# LESSON № 7

**Topic:** Angiosperms of the Kyrgyz Republic. Class Monocotyledones. Orders: Amaryllidaceae, Asparagaceae, Poaceae (Grasses). Rare and endemic species: Ungernia victoris and Ungernia sewerzowii, Eremurus zoeae, etc.

**Lesson Objective:** To study the biological features, systematics, geographical distribution, ecology, and resource significance of higher angiosperm plants of the class Monocotyledones in the flora of the Kyrgyz Republic, as well as to examine protected endemic and rare species, including rare bulbous endemics and grass phytocenoses.

**Target Tasks:**

1. To study the general characteristics and systematic position of the class Monocotyledones (*Liliopsida*) in the flora of the Tien Shan and Pamir-Alai.
2. To investigate the morphological-anatomic features and medicinal significance of representatives of the order Amaryllidaceae, specifically the genera *Ungernia* (Ungernia victoris, Ungernia sewerzowii) and *Eremurus* (Eremurus zoeae).
3. To familiarize with the family Asparagaceae, their adaptations to arid and mountain conditions in Kyrgyzstan.
4. To study the diversity and eco-cenotic role of the family Poaceae (Grasses) in the formation of steppe, meadow, and pasture ecosystems of the republic.
5. To review the conservation status of endemic and rare monocot species listed in the Red Book of the KR.

## Self-Control Questions:

1. What are the main distinguishing features of the class Monocotyledones (*Liliopsida*) from dicots in terms of seed structure, root system, leaf venation, and stem vascular bundles?
2. Provide a general characterization of the order Amaryllidaceae. What are the geophytic adaptations of ungernias to the dry summer period in high-altitude areas?
3. Characterize the endemic species of the genus Ungernia: Ungernia victoris and Ungernia sewerzowii. Their distribution range, alkaloid composition, and significance in pharmacy.
4. The genus Eremurus in the flora of Kyrgyzstan. Morphological and ecological characteristics of Eremurus zoeae and other species.
5. Characterize the family Asparagaceae. What is their economic, ornamental, and medicinal use?
6. The family Poaceae (Grasses): structural features of the inflorescence (spikelet), stem (culm), and flower. The role of grasses in the formation of pasture and fescue-feather grass ecosystems of Kyrgyzstan.

## INSTRUCTIONAL MATERIAL

Angiosperms, or Flowering plants (*Magnoliophyta*), occupy a dominant position in the vegetation cover of the Kyrgyz Republic. The class Monocotyledones (*Liliopsida*) is represented by a significant number of families that play a crucial environment-forming, forage, medicinal, and aesthetic role in arid zones, foothills, and high altitudes of the Tien Shan and Pamir-Alai.

### 1. Order Amaryllidaceae and Endemic Geophytes

Amaryllidaceae in the flora of Kyrgyzstan are represented by perennial bulbous herbs adapted to a continental climate with hot, dry summers and cold winters. Vivid representatives of this order are endemic species of the genera Ungernia and Eremurus.

- **Ungernia victoris V. Krecz. et Vved. and Ungernia sewerzowii (Regel) Vved.:** Relict endemic bulbous plants of Central Asia, growing on fine-gravel and rocky slopes of foothills and low mountains (specifically on the Fergana and Chatkal ridges). Bulbs are large, covered with dry scales. Leaves are strap-shaped, appearing in early spring. Flowers are gathered in umbellate inflorescences on a massive peduncle. Plants contain valuable isoquinoline alkaloids (lycorine, etc.) with pronounced pharmacological action (expectorant, antiviral, anticholinesterase). Listed in the Red Book of the KR due to the reduction of natural habitats and excessive harvesting of raw materials.
- **Eremurus zoeae Vved. and other eremuruses ("shiryashes"):** Powerful perennial rhizomatous plants with a rosette of linear-triangular leaves and huge raceme-like "candle" inflorescences consisting of hundreds of pink, yellow, or white flowers. They inhabit clayey and gravelly slopes. They possess a powerful root system that prevents soil erosion. Roots contain polysaccharides (inulin, eremuran) used in technology and medicine.

### 2. Order Asparagaceae

The family Asparagaceae unites perennial herbaceous plants with rhizomes, tubers, or bulbs, as well as subshrubs and lianas. The genera *Asparagus*, *Polygonatum*, and others are widely represented in the flora of Kyrgyzstan.

- **Asparagus officinalis and wild species:** Perennials with reduced leaves, whose functions are performed by modified shoots called cladodes. They grow in floodplain shrubs, meadows, and steppe slopes. Young shoots are rich in vitamins, saponins, and amino acids (asparagine) possessing diuretic action.

**3. Order Poaceae (Grasses)**

Grasses are one of the largest and most economically valuable families of angiosperm plants in Kyrgyzstan, determining the appearance of steppe, semidesert, and meadow phytocenoses.

- **Fescue (Festuca valesiaca), Feather grass (Stipa spp.), Wheatgrass (Agropyron spp.):** Dominate in foothill and mountain steppes, forming a vital forage base for livestock breeding (sheep farming, horse breeding) and playing a key role in turf soil stabilization.
- **Common reed (Phragmites australis) and Reedgrass (Calamagrostis):** Inhabit riverbanks, water bodies, and tugai ecosystems, performing water purification and shore-protection functions.

## Comparative Characteristics of Main Monocot Representatives in the KR:

1. **Ungernia victoris / sewerzowii (Ungernia spp.):**
   - Systematics: Division Magnoliophyta, Class Liliopsida, Order Amaryllidaceae.
   - Life form: Perennial bulbous geophyte.
   - Morphology: Large bulb, strap-shaped leaves, umbellate inflorescence.
   - Distribution: Fergana, Chatkal ridges, foothills.
   - Significance: Endemics, isoquinoline alkaloids (lycorine), Red Book of the KR.
2. **Eremurus zoeae:**
   - Systematics: Division Magnoliophyta, Class Liliopsida, Order Asparagales.
   - Life form: Perennial rhizomatous plant.
   - Morphology: Fleshy roots, leaf rosette, giant flower raceme.
   - Distribution: Foothill and mid-mountain gravelly slopes.
   - Significance: Ornamental, soil-protective, polysaccharides (inulin).
3. **Asparagus officinalis:**
   - Systematics: Division Magnoliophyta, Class Liliopsida, Order Asparagales.
   - Life form: Perennial herbaceous liana / subshrub.
   - Morphology: Cladodes (needle-like branches), scale-like leaves.
   - Distribution: River floodplains, shrub thickets, meadows.
   - Significance: Food, vitamin-rich, diuretic remedy.
4. **Feather grass / Fescue (Stipa / Festuca spp.):**
   - Systematics: Division Magnoliophyta, Class Liliopsida, Order Poales (Grasses).
   - Life form: Tussock perennial grasses.
   - Morphology: Narrow leaves, inflorescence — panicle or spike, culm.

◦ Distribution: Everywhere in steppes and semideserts (up to 3000 m).

◦ Significance: Main pasture forage base, turf former.

## SELF-TEST QUESTIONS FOR VERIFICATION

1. **Which feature is characteristic of the class Monocotyledones (Liliopsida)?**
   A) Taproot system and reticulate leaf venation
   B) Fibrous root system, arcuate or parallel venation, single cotyledon
   C) Cambium in the stem and secondary thickening
   D) Four- or five-merous flower
2. **Relict endemic bulbous plants of Kyrgyzstan from the family Amaryllidaceae containing valuable alkaloids (lycorine):**
   A) Ephedra intermedia
   B) Picea schrenkiana
   C) Ungernia victoris and Ungernia sewerzowii
   D) Asparagus officinalis
3. **What role do grasses (Poaceae) play in the mountain ecosystems of Kyrgyzstan?**
   A) Exclusively wood-constructional
   B) Environment-forming, pasture-forage, and soil-protective turf-forming
   C) Formation of dense coniferous forests
   D) Source of rubber production
4. **Eremurus zoeae is distinguished by the following morphological feature:**
   A) Presence of a woody trunk with needles
   B) Powerful rhizome with fleshy roots and a tall raceme-like inflorescence ("candle")
   C) Floating leaves on the water surface
   D) Blue cone-berries
5. **Which family do fescue, feather grass, and wheatgrass belong to?**
   A) Amaryllidaceae
   B) Asparagaceae
   C) Poaceae (Grasses)
   D) Orchidaceae

## REFERENCES:


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4. State Pharmacopoeia of the Republic of Kazakhstan / CCCP.