

# ENVIRONMENTAL FACTORS AND HEALTH OF THE POPULATION

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# REQUIRED THEORETICAL KNOWLEDGE

1. Environmental factors: definition, classification and general characteristics.
2. Characteristics of abiotic environmental factors.
3. Characteristics of biotic environmental factors.
4. Specific mechanisms of protection against the adverse effects of environmental factors.
5. Non - specific mechanisms of protection against the adverse effects of environmental factors.

# ENVIRONMENTAL FACTORS

- ⦿ Environmental factors - this is properties that have effect on the organism.

# CLASSIFICATION OF ENVIRONMENTAL FACTORS

⦿ All environmental factors can be classified into 3 big groups:

1. Abiotic
2. Biotic
3. Anthropogenic

# ABIOTIC ENVIRONMENTAL FACTORS

- Abiotic - they are factors of inanimate nature:
- ❖ Climatic: temperature, humidity, air pressure, movement of air, deposit, downpour, tornado, drought, etc.
- ❖ Edaphic: mechanical and chemical composition of the soil.
- ❖ Orographical: relief, height above sea level, avalanches, landslips.

# ABIOTIC ENVIRONMENTAL FACTORS

- ❖ Geophysical: geomagnetic storm, earthquake, electromagnetic fields.
- ❖ Hydrographic: floods, bogging, drainage, flooding, sources of water, supply, structure of superficial and underground waters.
- ❖ Geological: structure of rocks, tectonic breaks, radiation, minerals.

# BIOTIC ENVIRONMENTAL FACTORS

- Biotic - they are factors associated with the activities of living organisms:
  - ❖ Phytogenic: poisonous and medical plants, plants as food resources, cleaners of air and bioindicators of ecological adverse health effects.
  - ❖ Mikogenic (the impact of fungi).

# BIOTIC ENVIRONMENTAL FACTORS

- ❖ Zoogenic (the impact of animals): poisonous and dangerous animals, animal as reservoirs and carriers of activators of illnesses, as food resources.
- ❖ Microbiogenic (the influence of microorganisms): microflora of air, water, soil, animals, food, stuffs, object.



# ANTHROPOGENIC ENVIRONMENTAL FACTORS

- ⦿ Anthropogenic - they are man made factors:
  - ❖ Physical: the use of nuclear energy, the effect of noise and vibration.
  - ❖ Chemical: use of mineral fertilizers and pesticides.
  - ❖ Biological: production of food.
  - ❖ Social: people's attitudes.

# INFLUENCE OF ENVIRONMENTAL FACTORS ON ORGANISM

- They can be:
- ✓ Irritants, which promote occurrence of adaptive physiological and biochemical changes (hibernation);
- ✓ Limiters, changing geographical distribution of organisms because of impossibility of existence in the given conditions;
- ✓ Modifiers, which cause morphological and anatomic organisms changes;
- ✓ Signals, testifying to changes of other environmental factors.

# THE GENERAL LAWS OF ENVIRONMENTAL FACTORS ACTION

## ◎ *The optimum law.*

Any ecological factors has limits of positive influence on living organisms. Example: the man badly transmits both strong heat, and strong frosts. For the man are optimal average temperatures - so-called *optimum zone*. The more deviations from optimum are stronger, the greater degree the given ecological factor oppresses organism live ability. This zone has name *pessimum zone*. There are critical points in it - “maximum value of the factor” and “minimal value of the factor”; organism destruction comes outside their limits. Distance between minimal and maximal values of the factor named *ecological valency or organism tolerance*.

# THE GENERAL LAWS OF ENVIRONMENTAL FACTORS ACTION

- ◎ **The law of ecological individuality of kinds** has been formulated in 1924 by Russian botanist L.G.Ramensky. *Ecological spectra (tolerance) of different kinds don't concur, every kind is specific by their ecological opportunities.*

# THE GENERAL LAWS OF ENVIRONMENTAL FACTORS ACTION

## ◎ *The law of limiting factor.*

*Factor is most important for organism which most of all deviates from optimal value. I.e., the organism survival depends from minimal (or maximum) the submitted ecological factor during the given concrete moment. In other time intervals other factors can be limiting. During life of individuals meet with different limitations of the live ability.*

# THE GENERAL LAWS OF ENVIRONMENTAL FACTORS ACTION

## ◎ *The law of ambiguous action.*

*Action of every ecological factor is ambiguously at different organism development stages. For development of tadpoles the water is vital, and for adult frog - is not vital condition.*

# THE GENERAL LAWS OF ENVIRONMENTAL FACTORS ACTION

- ◎ **Ecological factors depending on organism influence are divided on direct and indirect.**

*Direct ecological factors* operate on organisms directly (chemical compound of soil). *Indirect ecological factors* operate redistributing direct factors. For example: physical soil properties (mechanical structure, moisture capacity, etc.) as indirect factors “redistribute” action of direct factors - chemical properties

# THE GENERAL LAWS OF ENVIRONMENTAL FACTORS ACTION

- ◎ **The law of interaction of ecological factors.**

*The optimum zone and endurance organism limits in relation to any factor can be displaced depending on combination with other factors. So, heat is easier for transferring in dry, instead of in damp air; the frost is worse transferred to a combination with wind weather, etc.*



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