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 № 23

Characteristic of families Brassicaceae, Ericaceae, Malvaceae, Urticaceae, typical species and practical uses

(1 hour)

Lecturer: candidate of biological science, associated professor
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Plan of lecture:

1 Brassicaceae family.
2 Ericaceae family.
3 Malvaceae family.
4 Urticaceae family.

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.

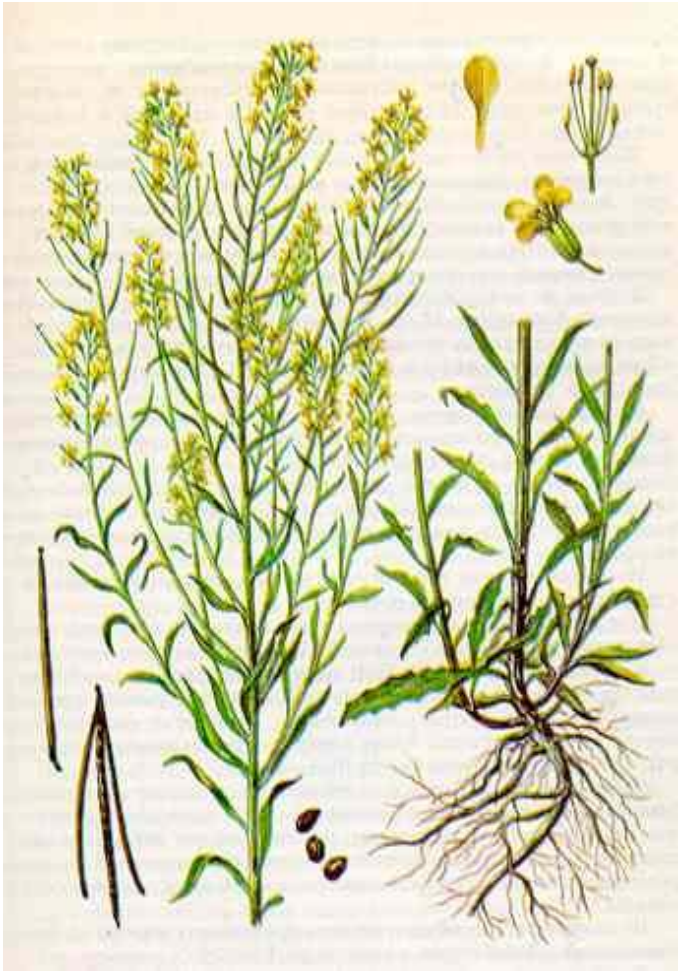
Additional literatures:

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 – *Brassicaceae (Cruciferae)*

Large family, includes 380 gena and more then 3000 species.
Spreading – all world.
Life forms – annual and perennial grassy plants, rare – semi-shrubs.
Pollination – by insects.
Flowering formula - * Ca4 Co4 A 4+2 G (2)
Important gena - *Brassica*, *Raphanus*, *Armoracia*, *Erysimum*, *Thlaspi*, *Sisymbrium*, *Berteroa, Alyssum*, *Capsella, Isatis, Lepidium, Camelina, Arabidopsis, Descurainia* and etc.
Practical uses: decorative, technical, food, fodder, medical, meadow.

Capsella
bursa-pastoris



Erysimum divaricatum

Family Erica*ceae*

Family includes 140 gena and more then 3500 species.
Spreading – all world, except desert and steppe region. They prefer acid soil.
Family is separated into 3 sub-families: *Ericoideae*, *Rhododendroideae*, *Vaccinioideae*.
Life form – bushes and semi-shrubs, rare – grassy plants and trees.
Flowering formula - *Ca4-5 Co4-5 A 8-10 G (4-5)
Pollination – by insects
Important gena – Erica, Ledum, Rhododendron, Vaccinum and etc.
Practical uses: decorative, meadow, medical and food.

Ledum

Vaccinum

Urva urcis

Systematic position

Class: Dicotyledonae

Sub-class: Polypetalae

Series: Thalamiflorae

Order: Malvales

Family: Malvaceae

General characters

Distribution

This family includes about 82 genera and more than 1,500 species. The plants are cosmopolitan in distribution, more abundant in tropical and subtropical regions. In India, Malvaceae is represented by 22 genera and 125 species.

Habit

Plants may be annual herbs (eg. *Malva sylvestris*) or perennial shrubs (eg. *Hibiscus rosa-sinensis*) or trees (eg. *Thespesia populnea)*. The members of this family have mucilagenous substance. Stellate hairs occur on their young parts.

Flower

Bracteate or ebracteate, bracteolate or ebracteolate, pedicellate, dichlamydeous, pentamerous, complete, actinomorphic, regular, bisexual and hypogynous.

Epicalyx

Bracteoles forming a whorl outer to calyx is called epicalyx. Bracteoles 3 in *Malva sylvestris*, 5 to 8 in *Hibiscus rosa-sinensis*, 10 to 12 in *Pavonia odorata* and absent in *Abutilon indicum*.

Calyx

Sepals 5, green, gamosepalous showing valvate aestivation.

Corolla

Petals 5, coloured, polypetalous but slightly fused at the base due to adhesion with staminal tube, regular and showing twisted aestivation.

Androecium

Numerous stamens, filaments are fused to form a staminal tube around the style and monadelphous. The staminal tube is fused with the petals at their bases. Anthers are monothecous, reniform, transversely attached to filaments and transversely dehiscent.

Gynoecium

Ovary superior, two to many carpels but usually 5 to 10 carpels and syncarpous. Ovary with two to many locules. Pentacarpellary in *Hibiscus rosa-sinensis*, 10 in *Althaea* and 15 to 20 in *Abutilon indicum*. Number of locules usually corresponds to number of carpels. Each locule contains one to many ovules on axile placentation. Style long, slender and passes through the staminal tube ending in two to many distinct round stigmas.

Floral formula : $Br., Brl., \oplus, \varnothing, K_{(5)}, C_{5}, A_{(\infty)}, \underline{G}_{(5)}$

ECONOMIC IMPORTANCE

1. Fibre plants

Gossypium barbadense (Egyptian cotton), *G. hirsutum* (American cotton), *G. herbaceum* (Cotton) and several other species of *Gossypium* yield cotton fibres of commercial value. The fibres are obtained from the surface of seeds.

Hibiscus cannabinus (Deccan hemp) yields **bast fibres** which are used for making ropes.

2. Food plants

The tender fruit of *Abelmoschus esculentus* (lady's finger) is used as vegetable. The leaves and sepals of *Hibiscus sabdariffa* (A kind of 'pulichai') are used for making pickles, jam and jelly. A delicious 'chutney' is prepared from the leaves and sepals of *H. cannabinus* (Pulichai keerai) and *H. sabdariffa.*

3. Timber Plants

Timber obtained from *Thespesia populnea* (portia tree) is useful for making boat, furniture and agricultural implements.

4. Medicinal plants

Root and leaves of *Abutilon indicum* (Thuthi) and *Malva sylvestris* are used against fever. Roots of *Malva sylvestris* and *Althaea rosea* are used for treating whooping cough and dysentery respectively.

5. Ornamental plants

Althaea rosea (Hollyhock), *Hibiscus rosa-sinensis* (Shoe flower) *H. schizopetalus* (A kind of shoe flower with dissected petals) are grown in gardens.

Althaea officinalis

Gossypinum

Alcea

Family *Urticaceae*

Family includes about 45 gena and more then 850 species

Spreading – all world, mostly – in tropic and sub-tropic zones.

Life forms – grassy plants, bushes and trees (in tropics). The characterized sign of this family – presence of special trichomes – emergencies.

Flowering formula

*P4-5 A 4-5

*P4-5 G (2)

Pollination – by wind.

Important gena – Urtica and Boehmeria.

Practical uses – medical and technical.

Urtica urens

Urtica dioica

Boehmeria

Control questions:

1 Mention the systematic position of Malvaceae.
2 Write a note on androecium of Hibiscus rosa-sinensis.
3. Describe the gynoecium of Hibiscus rosa-sinensis.
4. Name any three fibre plants of Malvaceae.
5. Mention the binomial of any three medicinal plants of Malvaceae.
6. Write any three binomials of food plants of Malvaceae.
7. Draw the floral diagram and write the floral formula of Hibiscus rosa-sinensis.
8. What is epicalyx? It is present in Abutilon indicum?

Test questions:

I. *Choose and write the correct options.*

1. *Thespesia populnea* belongs to
   a. Solanaceae b. Euphorbiaceae
   c. Malvaceae d. Musaceae
2. Malvaceae is placed in the series
   a. Thalamiflorae b. Inferae
   c. Heteromerae d. Disciflorae
3. Anthers are monothecous in
   a. Solanaceae b. Euphorbiaceae
   c. Malvaceae d. Musaceae
4. In *Abelmoschus esculentus*, the fruit is
   a. drupe b. schizocarp
   c. regma d. loculicidal capsule
5. Binomial of lady's finger is
   a. *Hibiscus cannabinus* b. *Thespesia populnea*
   c. *Gossypium barbadense* d. *Abelmoschus esculentus*