

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 № 29

## **Bases of phytocenology**

(1 hour)

Lecturer: candidate of biological science, associated  
professor

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# **Plan of lecture:**

- 1 Definition of phytocenology, or plant geography.
- 2 Flora. Geographic elements of flora.
- 3 Phytocoenosis.

## **Main literatures:**

- 1 Еленевский А.Г., Соловьев М.П., Тихомиров В.Н. Ботаника: систематика высших, или наземных, растений. 2 изд. - М.: Academia, 2000. - 440 с.
- 2 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 Байтенов М.С. Флора Казахстана. - Алматы: Гылым, 1999. – 240 с.
- 3 Байтенов М.С. Флора Казахстана. - Алматы: Гылым, 2001. - 198 с.

# **Geography of Vegetation**

Plants are main components of terrestrial ecosystems, they are primary producers, and almost all terrestrial life is based on plants. Consequently, plants will determine how a particular territory might look, which could be, for example, grassland, tundra, or forest.

These types of vegetation (i.e., visually different plant communities) will have different occurrence on Earth. Below is the list of the most important types (they also called biomes):

## **Tundra**

Small-sized plants adapted to the short season, wet soils and sometimes also permafrost

## **Taiga**

Conifer forests

# **Geography of Vegetation**

## **Deciduous forest**

Broadleaved temperate forests. The other type of deciduous forests are dry forests of tropical climates.

## **Grassland**

Prairie(North America),steppe (Eurasia), savanna (Africa and Australia), llanos (north South America), pampas (south South America)

## **Shrubland**

Chaparral (North America), maquis (Mediterranean),fynbos (South Africa), bush (Australia)

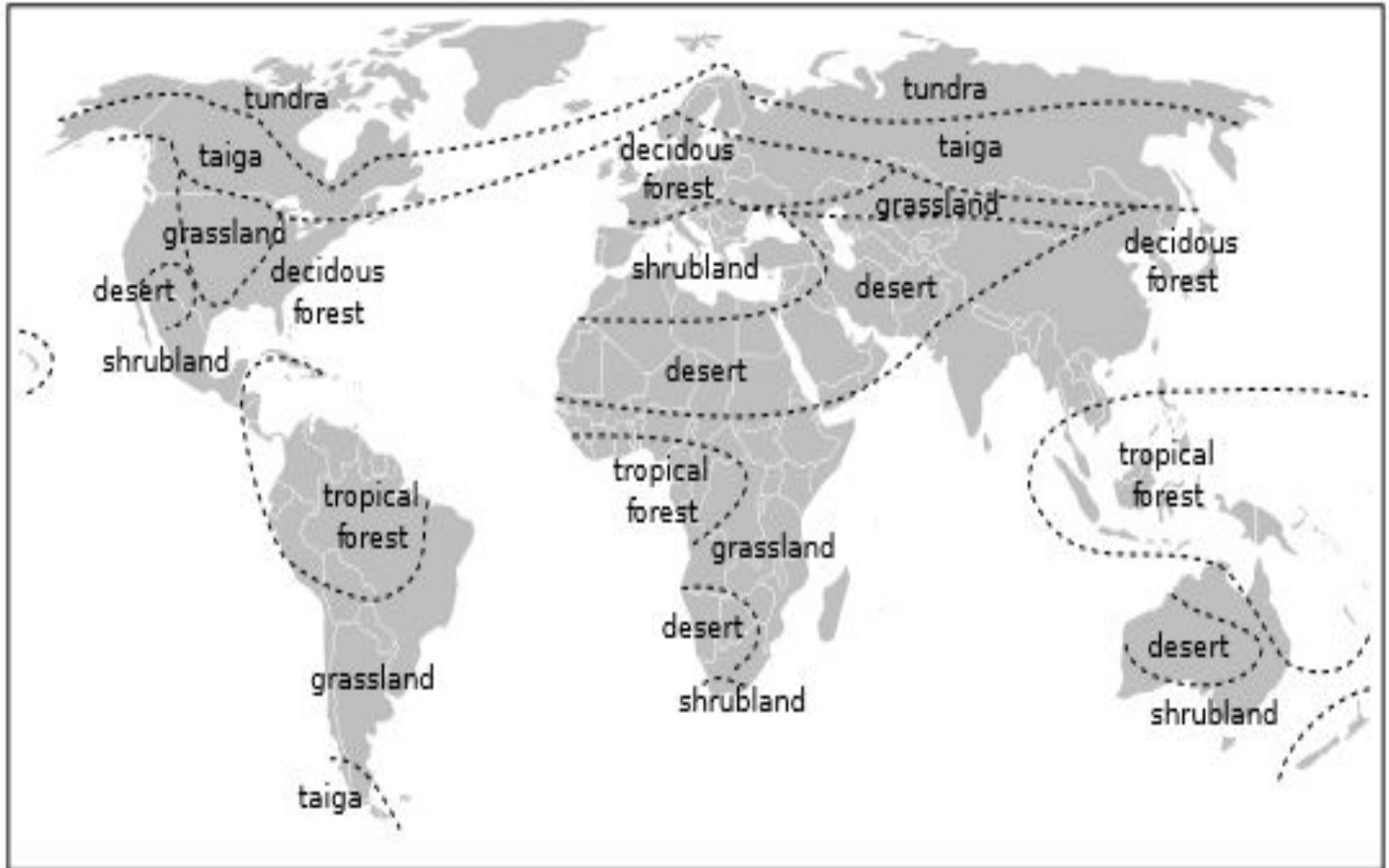
## **Desert**

Different from shrubl and by plants staying apart and soil surface visible

## **Tropical forest**

Selva, tropical rain forest: humid and warm environment, the peak of Earth biodiversity

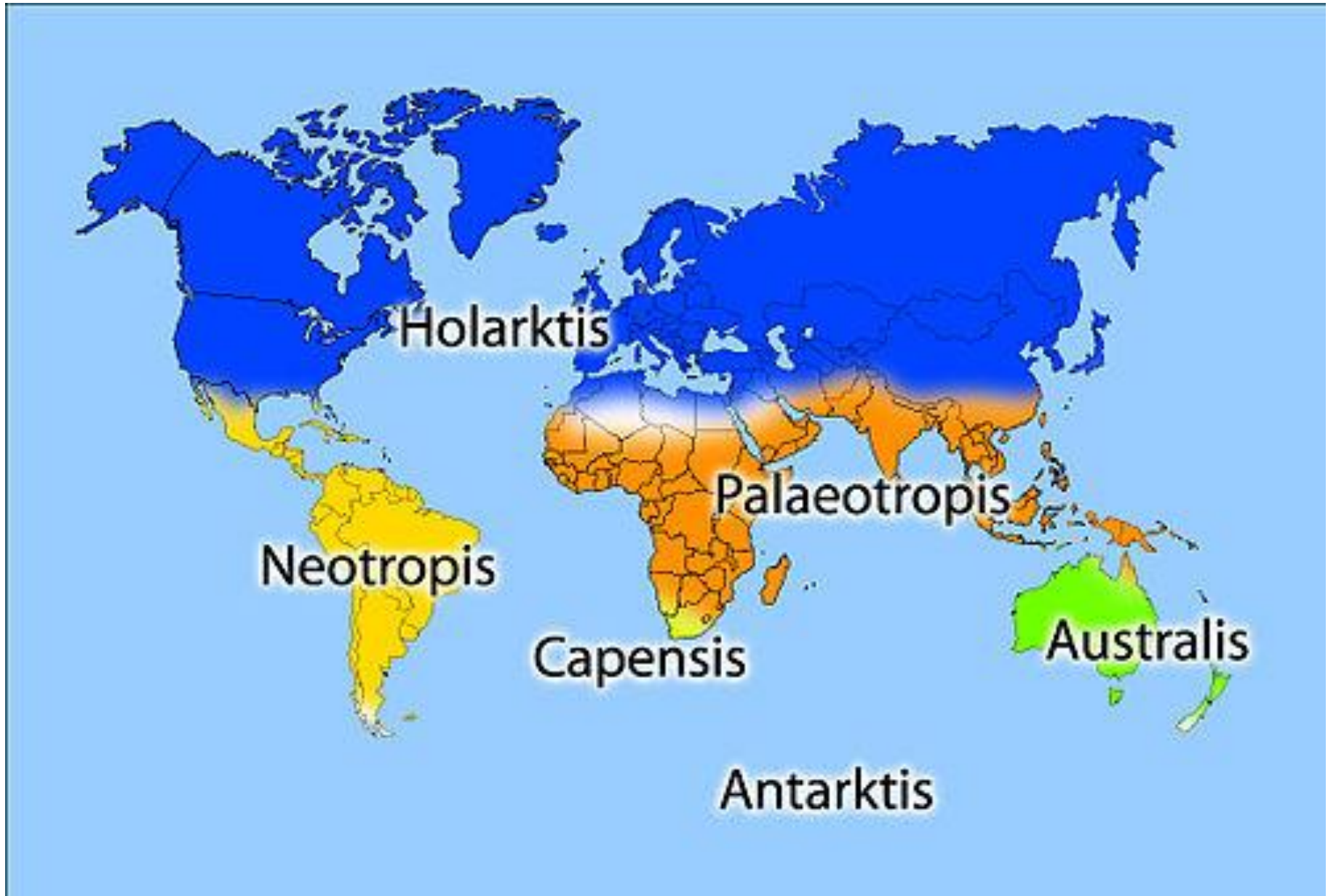
# Biomes (types of vegetation) of Earth



# **Geography of Vegetabilia**

Floristic differences are due to the various geological and biological histories of these places. Plant biogeography studies them, explains the man creates the floristic kingdoms classification.

# Floristic kingdom of Earth





**Holarctic** Most of North America and temperate Eurasia. Holarctic kingdom is largest, it covers two continents and most of Northern hemisphere. Typical representatives are pines (*Pinus*) and oaks (*Quercus*).

**South American** From South Florida to Patagonia and Antarctic islands. Aroids (Araceae family) and bromeliads (Bromeliaceae) are very common South American groups.

**African** Excluding Mediterranean Africa (very north of the continent). African acacias (*Senegalia*) are common to the most of savannas there.

Sometimes, botanists separate the southern tip of Africa into smallest **Cape floristic kingdom** which has multiple endemic plant genera (like kolkol, *Berzelia*) and even whole families.

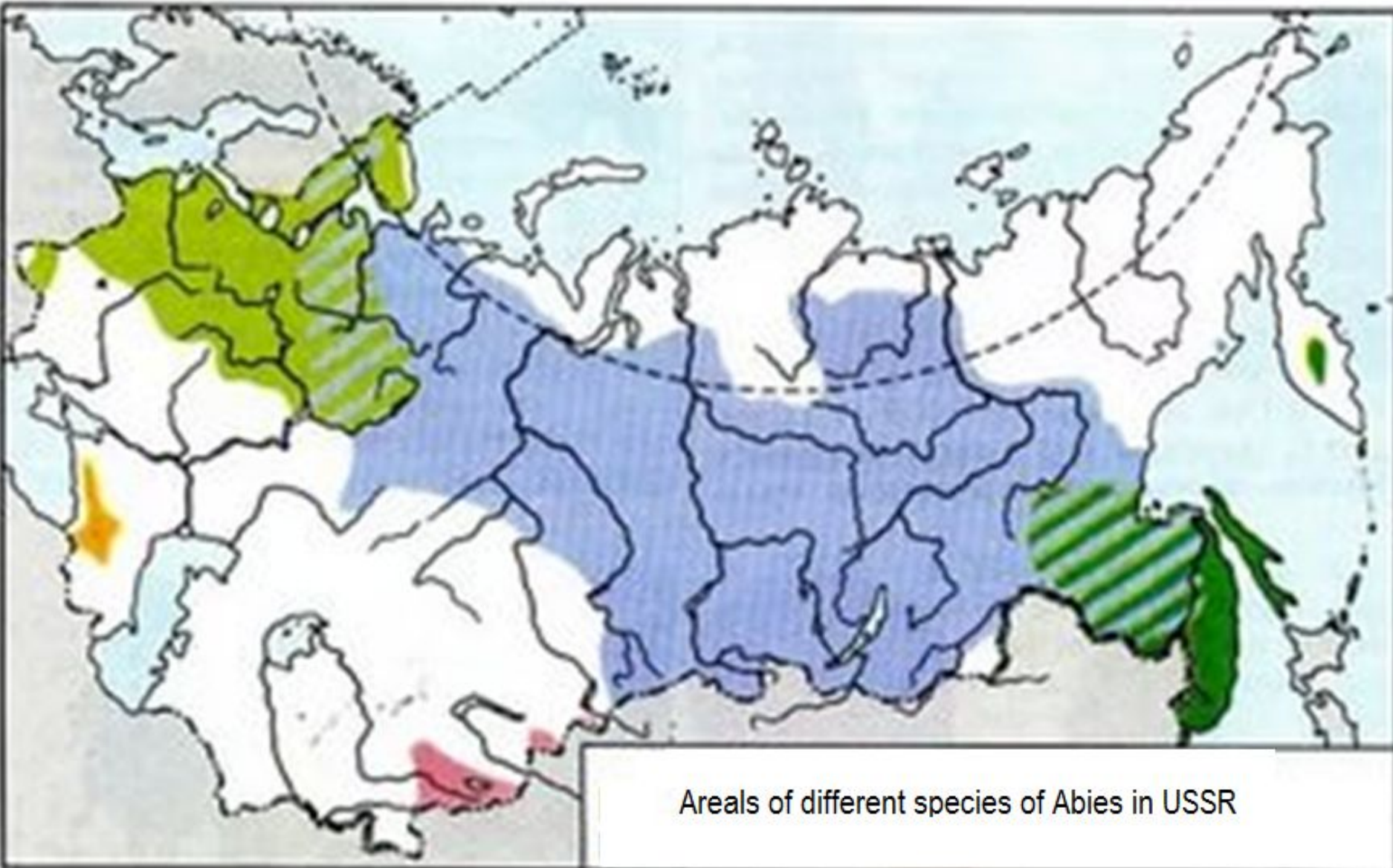
**Indo-Pacific** From India to Pacific islands including Hawaii. This kingdom is especially rich of orchids (Orchidaceae); tropical pitcher plants (*Nepenthes*) grow only there.

**Australian** Australia, Tasmania and New Zealand. Numerous specific plant groups, including *Eucalyptus*, *Banksia* and many others.

Every plant group has a specific *range*—the area of distribution. There are multiple common ranges, e.g., circumpolar (groups distributed across North Pole, both in North America and Eurasia, like spruces, *Picea*) or Gondwanian (groups distributed in the South Africa, Australia and South America, like protea family, Proteaceae). Sometimes, there are *disjunctions* (breaks in range); a typical explanation for the disjunction is long-distance dispersal (like for ispaghula, *Plantago ovata* in California and West Asia) or extinction in the connecting places (like for tulip tree, *Liriodendron* in China and Atlantic states).

***Areal*** – is a region of geographical spreading of systematic unit (species, genus, family, etc).

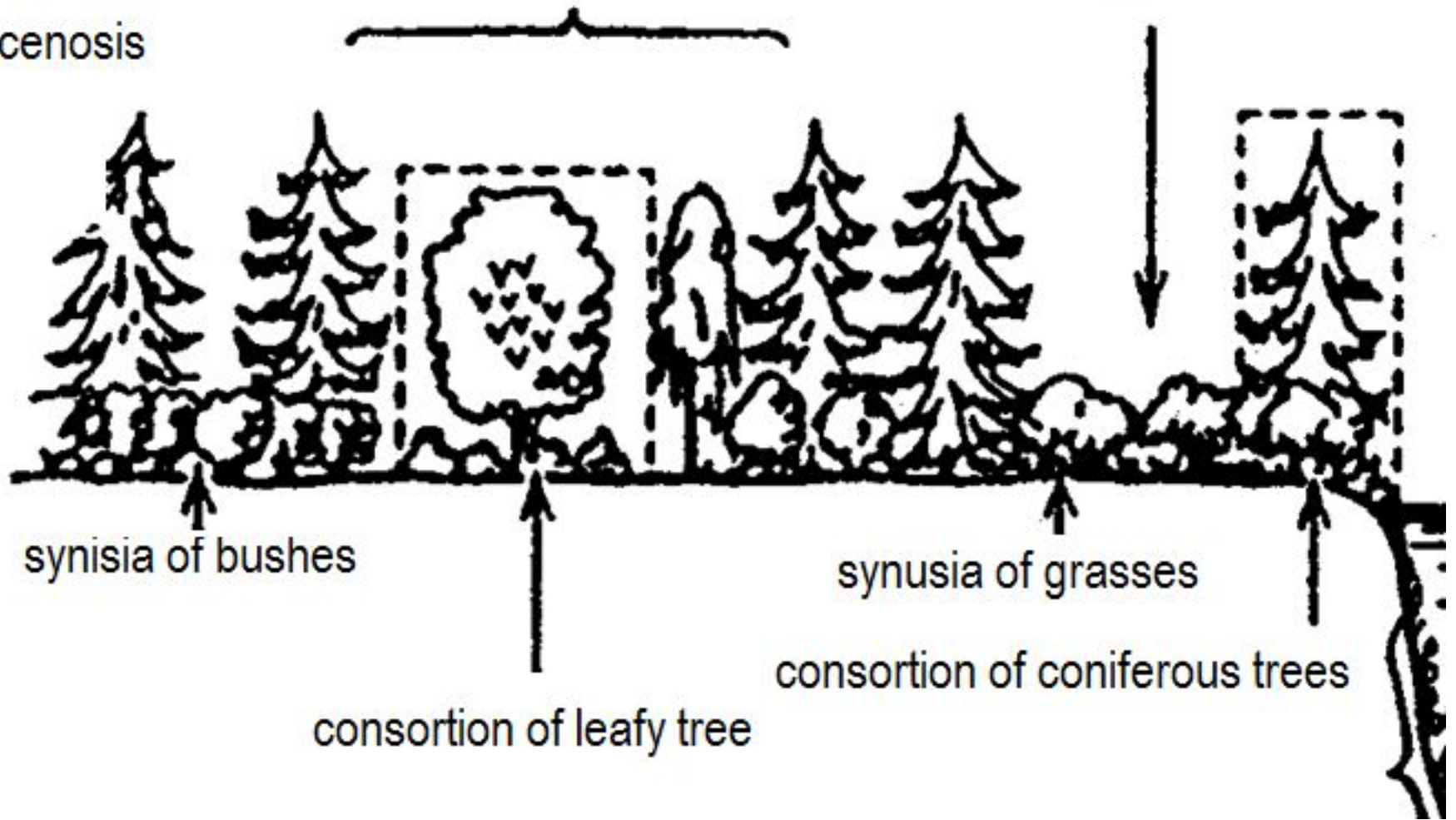
***Place of location*** – is a concrete geographic point, where this species was observed.



Areals of different species of *Abies* in USSR

# Horizontal structure of vegetation

forest  
biocenosis



synusia of bushes

synusia of grasses

consortion of coniferous trees

consortion of leafy tree



# Vertical structure of forest



5th tier

4th tier

3rd tier

2nd tier

1st tier

All species from Red Book are separated into following categories:

1. **Ex** - disappeared.
2. **E** – dangerous of disappearing. Need special activity for storage.
3. **V** – decreasing in amount.
4. **R** - rare. It is possible to decreasing in amount at non comfortable conditions.
5. **Recover species**. They early were included in categories E, V or R, but present day recovered their populations. Need in constant control.

## **Control questions:**

- 1 Take a definition for plant geography and phytocenology.
- 2 Which living forms do grow in Kazakhstan?
- 3 Make a list of basic types of vegetation for continent Eurasia.
- 4 How many types of vegetation can you separate for Kazakhstan?
- 5 What is vertical and horizontal structure of vegetation? Take a examples.



# Test question:

**Wide spreading species with leading position in society:**

- A) mesophytes
- B) heliophytes
- C) xerophytes
- D) calsiphytes
- E) heliophobes
- F) Succulent
- G) Dominant