

Biodiversity as an increasing factor of the adaptive potential and agroecosystem regulatory functions

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At the current level of ecology development and technical progress, there is a necessity to return to the idea of plant protection from inimical species by the appropriate agroecosystem control. In the conditions of specialization and intensification of agriculture, other approaches of plant protection may be unprofitable, and may have negative influence on environmental conditions (Polyakov, 1976). The objective experience indicates – the more intensive the growing of the culture is, the more inevitably we have to orient on regulating agroecosystem.

The adaptive ecological plant protection is an integral part of crop production. Its strategy based on ecosystem and agroecologic approach; and its tactics – on understanding of evolution peculiarities of the natural biota. The diversity of living creatures and craving for expansion of “living substance” – is a fundamental capacity of living matter.

Regarding that impoverishment of the species and genetic diversity of agroecosystem is one of the determinant factors that cause its instability; we should realize that modern plant protection from the inimical organisms is rather agroecologic, than technocultural problem (Sokolov, Philipchuk, 1977; Drozda, Kocherga, 2000). Therefore, planning the plant protection measures should based on knowledge of the specificity agroecosystem functioning, taking into account the consequences of these measures for autotrophs – dominants. Among them are the increasing of agroecosystem stability by its species, sort and genetic diversity enlargement, the improvement of general plant resistance to biotic stresses using genetic, selection, agrotechnics, immunity induction methods, induction and extensive

usage of natural mechanisms of the structure population consumers' regulation. One of the main conditions of the plant protection strategy should be maintenance of biodiversity and increasing the role of beneficial elements of flora and fauna in particular economies, regions and in whole agrocenoses. The constant reservation of this beneficial organisms and biodiversity complex are uncultivated territories with natural vegetation and rational usage of uncultivated soils. This is where concentration and reproduction of the main fund of beneficial organisms, their dissemination including agrocenoses originate.

In our perennial researches concerning this phenomenon, agrocenosis of an apple-tree garden was directly constructed. It was provided growing along its plant association perimeter. The plant association set is determined by the terms and duration of the blossom, their adaptation to soil and climatic conditions, the attractivity degree of beneficial and inimical species. The flora compound included next species of planting: ligneous planting – oak, linden, white alder, birch, osier; shrubby planting - bird cherry tree, mountain ash, melanocarpous and Ukrainian blackthorn, brier, white mulberry, cherry-plum, blue honeysuckle, alder buckthorn and others; herbaceous vegetation – great and stinging nettle, Solomon's seal, cumin, wild angelica, wild succory, primrose, spingel, Phacelia, coriander.

We estimated the attractivity, accumulation and reservation degree, to achieve optimality conditions for the beneficial functioning of the apple-tree arthropods complex – vermin and carnivores, the number of which in the gardens is over 1000 species. Their role in regulating the inimical species is essential only in case of optimal conditions established for their germination. The table's data illustrate the population and intensity of the main entomophage complex flight.

It is determined, that the forest belts with maximal floristic diversity perform the function of accumulation and expansion of all beneficial arthropods species, where these arthropods species fed carbohydrate food, bred and according to their diurnal flying activity rhythm, intensively migrated to agrocenosis, and there

traced and affected different stages of phytophage growing. There is a new well-defined tendency of the number of record entomophages depending on the plant species diversity.

Certainly, use of these measures are not enough to protect apple-tree from the whole range of specialized phytophages like weevils, leaf-rolling weevils, codling moths, scales, but entomophages efficiently controlled the number of injurious insects, particularly plant mites. We illustrate only one measure of natural regulation mechanism of the environmental safety system. It is supplemented by biologicals and hormonal preparation, trichogram colonization, land treatment and other non-chemical methods.

It is essential to focus on measures, directed on protection, attraction and saving of the natural entomophages populations and pollinators. It is meant, first of all about: 1. Establishment of micro nature reserves for vanishing species protection on the territory of every economy. Their size may be 0,5–5 hectares and more. 2. Realization of the complex researches of pollinator species and entomophages composition for detecting their population conditions and the species that require protection measures. 3. The environmental protection of miscellaneous herbs areas from tending herds and pesticides chemicalizing. 4. Domestication or creating of the artificial nests for natural pollinators, that inhabit the stems of elder, beak rush, raspberry-bush; usage of plastic foam workpieces.

Certainly, the inimical arthropod, weeds and rodents occur in these areas. Nevertheless, their number are comparatively small, and on conditions that special measures, like – overgrassing, nectariferous reseeding, are used, their number may be minimized. Rather conflicting data are concerning effect of weeds on agrocenosis fauna. (Stolyarov, 1997). Their negative role as a phytophage accumulator is well known. At the same time, weeds attract certain part of phytophage feeding pests and decrease pressure of weeds on the cultivated plants.

Gradual introducing the system of such measurements in agricultural industry and creating agrolandscapes is complicated, but obviously is one of the conditions of successful crises overcoming in human and biosphere interrelation. In ideal conditions, reservation, that would exist and function independently without any interference, should be created.

Indexes of the beneficial arthropods complex number in apple-tree planting depending on species composition of the plant association

Measures enumeration – composite parts of original technology	Parasitic insects		Carnivorous arthropods		
	Polypterous	Two-winged flies	Bugs, beetles, ground beetles, road beetles	Carnivorous two-winged flies, syrphid flies, sweat bees, serphids	Fitoseids, stimeids, anastids
Ligneous planting (8 species), shrubby planting (12), herbaceous vegetation (15) along the garden perimeter. Original composite part of the technology	279,8± 24,6	92,8±12,5	94,5±13,8	109,4±11,3	72,8±9,2
Typical forest belts. Better analogue.	181,4±10,6	60,5±7,2	50,6 ±9,7	80,2±8,5	49,1± 4,2
Only the ligneous planting – 4	68,8 ±7,4	16,3± 2,5	31,2 ±3,8	24,2± 4,8	16,2 ±1,9
HIP ₀₅	70,5	5,2	18,6	12,7	7,4

Note: The number of parasites and carnivores was determined on 15 June by imago capture (sweep net cutting). The carnivores' number in soil was determined by counting in the Barber's traps; carnivorous bugs were determined by the calculation of moved phases on the leaves surface.