

**KROK TESTS 2012-2016  
PLANT CELL**

After application of chlorine-zinc-iodine to the thick colourless cell membranes of collenchyme they became violet. That means the membranes are: {

- = Cellulose
  - ~ Lignified
  - ~ Cutinized
  - ~ Mineralized
  - ~ Suberized
- } (2015)

In the course of plant cells treatment with phloroglucinol with concentrated sulfuric acid their cell walls became crimson-red, which means: {

- = Lignification
  - ~ Suberization
  - ~ Mucification
  - ~ Cutinization
  - ~ Mineralization
- } (2014)

Histochemical test for fixed oils with sudan III results in the following stain colour: {

- = Pink and orange
  - ~ Blue and violet
  - ~ Lemon-yellow
  - ~ Raspberry-red
  - ~ Black and purple
- } (2012)

Microscopic study of soybean seeds stained with Sudan III revealed droplets of various sizes. They are: {

- = Lipids
  - ~ Proteins
  - ~ Starch
  - ~ Inulin
  - ~ Glycogen
- } (2012, 2015)

Examination of the leaf epidermis revealed cells containing cystoliths. Presence of cystoliths is typical for plants of the following family: {

- = Urticaceae
  - ~ Brassicaceae
  - ~ Fabaceae
  - ~ Solanaceae
  - ~ Papaveraceae
- } (2012)

Racemose clusters of calcium carbonate crystals are detected among the waste products of a protoplast. These crystals are: {

- = Cystoliths
  - ~ Isolated crystals
  - ~ Raphides
  - ~ Styloids
  - ~ Druses
- } (2015, 2016)

Elongated narrow prismatic crystals with sharpened points were detected during microscopic investigation of *Convallaria majalis* mesophile. These crystals are: {

- = Styloids
  - ~ Druses
  - ~ Crystalline sand
  - ~ Cystoliths
  - ~ Perigonium
- } (2015)

**PLANT TISSUES**

Stem thickening occurs due to functioning of the following structures: {

- = Lateral meristem
- ~ Apical meristem

- ~ Wound meristem
- ~ Intercalary meristem
- ~ Endoderm

} (2016)

When root was being studied under microscope, root hairs were detected, which are cell growths of: {

- = Epiblema
- ~ Epidermis
- ~ Endoderm
- ~ Exoderm
- ~ Mesoderm

} (2014, 2015)

In root transverse section laying and formation from pericycle of the following organs can be seen in maturation zone:

- {
- = Lateral roots
- ~ Trichome
- ~ Additional roots
- ~ Root hairs
- ~ Root cap

} (2014)

Cross section of a root conducting zone shows pericycle that gives rise to: {

- = Lateral roots
- ~ Trichomes
- ~ Adventitious roots
- ~ Root fibrilla
- ~ Root cap

} (2013)

Microscopy of monocotyledon leaf epidermis revealed that stomatal complex has four accessory cells. That means stomatal apparatus belongs to the following type: {

- = Tetracytic
- ~ Diacytic
- ~ Anisocytic
- ~ Anomocytic
- ~ Paracytic

} (2014)

Microscopy of leaf epidermis of Lamiaceae (Labiatae) family plants revealed that both accessory cells are perpendicular to a stoma. Such stomata are called: {

- = Diacytic
- ~ Paracytic
- ~ Anisocytic
- ~ Anomocytic
- ~ Tetracytic

} (2016)

Microscopic examination of a stem of a perennial plant revealed integumentary tissue of secondary origin that was formed as a result of activity of: {

- = Phellogen
- ~ Procambium
- ~ Cambium
- ~ Pericycle
- ~ Protoderm

} (2012, 2013)

While studying a stem covered with periderm, the researcher realized that gas exchange takes place through {

- = Lenticels
- ~ Stomata
- ~ Pores
- ~ Non-suberized (conducting) cells
- ~ Hydatodes

} (2012)

A sample section of an axial body shows a complex consisting of phellogen and its derivatives - cork and phelloderm. This tissue is called: {

- = Periderm
- ~ Colenchyma
- ~ Sclerenchyma

~ Epiblema  
 ~ Epidermis  
 } (2013, 2015, 2016)

A substance performs mechanical function; its cells are covered with uniformly thick lignified membranes. This substance is: {  
 = Sclerenchyma  
 ~ Collenchyme  
 ~ Periderm  
 ~ Cambium  
 ~ Sieve tubes  
 } (2016)

Having been studied, conifer wood is determined to be composed of cells with pointed ends and lignified ring-porous cell wall. Therefore, this tissue of conifers is represented only by: {  
 = Tracheids  
 ~ Vessels  
 ~ Sieve tubes  
 ~ Companion cells  
 ~ Bast fibers  
 } (2014)

While determining the type and characteristics of conducting bundles of axial organs one should take into account the positional relation between phloem and xylem and...{  
 = Cambium  
 ~ Procambium  
 ~ Collenchyme  
 ~ Pericycle  
 ~ Phellogen  
 } (2012)

In a sample studied under a microscope the multilayer palisade (columnar) parenchyma can be clearly seen. Such structure is typical for: {  
 = Leaf  
 ~ Root  
 ~ Dicotyledon stem  
 ~ Rhizomes of ferns  
 ~ Adventitious roots  
 } (2013)

### ANATOMY OF THE VEGETATIVE ORGANS

The study of the main root ontogenesis shows that it has developed from: {  
 = Radicle  
 ~ Apical meristem  
 ~ Pericycle  
 ~ Lateral meristem  
 ~ Intercalary meristem  
 } (2015)

What type of conducting bundles is characteristic of all root zones of one seeded plants? {  
 = Radical  
 ~ Central phloem  
 ~ Central xylem  
 ~ Bilateral  
 ~ Collateral  
 } (2012, 2013, 2015, 2016)

When root is studied under microscope, one leading bundle is detected in its maturation zone, where xylem and phloem areas interchange radially. It can be concluded that this bundle type is: {  
 = Radial  
 ~ Collateral  
 ~ Bicollateral  
 ~ Amphicribal  
 ~ Amphivasal  
 } (2014)

Microscopic examination of absorption zone of primary root cortex revealed that it consisted mainly of loose multilayer living parenchyma with amyloid granules. It is called: {

- = Mesoderm
  - ~ Endoderm
  - ~ Exoderm
  - ~ Collenchyme
  - ~ Phellogene
- } (2012)

Microscopic analysis of a root revealed the following features: primary structure, endodermal cells with horseshoe-shaped areas, radial fascicle of the central cylinder, more than six xylem rays. Such root structure is typical for the following plants: {

- = Angiosperms, monocotyledons
  - ~ Angiosperms, dicotyledons
  - ~ Gymnosperms, conifers
  - ~ Gymnosperms, gnetales
  - ~ Pteridosperms
- } (2013)

On the photomicrograph of a herbaceous plant stem the bicollateral vascular bundles are clearly visible. The microspecimen represents the stem of the following plant: {

- = Pumpkin
  - ~ Rye
  - ~ Flax
  - ~ Corn
  - ~ Solomon's seal
- } (2013)

### MORPHOLOGY OF THE VEGETATIVE AND GENERATIVE ORGANS

A student analyzes an axial plant organ characterized by radial symmetry, unlimited growth, and positive geotropism. It provides nutrition, vegetative propagation, anchorage of plant in the soil. This organ can be identified as: {

- = Root
  - ~ Stem
  - ~ Leaf
  - ~ Rhizome
  - ~ Seed
- } (2012, 2013, 2014, 2015)

Comparison of the underground organs of herbaceous plants revealed that in the bipartite annuals the following organ prevails: {

- = Main root system
  - ~ Adventitious root system
  - ~ Rhizome
  - ~ Bulb
  - ~ Corm
- } (2013)

When studying white mistletoe - perennial medicinal semi-parasite plant it was revealed that, its embryonic root buries into higher plant stem tissue and reaches vascular tissue system. This type of roots is called: {

- = Haustorial roots
  - ~ Photosynthetic roots
  - ~ Aerating roots
  - ~ Contractile roots
  - ~ Aerial roots
- } (2014)

Name the above-ground sprout modifications that develop from lateral buds, are situated in leaf angles or inflorescences, and take part in vegetative reproduction: {

- = Bulbils
  - ~ Above-ground tubers
  - ~ Cladodes
  - ~ Tendrils
  - ~ Thorns
- } (2015)

A plant has erect stem with only one leaf growing from each node. What phyllotaxy is characteristic of this plant? {

- = Alternate
  - ~ Opposite
  - ~ Verticillate
  - ~ Dichotomous
  - ~ Parallel
- } (2015)

During the morphologic analysis of various plant leaves the students found the leaves, whose length of the leaf blade is 5 times more than its width. Specify the shape of the leaf blade: {

- = Linear
  - ~ Elliptical
  - ~ Lanceolate
  - ~ Ovoid
  - ~ Reniform
- } (2013)

*Quercus robur* leaves have the following type of lamina shape and division: {

- = Pinnatilobate
  - ~ Trilobate
  - ~ Pinnatipartite
  - ~ Palmatilobate
  - ~ Palmatipartite
- } (2014, 2015, 2016)

Leaves of *Aesculus hippocastanum* are composed of 5-7 assidenous folioles that are oblong-obovate shaped with dentate-serrated margin, are attached to petiole (leaf rachis), and therefore are: {

- = Palmately compound
  - ~ Pinnately compound
  - ~ Pinnatisected
  - ~ Palmatisected
  - ~ Palmatilobed
- } (2014)

During morphological analysis of lily-of-the-valley (*Convallaria majalis*) leaf it was noted that lamina has wide elliptic shape and numerous veins are parallel to leaf margin and merge only at the leaf point. What is this venation type called? {

- = Arcuate
  - ~ Parallel
  - ~ Palmate
  - ~ Pinnate-reticulate
  - ~ Dichotomous
- } (2014)

During practical field session students have detected plant with diversity of leaves that differ by their placement on stem, parts development, size, shape, lamina division. This phenomenon is called: {

- = Heterophylly
  - ~ Phyllotaxy
  - ~ Metamorphosis
  - ~ Leaf mosaic
  - ~ Venation
- } (2014)

Colored or white component of double perianth, which consists of petals, is a: {

- = Corolla
  - ~ Flower cup
  - ~ Androecium
  - ~ Gynoecium
  - ~ Perigonium
- } (2016)

Corolla of a zygomorphic hermaphroditic flower consists of 5 petals: the largest one is called the banner, the two lateral petals are called the wings, and the two fused petals forming the keel. Such corolla is characteristic of medicinal plants of Leguminosae family. Name the type of corolla: {

- = Papilionaceous
  - ~ Labiate
  - ~ Saucer-shaped
  - ~ Funnelform
  - ~ Tubular
- } (2015, 2016)

A plant under examination has papilionaceous flower. This plant belongs in the family: {

- = Fabaceae
- ~ Scrofulariaceae
- ~ Ranunculaceae
- ~ Lamiaceae
- ~ Asteraceae

} (2012, 2013)

Students should identify the following to determine the sex of a flower: {

- = Stamens and pistils
  - ~ Flower cup and corolla
  - ~ Pedicel and receptacle
  - ~ Symmetry
  - ~ Colour and type of indumentum
- } (2015, 2016)

Androecium of *Brassica oleracea* flower has six stamens, with four stamens of inner circle longer than two stamens of outer circle. What is this type of androecium called? {

- = Tetradynamous
  - ~ Didynamous
  - ~ Diadelphous
  - ~ Monadelphous
  - ~ Polyadelphous
- } (2014)

*Astragalus dasyanthus* has sessile flowers gathered into inflorescences with a short thick axis. This inflorescence is called: {

- = Capitulum
  - ~ Cyme
  - ~ Truss
  - ~ Spike
  - ~ Head
- } (2012, 2013)

Morphological analysis of poplar inflorescence showed that it is a simple monopodial inflorescence: main axis is drooping, the flowers are sessile, unisexual. Specify the type of inflorescence: {

- = Catkin
  - ~ Head
  - ~ Capitulum
  - ~ Cyme
  - ~ Panicle
- } (2012, 2013, 2016)

Inflorescence of greater plantain grows out at apex, the main axis is long, and flowers are sessile. This type of inflorescence is called: {

- = Spike
  - ~ Panicle
  - ~ Spadix
  - ~ Capitulum
  - ~ Thyrsus
- } (2012)

Cherry (*Prunus cerasus*) inflorescence has short floral axis and approximately same length pedicels emerging from one point. It is characteristic of the following inflorescence organisation: {

- = Umbel
  - ~ Corymb
  - ~ Raceme
  - ~ Spike
  - ~ Head
- } (2014)

*Datura stramonium* has dry many seeded fruits formed by syncarpous gynoecium that dehisce when the valves are broken off. Specify the fruit type: {

- = Capsule
  - ~ Follicle
  - ~ Siliqua
  - ~ Coenobium
  - ~ Hesperidium
- } (2013)

Dry many-seeded monocarp fruit opens along its ventral suture. It can be identified as: {

- = Follicle
- ~ Legume
- ~ Nutlet
- ~ Drupe
- ~ Capsule

} (2015)

The fruit of black locust is dry, formed of a single carpel, dehisces by the ventral and dorsal sutures on two sides, the seeds are attached along the ventral suture. Such fruit is called: {

= Legume

~ Siliqua

~ Follicle

~ Capsule

~ Silicula

} (2013)

## PLANT SYSTEMATIC

A seed of a legume contains proteins and fatty oil. Name this legume: {

= *Glycine hispida*

~ *Vaccinium myrtillus*

~ *Sinapis alba*

~ *Astragalus dasyanthus*

~ *Datura stramonium*

} (2015)

Both scientific and folk medicine uses medicinal plant *Glycyrrhiza glabra* L. What part of the plant is harvested? {

= Roots and rhizomes

~ Foliage

~ Inflorescence

~ Grass

~ Seeds

} (2016)

When studying five herbarium specimen of medicinal plants, it was determined that one of them belongs to *Fabaceae* family. Which one is it? {

= *Ononis arvensis*

~ *Atropa belladonna*

~ *Hyoscyamus niger*

~ *Datura stramonium*

~ *Solanum dulcamara*

} (2014)

The analyzed plant has hollow ribbed stems, compound umbel inflorescence, schizocarpic fruit (cremocarp) and is rich in essential oils, which is a characteristic of: {

= Apiaceae

~ Fabaceae

~ Ericaceae

~ Brassicaceae

~ Asteraceae

} (2012)

Which representative of the Rosaceae family has spring bloom in form of white, fragrant flowers gathered in pendulous racemes at the ends of short shoots? {

= *Padus rasemosa* (*P. avia*)

~ *Potentilla erecta*

~ *Sorbus aucuparia*

~ *Cerasus vulgaris*

~ *Crataegus sanguinea*

} (2013)

Many species of wild rose are a source of vitamins, fatty oils and herbal material. Specify the juicy pseudocarps that are procured as herbal raw material: {

= Rose hips

~ *Coenobia*

~ *Hesperides*

~ Aggregate-accessory fruits

~ Cenocarp stone-fruits

} (2013)

A plant under study has stipules fused together and thus forming a tight tube - ochrea, that is a diagnostic feature of the following family: {

= *Polygonaceae*

~ *Gramineae*

- ~ Rosaceae
- ~ Papaveraceae
- ~ Clusiaceae

} (2013)

*Arctostaphylos uva ursi*, *Vaccinium vitis idaeae*, *Vaccinium myrtillus* life forms can be defined as: {

= Small shrub (fruticulus)

~ Vine

~ Grass

~ Shrub (frutex)

~ Subshrub (suffrutex, semifrutex)

} (2014)

A species of Ericaceae family is characterized by the following type of leaves: alternate leaf arrangement, short footstalk, leathery, elliptic or obovate with retuse tip, downturned edges; upper surface is dark-green, lower surface is light-green with punctate glandules. Name this species: {

= *Vaccinium vitis-idaea*

~ *Arctostaphylos uva-ursi*

~ *Vaccinium oxycoccus*

~ *Vaccinium myrtillus*

~ *Ledum palustre*

} (2016)

A cultivated plant has green berrylike fruit and underground sprout modifications - tubers. The described plant is: {

= *Solanum tuberosum*

~ *Convalaria majalis*

~ *Polygonatum odoratum*

~ *Atropa belladonna*

~ *Solanum lycopersicum*

} (2015)

An essential oil plant has a tetraquetrous stem, flowers with bilabiate corolla, its fruit is coenobium. These signs are typical for the following family: {

= Lamiaceae

~ Papaveraceae

~ Polygonaceae

~ Solanaceae

~ Scrophulariaceae

} (2016)

If aromatic secretory-downy plant has square in cross section stem, spike inflorescence made up from whorled dichasia, bilabiate corolla and its fruit consists of four nutlets, it probably belongs to the following family: {

= Lamiaceae

~ Scrophulariaceae

~ Brassicaceae

~ Apiaceae

~ Solanaceae

} (2014)

When studying the diagnostic features of *Origanum vulgare*, the students noticed that the plant had a compound monopodial inflorescence. It is called: {

= Corymbose panicle

~ Cluster of heads

~ Cincinnus

~ Bostyx

~ Head

} (2013)

Analysis of a plant revealed essential oil glands with several layers of cells arranged in pairs. This allows for the possibility that the plant relates to the family: {

= Asteraceae

~ Scrophulariaceae

~ Solanaceae

~ Apiaceae

~ Lamiaceae

} (2013)

The figwort family Scrophulariaceae includes a biennial plant up to 1,5 m high, with golden-yellow flowers gathered in spiked inflorescences. The flowers have five stamens. Specify this plant: {

= *Verbascum flomoides*

- ~ *Digitalis purpurea*
  - ~ *Digitalis grandiflora*
  - ~ *Digitalis lanata*
  - ~ *Digitalis Ferruginea*
- } (2013)

Rhizome of a species belonging to the Asteraceae family is polycephalous, succulent, has lysigenous cavities, accumulates inulin. Such underground organ is characteristic of: {

- = *Inula helenium*
  - ~ *Hyoscyamus niger*
  - ~ *Digitalis grandiflora*
  - ~ *Sorbus aucuparia*
  - ~ *Helianthus annuus*
- } (2015, 2016)

Which medicinal plant of the Asteraceae family has only disk flowers in the flowerhead? {

- = Three-part beggarticks (*Bidens tripartita*)
  - ~ Dandelion (*Taraxacum officinale*)
  - ~ *Echinacea purpurea*
  - ~ Cornflower (*Centaurea cyanus*)
  - ~ Common yarrow (*Achillea millefolium*)
- } (2012, 2013)

*Calendula officinalis* which a representative of the aster family is characterized by the following inflorescence type: {

- = Flowerhead
  - ~ Umbel
  - ~ Catkin
  - ~ Glome
  - ~ Cyme
- } (2012)

In the practice of harvesting herbal raw material of Asteraceae family the term "flowers" means both individual flowers and inflorescences. However, the notion of "flowers" is botanically correct only for: {

- = *Centaurea cyanus*
  - ~ *Gnaphalium uliginosum*
  - ~ *Arnica montana*
  - ~ *Echinops ritro*
  - ~ *Bidens tripartita*
- } (2012, 2015)

You are studying the silvery downy plant of Asteraceae family, which is rich with essential oils and bitters. Harvested are apical sprouts with panicle of small round flower heads. This plant is: {

- = *Artemisia absinthium*
  - ~ *Arctium lappa*
  - ~ *Bidens tripartita*
  - ~ *Calendula officinalis*
  - ~ *Chamomilla recutita*
- } (2014, 2015, 2016)

Weeds can be harmful for populace's wellbeing. Particularly, allergic reactions are often caused by the following plant in its period of blossoming: {

- = *Ambrosia artemisiifolia*
  - ~ *Equisetum arvense*
  - ~ *Stellaria media*
  - ~ *Erigeron canadensis*
  - ~ *Taraxacum officinale*
- } (2016)

Diaphoretic herbal tea includes dichasial cymes with light-yellow, oblong, wing-like, squame-liferous perianth. The flowers are fragrant, yellowish. These inflorescences belong to: {

- = *Tilia cordata*
  - ~ *Viburnum opulus*
  - ~ *Robinia pseudoacacia*
  - ~ *Mentha piperita*
  - ~ *Padus avium*
- } (2012)

To make diaphoretic herbal tea the following inflorescences are used: 3-15 corymbose dichasia with light-yellow oblong wing-shaped membranous recaulescent squamella that fuses halfway with floral axis. Flowers are fragrant, yellowish. These inflorescences belong to: {

= *Tilia cordata*  
 ~ *Viburnum opulus*  
 ~ *Robinia pseudoacacia*  
 ~ *Mentha piperita*  
 ~ *Padus avium*  
 } (2014)

It is known that leaves of most gymnosperm species are represented by needles. Which one of the species listed below has macropodous leathery leaves with solid flabellate lamina, dichotomous venation and one or several notches along the upper margin? {

= *Ginkgo biloba*  
 ~ *Cedrus libani*  
 ~ *Juniperus communis*  
 ~ *Picea abies*  
 ~ *Abies sibirica*  
 } (2014)

A common species of the Pinaceae family is a tall, evergreen, shade-enduring tree. The needles are solid, prickly, quadrangular in cross-section, spirally arranged. This tree is: {

= *Picea abies*  
 ~ *Larix sibirica*  
 ~ *Pinus sylvestris*  
 ~ *Juniperus communis*  
 ~ *Ephedra equisetina*  
 } (2012)

Spore and pollen analysis revealed in the pollen some tetrahedral spores with a semi-circular base and a reticular surface, which may belong to: {

= Lycopodiophyta  
 ~ Equisetiphyta  
 ~ Bryophyta  
 ~ Polypodiophyta  
 ~ Pinophyta  
 } (2012, 2013, 2015, 2016)

It is known that cells of *Chlorophyta* division representatives have chromatophores of various shapes. We can observe ribbon-like chromatophores in the species of the following genus: {

= *Spyrogyra*  
 ~ *Volvox*  
 ~ *Clorella*  
 ~ *Chlamidomonas*  
 ~ *Spirulina*  
 } (2014)

Representatives of this division propagate vegetatively by special formations: isidia, soredia, lobules. Name this division. {

= Lichenes  
 ~ Basidiomycota  
 ~ Equisetophyta  
 ~ Lycopodiophyta  
 ~ Polypodiophyta  
 } (2014)

### Ecology

Common nettle, hop, black elderberry relate to the plants that require soils rich in nitrogen compounds, that is, such plants are called: {

= Nitrophytes  
 ~ Nitrophobes  
 ~ Calciphiles  
 ~ Calciphobes  
 ~ Halophytes  
 } (2013, 2015)

Stinging nettle (*Urtica dioica*), hop (*Humulus lupulus*) and common elder (*Sambucus nigra*) are plants that require high nitrogen content in soil, which means that they are: {

= Nitrophilous  
 ~ Nitrophobous  
 ~ Calciphilous  
 ~ Calciphobous

~ Halophytic  
} (2014)