in State Pharmacopeae?

## Test questions:

**These plants from Convallariaceae family are used as medical plants:**

- A) Festuca valesiaca
- B) Canvallaria majalis
- C) Lilum margadon
- D) Allium sativum
- E) Asparagus officinalis
- F) Allium coeruleum
- G) Poa annua

**Fodder plants from Poaceae family:**

- A) Festuca valesiaca
- B) Canvallaria majalis
- C) Lilum margadon
- D) Allium sativum
- E) Asparagus officinalis
- F) Allium coeruleum
- G) Poa annua