AQUA VITAE

PIBEPM

RIVERM®

Principles of environmentally safe agriculture

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In this work are stated the principles of ecologically safe agriculture, the features of development and nourishment of plants.

It is exposed the biophysical mechanism of new generation preparation «Riverm» while crops growing and soils fertility improvement.

PREFACE

The search of optimum terms of providing the plants by the elements of nourishment and defenders is one of main tasks for the producers of agricultural product. Especially it is actual in the conditions of nowadays, when the efficiency of agrarian sector considerably decreased because of energy crisis and unfavorable weathers conditions.

Presently, an additional leaf-feeding of agricultural cultures by the accessible forms of microfertilizers is the most economically advantageous way of overcoming the deficit of elements for the plants (including microelements).Here it is obviously, that expenses to application of liquid preparations of could be considerably reduced if the process of their application is united with the treatment of sowing with facilities of pest control and weeds.

Nowadays there are a lot of various liquid fertilizers, growth-promoting factors, other preparations for leaf-feeding. However, almost all of them are agrochemical, complex molecular solutions. It is known that chemical technological intensification of plant growing at favourable weather-climatic factors provides high harvests of agricultural product, but cause contamination of food and environment stuffs by harmful. And this becomes a determining point in entry of Ukraine into WTO and European Union. Therefore, in such conditions, it is necessary to have ecologically safe and economically effective management for receiving biologically valuable and conservation of soils fertility.

The mentality in relation to technologies of agricultural cultures growing, and also the fertilizers and preparations applied in this process will change. Squirearchies will realize that it is better and more advantageous to cultivate valuable, high liquidity products on 100 hectares, than any other one on 1000 hectares, especially as every year in many countries the control of food stuffs quality, especially in the countries of European Union becomes tighter.

«Riverm» is one of new generation preparations.

«Riverm» is a liquid, organic, ecologically safe fertilizer which was developed by International Ecological Foundation «AQUA-VITAE» and National Agrarian University.

«Riverm» passed the state testsand was registered in Ukraine under №1921 from 6.06.2005. (a certification series A №01031), and also was acknowledged by an international organization - System of Independent Certification (SIC) as ecologically clean fertilizer which complies with an international specification ISO 14024:1999.

In 2006 «Riverm» became the laureate of national «Vishcha proba».

Since 2007 IEF «AQUA-VITAE» has been accepted into inspection-certification program «Organic production» by the international group Control Union Certifications and acquired the right to mark the products which confirm to EEC2092/91 and CUC Inputs standards.

In 2008 ««Riverm» became the winner of Ukrainian «Best product of the year».

Presently «Riverm» is in demand not only in Ukraine but also abroad.

RETURN TO NATURE.

The reality is that people` consumer attitude toward an environment approached a biosphere tomortal danger. In the process of public evolution people all «walked» away from Nature farther, they limited themselves by the mechanical world of artificial things and objects. As a result they were materialized and deeply disfigured and hid from themselves their true essence.

Ecological consciousness of men must not base on the foundation of mechanical materialism, on harmonization of mechanical connections with Nature. Men are inseparable from Nature. Nature is in men and men are in Nature. An understanding that Nature is «an inorganic body» of a man results in understanding of a unity between them.

Every living substance in nature is interconnected. The German scientist Ditmer when was an assistant, was running experiments with the plants. He added to them and controlled their reaction by devices. In some time Ditmer decided to have a bite. He boiled water in a glass and put an egg into it. At this time all devices exceeded indexes. Ditmerwas not able to explain the reason of this phenomenon. In some years another experiment was made.

One half of snail`s litter was brought to Germany, andhalf was brought to Australia. When a snail in Australia was being pricked by a needle the snails in Germany were abruptly shrinking. Ditmerunderstood that every living substance in Nature instantly reacts to pain of living substance.

If, for example, an animal browses leaves from a bush, bushes feel it and secrete bitter enzymes protecting them from animals. It confirms that in Nature everything is interrelated.

Today humanity begins to understand an obvious truth that existence of civilization as a whole, depends on the state of the cover of the planet. Due to green plants the amount of CO_2 and O_2 remains enough stable in an atmosphere in spite of milliards tones of carbon dioxide which go into atmosphere as a result of burning and breathing.

Dutch naturalist Yan Batist Van-Gelmont (1577-1644) in one of his experiments set a task – to define the source of plants` life.

To answer this fundamental for science question, he made genius in its simplicity but deep in its essence experiment.

80kg of preliminary dried up earth he poured in a figuline. A young pussy-willow plant (2 kg) was planted into the same figuline. Five years nothing except rain-water has been entering the vessel. For this period a young plant has grown into a sapling. The experiment was completed. A clay vessel was broken; the earth from it was dried up and weighed. Over five years only 60gr. of it was used. A pussy-willow sapling was weighed. Weight was 68kg.

As nothing except for rain-water entered the vessel, a pussy-willow continued growing a doctor Van-Gelmont drawn a conclusion: trees with their leaves bark and roots grow only due to water. Water is the sourceof nourishment and life of plants.

Only in three centuries, in our time scientists provedthat in green world water, carbon dioxide and energy of sun arethe source of life. They this process - photosynthesis. It can be expressed as a schematic equation:

$CO_2 + H_2O + \text{energy of light} = 1/6\ (C_6H_{12}O_6) + O_2$

Due to absorbed sun energy a green plant carries out chemical rearrangement of carbon dioxide and water molecules.

As a result of it the organic matter appears and free oxygen is being evolved. Only green organs and plant tissues, above all leaves have an abilityto execute the functions of photosynthesis. Out of (chlorophyll there is no a laboratory in nature, where it is possible to get the organic matter from inorganic one. Water is obligatory component of every plant, every organ, tissues and

WATER CYCLE OF PLANTS.

The biggest part of plant cell content is water which is amajor part of the organized matter. The role of water in the plant is conditioned by its unique physical and chemical properties (polarity of molecule).

Polarity forms due to the asymmetrical location of hydrogen and oxygen in water molecule that result in the uneven distributing of positiveand negative charges.

As a result of this feature molecule H_2O, being electro-neutral has, neverthelesstwo poles, i.e represents doublet. Due to it, the molecules of water are able to form with other charged particles, of different degree of complexity.

In the waterlogged of roots the most chain of processes of ionic exchange with soil is carried out absorbing water proteins develop pressure 1000 atm.

In a plant cell water can be free and bound. Water is considered to be bound if it is held by the colloids of protoplasm, and also by the other osmotic active matters. The amount of permeates in a influences the content of bound water.

In leaves and roots equilibrium with external solution comes in 15-20 minutes, but a little more than a half of the water contained in them is exchanged. Water of stems is exchanged on 90%.

NAS established that at artificial dry of different plants types, firmly bound water disappears least of all and plants can resist to the drought and freezing.

For realization of all processes of vital functions water and must from an environment. Substances move due to diffusion inside a cell. Diffusion is an involuntary process which causes moving of any matter from one area to other, where concentration of this matter is less.

The real stream of molecules always comes from a source where their concentration is higher, to those areas, where their concentration is less. The higher concentration of the matter is the higher is its activity and chemical potential.

Chemical potential of clean water is water potential. The highest value of water potential has chemically clean water. Conditionally this is accepted as a zero, and therefore water potential of any matter has matters negative value.

The membranes of living can transport only certain molecules or ions of permeates, showing selectivity which depends on nature of membrane.

Diffusion of water through a membrane is osmosis.

As in all biological systems water is a solvent, osmosis for them is the diffusion of water through a membrane. The more concentrated a solution is the higher is osmotic pressure. Osmotic potential is equal to the difference between chemical potential of the solution and chemical potential of clean water. It is always negative, and testifies how a solute reduces water activity.

Motion of water caused not by nature solute in , amountof particles of this matter. Water potential of becomes more negative due to the presence of organic matters which water.

Coming of water into a cell is also possible through an electro-osmosis because of the difference of electric potentials which appear on different sides of membrane.

As a rule, cations or anions penetrate through a membrane quicker. The more quickly they join the exchange of matters; the more intensive their absorption is.

Therefore there is no equilibrium between ions content in an external solution and their presence in enchylema.

All interactions of plants with water have not biochemical, but biophysical character, possibly even physicochemical. Biochemical reactions need only 1% of water from the amount passing through the plants. It is necessary to understand a very important aspect. The plant (cell) needs water not only as a source of nutrition, more, as a mean of its clearance from toxins and other products of vital functions. It is known that there is not only upward flow (along a xylem), – along a phloem.

A xylem is the system providing water and delivery from soil to the upper part of the plant. The diameters of conducting elements of xylem varyin a range 10-500 micrometers for different types of plants. Their length can be from many micrometres to two or more meters. The resistance to water and solutions passing through them is very little because these conducting elements have no protoplasts and cell walls.

Water will rise along a capillary until pressure becomes balanced. Additional pressure in the vessels of xylem is not able to provide liquid rise in the plants for one meter.

In big distances water transfer is ruled by a volume flow which can overcome attractive power and support water motion in a xylem. The more capillary radius is the more is the rate of volume flow which dominates in the process of liquid transfer to largedistances.

Phloem is the second conducting system that distributes most organic matters (above all things) for providing the processes of different plant parts growth.

Unlike a xylem phloem`s conducting elements have protoplasm. These conducting elements are tubes. They are united in a chain, which provides organic matters transporting. The products of photosynthesis move along the phloem from leaves to roots, and sugar moves from roots to a plant top (with unloading of phloem). Work of phloem is not enough studied yet. There is a hypothesis foreseeing participation of electro-osmosis in the transport of matters along phloem. The transportation of K+ ions is accompanied by the origin of the electric fields on every plate. Speed of photoassimilants movement is 50-100sm/h. Efflux from senescent organs on phloem is – salvage (callose efflux). The more active water is the better unloads phloem.

Activity of clean water is equal to one. An addition of permeates into water diminishes water activity. If primordial potential is less than solution potential, absorbs it. Otherwise water will pass from a plant cell into solution, until a dynamicequilibrium will not be established.

In the case of complete satiation of a by water, photosynthesis diminishes, just as at its deficit. Maximal photosynthesis at the deficit of water is 5-20%.

IONS TRANSPORTATION

The electronic transportation is less sensible to plants dehydration.

Passive transportation is moving diffusion. The gradient of concentration is motive force of passive transportation of neutral molecules, and for the passive ions transportation - a gradient of electrochemical potential. Ions can passively diffuse through a membrane due to own kinetic energy, and also through the protein channels.

Ionophorcs are polypeptides and proteins able to create the proper channels for certain ions. If they are added to the artificial lipid membranes, they accelerate ion penetrating through a membrane in millions of times. There are two types of the inserted organic origin elements: selective (selected) channels of ionic conductivity and functional (enzymatic) proteins, as a basis of ionic pumps work. There are potassium, sodium, calcium and chloride channels.

ACTIVE TRANSPORTATION.

As all ions are charged, so speed of their diffusion is determined not only by membrane penetrating, by the difference of their concentration on both its sides (chemical potential). And also by electric potential which arises up between the external and internalsurfaces of membrane (electrochemical potential). On-the internal membrane surface the charge is negative, therefore cations are absorbed.

The processes of exchange of matters consist of reactions, which take place with the use of energy and with its liberation.

In the process of living organisms evolution was formed an ability to conservation of energy in the form of which have high-energy compounds. Among these has a central position (CAT).

ATPases (phosphoric compounds) is quasi a system of cellular muscles.

Ion Na^+ is taken from a plant top. ATPase activates by potassium ions. And this is very important. Because, pumping out ballast sodium from a cell, ATPase simultaneously pumps full potassium that a cell needs. Therefore is sodium-potassium ATPase. Potassium influences on the activity of almost 60 enzymes. If humus is present in a soil, a plant can absorb more elements of from a solution. Humus serves as ions

LIQUID SOLUTIONS.

Solution is a homogeneous system consisting of two or more components is called a solution.

Every solution consists of permeate and solvent, i.e. a milieu in which this matter is equally divided in a view of separate molecules or more particles – ions.

When water is a solvent, such are hydrates, and process of their – hydratation. At certain conditions hydration water is so durable bound with the molecules of permeate, that during the clearance of the last one from a solution comes into the consistence of crystals.

The saturated solution - is such a solution which can indefinitely long remain in equilibrium with a surplus of the dissolved matter. In most cases are used unsaturated solutions, i.e. with lessconcentration of permeating, than at a saturated solution.

A suspension is insoluble in water matter in the form of nonsettling microscopic particles being in suspension state.

At consideration of a drop of a liquid with the suspended particles in a strong microscope, it is possible to see that particles do not remain at peace, and continuously move to various directions. Their motion differs by an extreme disorderliness, without any regularity. This motioncan proceed at any amount, not weakening and not changing their nature. In ionic solutions, where the charged micro particles constantly change the location, it is very difficult to determine physical and chemical properties. From one sample of such solution, it is possible to get a few, absolutely different physical and chemical indexes and characteristics. Such solutions dissolve in water very well, getting into its molecular net contacting with doublets.

Major mineral elements, minor elements, ultra minor elements can be a part of solutions.

Major mineral elements – vary from hundredth parts to ten percents (Si, K, Mg, P, S, Fe).

Minor elements – vary from hundredth to hundred-thousandth partsof a percent (Mn, B, Cl, Cu, Zn, Ni, Mo, Co).

Ultra minor elements – vary from millionth parts of a percent (Cs, Cd, Ra, Ag).

Water solutions, even with a very few amount of a substance solute in them, can acquire characteristic.

We will assume that we in succeeded to mark all molecules containedin 1 gram-molecule (18gr) of water. If now we outpour this water into a sea and wait till, evenly interfused with all waters on the earth, drawing glass of water from any place, we will find in it about 500 molecules marked by us. Or if the same amount (1 gram-molecule) of water, we, for example, evenly distribute on all ground surface, even on such conditions there will be about 100000 molecules on every square centimeter of the surface.

ENERGY INFORMATIVE PROPERTIES OF WATER.

Almost all physical and chemical properties of water are exclusion in nature, and only due to these anomalies of water, life on our planet is possible, at least, in that form which exists.

The major feature of water is preservation of its structural changes in time, i.e «memory of water». One of the first who faced with «memory» was a father of homoeopathy Ganemann. Diliting a medicinal extract to the unthinkable degree, he wrote: «I take away the substance, keeping force».

At the end XIX cent Carl Nachelly prepared a solution of mercuric chloride for disinfection. All microorganisms perished in this solution. Then Nachelly diluted the solution to such degree, that probability that bacteria will meet the molecule of mercuric chloride was insignificantly small. But the solution killed bacteria not worse, than mercuric chloride.

Water memorized, that mercuric chloride was dissolved in , and disinfectant of the solution were similar to of the concentrate. Water remembers everything that had happened. Swiss scientists run an impressive experiment confirming this information. On the one bank of Genevan lake they dissolved in water a few molecules of salt. On the other bank they fixed… no, not salt but memory about it. Sensitiveness of devices was simply not enough for salt by itself. But water of a lake saved this memory in full volume.

A living organism isthe most system consisting of enormous number of cells. Such system can not normally act without an exchange of information between its structures. Biologists proved that water not only a living organism, spreads information round it. Exactly due to living body organs get signals about the state of each other, and how it is necessary to function.

When a substance dissolves in water, certain verges of structural elements of water surround the molecule of substance. These structural elements found coding property of informative system of water, line up the other structural elements of water in certain order reflecting properties of a solute.

This is the way of homoeopathic remedies` effect. Not only vanishing few amounts of preparations influence an organism, creation of certaininformative pattern of water has salutaryinfluence on it. It is necessary to that wave emission from water being in the magnetic field was discovered. If we exclude the magnetic field, an emission on frequencies of millimetric waves will exist for a long time.

Now it is an indisputable fact, that small and super small doses of different biologically active matters have noticeable influence on living organisms.

BIOHUMUS

Biohumus - is a high-efficiency ecologically clean organic fertilizer with well expressed action. It is received in a result of decomposition of organic matters by the heterotrophic organisms. Biohumus forms on the base of coprolith (excrements) of composts worms. Micro flora and micro fauna which are part of biocenose of compost clamp, participate in forming. Biohumus subjected to the initial organic waste and technology of its composting has certain qualitative and quantitative parameters which can be controlled and programmed.

Biohumus containsall microelements of necessary to the plants, and also biologically active matters and vitamins. Microorganisms able to fix atmospheric nitrogen are part of biohumus. The efficiency of biohumus is approximately 70 times higher than the traditional organic fertilizer – dung; besides in contrast to it, biohumus does not containseeds of weeds that allow reducing application of herbicides.

Being, in fact, a native habitat of plants and containing the enormous amount of specific, soil-forming micro flora, biohumus can be used for the reanimation of soils having lost the fertility in a result of natural or man impact. It is necessary to note that practical application of biohumus is difficult.

Mainly it is used by the method of throwing in an amount 4-6 t/hec. At the same time it isa nutritional medium not only for cultivated plants but also for weeds. Biohumus differs by a high moisture-capacity and retains up to 70% of water, although badly dissolves itself. optimum humidity is within the limits of 60% that does not allow distributing it through seeders.

The most effective method of extraction from biohumus biologically active and nutrientive materials is. The dispersible suspension of biohumus has the sizeof microparticless – 30mk that in future allows using it for leaf-feeding by all types of spraying technique.

MINERAL FERTILIZERS AND PESTICIDES.

The wideuse of mineral fertilizers has began since second half of the XIX century in countries with the developed agriculture, that allowed to multiply productivity of grains from 10-15 to 30-45 c/ hectare.

Today in all developed countries 50-60% increase of agricultural production caused by mineral fertilizers application. It is necessary to take into account that the mineral fertilizers, above all, support a certain level of land fertility, with a purpose agricultural cultures does not exhaust soil. The nutritive sudstances are lost because of wash-out, transformations into insoluble fixed in a complex.

So 100 years ago the amount of humus in of Ukraine was 10-12%, and in our time only 2,5-6%. Thus every year about 24 millions tons of humus are being lost. Therefore, it is necessary together with the traditional agrochemical to improve a theory and practice of plants methods, to make conditions for prevention toxic elements penetrationinto them. It is necessary to from the simplified understanding about the of plants by cations and anions of mineral to the priorities mechanisms of assimilation of bioplexes taking into account their co-operation in wild-life. It will allow considerably accelerating metabolic processes at simultaneous diminishing of power and raw materials expenses for harvest formation.

In the dry matter of plant it is possible to find atoms of 25-35 chemical elements in correlations which testify about different contribution to the processes of vital functions.

It is important to understand that cations and anions of mineral fertilizers are identical to the soil ions and organic fertilizers. They not foreign to wild-life and is identically assimilated by the plants in the process of vegetation. There is another question. It is known that from the fertilizers in a soil, only a part of nutritives is assimilated by the plants. On the average for most crop the use factor of the fertilizers is– 40-50%, phosphoric – 10-25%, potassium – 50-60%. As a rule, fertilizers unabsorbed by the plants, are accumulated in water and in soil. For the nitric fertilizers an increaseof a dose of their bringing caused by high mobility in soil solution. Thus nourishing nitrogenin a soil, under influence of bacteria become the poisonous substances - nitrites.

Expansion of the use of phosphoric and complex fertilizers results in accumulation in a soil not only phosphates, strontium,cadmium, lead, fluorine and other

Bringing of amount of fertilizers not only contaminates a soil but also changes its physicochemical and biotic properties.

So, ammoniac fertilizers acidulate soil that negatively influences the rootage of plants, violate potassium and calcium. The use of nitrates, sulfates and chlorides as the fertilizers is instrumental in the losses of calcium and magnesium, strengthen the solinization. Chemical fertilizers in soil cause between biogenic and toxic elements, macro and microelements, chemical matters and biota, that substantially changes properties and fertility of soils, andgrowth and productivity of plants, their quality.

The chemical compounds, which have toxic characteristics in relation to living organisms, are pesticides.

The wide use of pesticides is typical for the second half of the XX century. Regulating with their help biotic factors, it was succeeded to decrease loss of harvest on 35%, including loss of harvest because oa harmful animals and insects on 14%, because of illnesses on 12%, because of weeds on 9%. However only in many years of the intensive use of

pesticides it appeared, that their efficiency in the pest control is accompanied by the whole range of negative consequences among which the most important is high-toxic matters introduction into biogeochemical circulation. The world assortment of pesticides counts about 900 basic types. About 500 preparations are constantly used, that makes 4 million tons of annual of high-toxic matters into environment. Mineral fertilizers are brought in an amount about 500 million tons of physical mass.

For today in Ukraine are registered more than 243 types of pesticides and a part of them have unknown origin and clinical effect. So, 90th the factories of Ukraine have 4 insecticides, 12 fungicides, 14 herbicides and 2 of disinfectants of seeds. For today their domestic production diminished considerably, andthe list of similar preparations had grown due to the import: insecticides to 47, fungicides to 72 and herbicides to 97.

Even in such a developed country as the USA, from the common of used pesticides, only 10% are tested on mutagene activity, 30% - on carcinogenic and 40% on teratogenic. Except for high toxicity, pesticides differ by persistence. The inspection in 1990 in Ukraine testifies, that in a number of regions pesticides penetrated to groundwater on a depth almost 220 meters, and in underwaters it was found 40 types of pesticide residues and their metabolites, including dichlorodipheny, the use of which has been forbidden for almost 30 years.

In Ukraine the inspections of plant growing showed that 25% contain the remaining amount of pesticides. Maximally possible level is exceeded in 5,1%. Most frequency of exposure in a soil of such pesticides residues as THAN, PHK, simazin, alirox, atrazine, agelon, 2,4-, dichlorodipheny, dialen, lenazyl, prometholonum, protazyn, treflan, aptan, aridikan, and at vegetative – PHK, lenazyl, atrazine, simaxyn, alirox, sitrin, THAN.

As biologically active matters, pesticides and their compounds from a nutrient medium often are the components of plants metabolism and thuscome into food chain of animals and people. No wonder that more than 3 million poisonings and 20.000 fatal cases caused by pesticides are annually registered in the world.

For today biochemical influence of pesticides to plants on cellular level is not studied enough. There are no doubts that their molecules are not ballast matters of living and not inert components of chemical reactions in nature.

FEATURES OF DEVELOPMENT AND AGRICULTURAL CULTURES.

All plants, for the growth and development have certain demands toconditions. They include air, light, water, heat and nutritives, thus all of them are equal and irreplaceable. The deficiency of one of them will be unavoidable cause the considerable weakening of growthor death of a plant.

It is possible to get big crops with good technological values only at favorable agro climatic conditions, observance of the technologies foreseen for a certain area with the use of high-efficiency complex fertilizers.

Except for a carbon, oxygen and hydrogen from air, the plants extract from soil with water such important component elements of as nitrogen, phosphorus, potassium, magnesium, calcium and sulphur. These elements of are consumed by the plants in comparatively generous amounts and that is why they are called macroelements. Those elements which are consumed by the plants in comparatively less amounts (coniferous forest, manganese, copper, molybdenum, zinc, cobalt, sodium and some other) are microelements.

Each of these elements participates in the normal vital functions of plants and can not be substituted by some other. The level of necessity of these elements depends on a species, breedsort, age and phase of plant development.

We will describe of most essential of them.

NITROGEN is an organic essential for growth of plants compound participating in their development. The plants in different periods of vegetation feel different need in it. It is important that some types of plants use nitrogen not only for growth and corps forming, but can accumulate it and save in reserve.

At the same time at the lack of nitrogen, plants grow poorly, begin to wither. Surplus of nitrogen has unfavorable influence on the garden plants: increases falling of garden-stuffs before ripening; resistance to the cold of trees goes down.

PHOSPHORUS is an important element of nutrition, which is instrumental for better assimilation of nitrogen, potassium, magnesium. It accelerates and ripening of garden-stuffs.

At insufficient flux of phosphorus a protein metabolism interrupts and retrogress assimilation of nitrogen from a soil. Features of the lack of phosphoric are growth inhibition, dark-green and leaves with purple spots or

POTASSIUM does not enter into the composition of organic compounds, but plays an important role in carbonhydratess, stability of plants to the diseases. Necessity in it is not less than in nitrogen. Potassium is instrumental in absorption by the plants of other and their movement in the plants.

At the deficiency of potassium photosynthesis gets worse, stability to mycotic diseases and resistance to the cold decreases. Features of potassium lack: of growth, up to brachysm, edges of leaves become fulvous, while ribs remain green. Sick leaves shed early.

These are the most essential elements of nutrition. If indicatedthree elements form the basis of of plants, others are conditionally necessary.

MAGNESIUM - Old leaves signal about above all things: their color becomes look like a herring-bone pattern – light yellow; yellow and then fulvous spots appear between green ribs. Such phenomenon has a name. At that considerable part of leaves die off- first of all older ones, falling of garden-stuffs.

SULPHUR takes part in making of albumens and vitamins by the plant. The leaves size diminishes at the lack of it , they become woody. The deficit of sulphur at the plants exhibits rarely

IRON There is serious chlorosis at (it starts with leaves). Illness shows up at the garden plants, foremost on browses.

BOHR resistance of plants to the mycotic diseases. Influences on forming of fruit ovaries and fruiting. Inside and outside garden-stuffs appear watery cankers, which become like a cork and have fulvous color andthe tastegarden-stuffs become bitterish.

COPPER is instrumental in drought- resistance, anddeficiency results in the oppressed growth of sprouts, weak development of rootage. Coloring of leaves gets a dark blue-green color, flowering stays too long.

MANGANESE humectancy, reduces volatility of moisture by leaves, has influence on fruiting. At manganese chlorosis is evident in spots; growth and fruiting of plants become slowly or even stop.

MOLYBDENUM participates in a regulation process of nitric exchange of matters. At nitrogen assimilation violates, therefore the signs of starvation are similar with the signs of

insufficiency of nitrogen – the pale green color of leaves appears, a lamina becomes deformed and dies off.

ZINCUM participates in protein carbon and phosphoric metabolism. Detains cell fission that causes change of leaves structure. On the ends of branches appear brachyblasts with leaves. The phosphoric fertilizers in increased doses reduce the zinc to the plants.

It is therefore necessary to use the fertilizer with the balanced composition of elements of which is instrumental in the increase of harvest, improves quality and allows resisting to the diseases.

«Riverm» is such a preparation. It is necessary to «Riverm», very well combines with herbicides and fungicides. Experience in «Riverm» application showed that a harvest and quality were considerably improved at leaf-feeding.

«Riverm» includes the balanced elements and also the most essential for fruit cultures macro and micro elements - nitrogen, phosphorus, potassium, magnesium, iron, coniferous forest, copper, manganese, molybdenum, zinc etc.

The major factor which high biological activity of «Riverm» is enriching by useful micro flora.

At biohumus dispersant process particles surface area in unit of volume and their sorption propertiesincrease. In that way are formed the most favorable conditions for the development of such useful microorganisms as organotrophic and eutrophic bacteria, which accelerate transformation of nitrogen in a soil (optimize the humus state of soil), micro mycetomes and streptomycetomes which activate the processes of cellulose decomposition to bioactive matters, azotobacters and phosphobacters, which are instrumental in fixing of nitrogen and conversion of mineral phosphorus in organic forms and product a range of biologically active matters responsible for growthand development of plants.

The plants, structures, mainly consist of carbon, hydrogen, oxygen, nitrogen, phosphorus and sulphur. The other elements make auxiliary functions, joining the separate structures of a . So, for example, a calcium executes alarm functions, magnesium joins chlorophyll, iron – histohematins and etc.

It is very important, for normal growthand development of plants to provide their sodium-potassium balance. It is known a little about the role of sodium in life of plant. of high osmotic pressure isin cellular juice is its main function, that allows the plant to extract water from dry and saline soils. Potassium the hydrophilicity of protoplasm and multiplies its waterretaining ability, creating jointly with sodium the difference of potentials on the membrane. The presence of potassium existence of plant at night, when there is no sunlight.

Root nutrition of agricultural cultures is effective at the shallow position of rootage and sufficient moisture-capacity.

When roots are disposed on a considerable depth only leaf-feeding can be effective. Let`s consider, for example, vineyards. At an age of several dozens of years the length of roots varied from 5 to 15м. There are few in this layer; therefore a rootage serves as their store, in a case of critical situations. Therefore the most important isleaf-feeding of in 7-8 days after harvesting. In this period leaves begin to throw down sugar accumulated in them, starch and other matters into a rootage. Having no dormant state, a rootage develops almost all winter.

Due to it, in spring appear 3-4 covered by bast. Thus vineyard stability not only against light frosts, against many diseases, including a bacterial cancer.

Cultivating rye as a separate bush, Ditmer determined that general length of roots and roots fibrils, at attained 10000km. An accretion every day was 5km. of roots and 80км. of roots fibrils.

For most agricultural plants, productivity of evaporation makes about 3g. In other words expending 1000g. of water, the plant synthesizes 3g of dry matters.

For the construction of component parts of the body, the plant uses a 0,2% of water skipped through itself. 99,8% - are used for evaporation. Thus, the stronger is wind, the greater is evaporation (steppe zone). For example, wheat in Kherson region at medium productivity evaporates during a vegetation period 300-320mm of water, which exceeds the amount of falling fallouts. Therefore for winter crops is very important a rootage penetrated to the depth of frost zone before frosts.

Winter rape must have the thickness of a stem before frosts not less than 5mm.

Preplant treatment of cultures seeds by preparations containing azotobacters, providestheir good growthwithout the expenses of energy on forming of tubers.

The higher plants are incapable, to use as nitric food atmospheric nitrogen, as they are unable to overcome forces of atoms coherence in the molecule of the last. That`s why all huge mass of free nitrogen (8t/m2 of the earth) not is accessible to the plant. Even in organically rich soils there is 1-2%of nitrogen accessible to the plant or approximately 200kg/hec of topsoil. In the other soils there is in 3-4 times less nitrogen.

In 1901 Ì. M Beyerink found the aerobic microorganism called azotobacter. Azotobacters are very important for photosynthesis. In a year they accumulate from 10 to 40kg of bound nitrogen for 1hec.

There are about 40ml/1gr of soil in black earth of nitrogen.. Some preparations have them in 1gr hundreds of millions. For example, in «Riverm» there are more than 150 million/1gr azotobacters. This question is very actual today because almost all biota is destroyed on the earth. In many soils there are no azotobacters, andis considered dead without them. Morbificviruses and bacteria dangerous for us take their position.

The plants are biological organisms and it is natural that they depend not only upon the , from geophysical processes. When growing plants it is necessary to take into account their biological clock.

A biological clock is a cellular mechanism, which cause the rhythm of vital functions or plant ability to orientate in time (clear periodicity of physical-chemical processes).

This ability to perceive vibrations of geophysical factors, day's and seasonal periodicity of the electric and magnetic fields of Earth, climate, sun and cosmic radiation,, and etc.

For example, nobody can explain how a tree produces electric power. But such effect exists. The Inventor Gordon Uold says that it is very will simple to prove it. It is necessary to stick one bar through a bark to the trunk of living tree, and other alongside, in soil, on a depth 20 sm and to connect a voltmeter. A pointer will show that between bars there is potential 0,8-1,2V of direct current in a trunk and in earth. But most interesting, that tension for some reason rises in winter, when there no leaves. Maybe, it is one of reasonsof intolerance by the plants of each other. It is known that a peach, very aggressively behaves a pear. Stone-fruits do not live in harmony with wild strawberry. A raspberry is a kind neighbor. Neighborhood of such cultures as berry bushes (currant, gooseberry and especially raspberry) is not recommended with apple-trees and apple trees are undesirable to plant with plums and cherries. It is known that walnut and mountain ash usual oppress apple-trees. There is similar incompatibility among the fields plants. The increasing requirements toquality of agricultural

products will necessarily result in the revision of technologies of its growing taking into account all necessary factors.

REVIVAL OF SOIL FERTILITY

Today soils resources are in a society mainly, as a source and a method of income receipt. The modern high farming resulted in the serious ecological problems related to degradation of soils and exhaustion of their fertility. Soil is a living medium which develops on its own laws.

Every particle of soil contains the enormous amount of living organisms: microflora, micro - and mesofauna. Besides 9/10 all types of insects spend their life in soil. To 1м2 of ground surface fit 2kg of living organisms' biomass, and on 1hec – to 20t. I, It is impossible to violate life in soil.

The aggregate of all soil organisms V.È. Vernadskiy called the living matter of soil. Taking into account the generation of microorganisms, annual productivity of their mass is multiplied in dozens of times and is achieved 192t/hec. It shows that productivity of dynamic microbal mass for vegetation period approximately equals to productivity of above-ground mass of plants. Unfortunately plenty of bacterial plasma (0,03 – 0,28% mass of topsoil) remains not investigational, although huge possibilities of fertility-improving soils are hidden here.

Due to the living matter of soil soluble chemical elements which are only 1,5 – 2% from generalmass in the earth's crust, are revolved on the closed curve. It is the main reason of that the wretched amount of elementsin soil enables plants to synthesize enormous masses of organic matter annually. It is necessary to realize that the criterion of soil fertility is not amount of elements, and degree of their participation, in biochemical circulation. These can account for that researchers do not find direct dependence between the amount of in soil and amountof harvest that is why it is impossible to conclude about intensity of biological processes after the remaining amount of movable elements of nitrogen, phosphorus, potassium determined by modern methods. A circulation is a dynamicprocess and that is why composition of ash is not capable complete information about total mass of matters engaged in metabolism. And if to take into account excretions of organisms in their lifetime the amount of which considerably exceeds mass of organism, it will become clear how incomplete and distant from objectivity are modern methods of soils and plants analysis.

In 1976 A. P Rode wrote, that soil without organisms is a dead body. Determining composition of humus physical - chemical indexes soluble in acids or pratums phosphorus and potassium; we pay no attention to the most powerful force - living matter of a soil.

Accumulation of nutritives is related to dying off of heterotrophic organisms, which in natural terms happens in the topsoil (0-5, 0-10см), then the methods of its treatment and bringing of agrochemicals accordingly must be revised.

During last years slowly, but confidently has been developing an organic agriculture. The nutritives in organic agriculture are determined not by a presence of them in soil solution, according to composition of insoluble mineral constituents of soil (that depends on matrix type) to maintenance of humus, biological activity, soil structure, saturation by gases, presence of organic residues.

Organic matter is the most important component part of soil. Humus is basis of organic matter; it is the source of both for the plants and for microorganisms. It also forms the structure of soil its cation exchange properties due to co-operation with cations of metals.

For a long time agriculture in Ukraine has been developing by a way of maximally possible intensification with the use of high doses of mineral fertilizers, facilities of plants chemical intensive sowing sessions, saturated by corn and technical crops. The main soil treatment was deep plowing. This system of agriculture did not stand a test by time. Gradually the facts of its negative influence on soils fertility became obvious, the quality of the final product and state of environment. Not unimportant factor of such situation is formed mentality in agriculture. For today considerable part of farmers is disturbed by providing of plants by macro and micro elements and facilities of their

In structured biologically active soil, a layer of 8sm and an area of 1hec nitrogen, sand clay – 47,5; black earth – 1543,0.

Besides in the structured soil underground dew which supplies to soil near 60kg of nitrogen falls out. For good harvest of wheat or beet are required 100-120 kg/hec.

For a good harvest are needed 300 kg/hec of phosphoric acid. Sandy soil contains 870 kg/hec of it, black earth – 5400 kg/hec. It is expended 60-90 kg/hec of potassium. Its contents in soil, in a layer 20 sm, (kg/hec): stony (rocky) - 300; clay - 4000; black earth - 18900.

The roots of plants penetrate much deeper; consequently, they can have enough potassium. On our black earths we do not have a deficiency in the other elements of feed.

On this basis, we must learn to use riches lying under our feet and circumferential us in an atmosphere. For this purpose it is necessary to change mentality and to realize that the plants can obtain the feed only in symbiosis with the living matter of soil.

Consequently, biological activity of soil must be spared the special attention. It is possible to return activity to our degraded soils after general chemicalixation due to the use of symbiotic plural-component bacterial or special biodynamic preparations.

One of such preparations is «Riverm».

When bringing «Riverm» into soil, hard accessible for the plants of compounds decay on accessible ions:

Ca^{2+}, Mn^{2+}, K^{+}, Fe^{2+}, PO_4^{3-} and other

Almost 98% of biotelements of soil are concentrated in organic residues and hardly soluted inorganic connections. It is a large reserve of nutritives. Due to «Riverm» the plant can provide itself by elements of feeds which are present in an enough amount in soil. In this case «Riverm» executes the function of ions transmitter, accelerating their moving from ground solution into the rootage of plant, improves physical and chemical properties of soil, strengthens activity of microorganisms, promotes efficiency of other fertilizers.

All these factors lead to soil fertility that helps the growth and development of plants.

HIGH-PERFORMANCE, ENVIRONMENTLY SAFE, LIQUID ORGANIC FERTILIZER «RIVERM».

«Riverm» is a liquid, suspension, environmently safe, organic fertilizer of a new generation.

«Riverm» production technology lies in extraction of nutritive and bioactive substences from biohumus with the help of hudrolic and mechanical dispersion. Dispersed biohumus mixes with water in a special hydrodiffusion plant. It is known that, being electrically neutral, a

water molecule has two poles, i.e. it is a dipole. Because of this, water molecules can form compounds of different complaxities with charged particles of dispersed biohumus. Thus, biochemical composition for “Riverm” fertilizer is not so much important as its structure, like an intire self-organizing system, which provides natural biological activity of fertilizer. “Riverm” structural order provides safety of microorganisms and its life products, such as ferments and growth substences. Usefull microbiocenoses accelerate nitrogen compounds transformation in soil (optimize humus content of soil), stimulate the processes of cellulose decomposition to bioactive substenses, promote nitrogen fixation, phosphorus organic compounds transformation into mineral assimitated forms and produce a number of bioactive substences (vitamins, aminoacids, auxins) fostering the growth and development of plants. Multiple experiments and studies of agrichemical and physical properties of “Riverm” have shown that it shouldn’t be considered uniquely as the fertilizer in its traditional sense. The functional range of “Riverm” is wider.

Approximately in 20 minutes after spray treatment the working solution of “Riverm” penetrates in a cropper’s cells and reaches its root system, providing ionic exchanging with soil. Because of that the cropper can extract even combined (dead) water from soil. Ionic link between the root fibers and leaf area bounds water molecules and does not allow them to evaporate. It ensures the croppers resistance to drought and frosts.

Essentially, being a solution with biophysical properties, “Riverm” raises protoplasm’s hydrophilic behavior and increases its water-holding capacity, positively effecting on synthesis of proteins, amylose, fats, and carbohydrates. “Riverm” functioning is associated with processes of electrons transition from one catalyzed protein to another which must be considered as a basic result of redox reaction in a cell. It specifies the biological rhythm of a cell vital activity and ensures a cropper capability to have a strict periodicity of physical and chemical processes.

To perform all the processes of vital activity water and nutritive substances must enter a cell. The faster nutritive substances take part in metabolic process the more intensive a cropper consumes them providing its normal growth and development.

In normal solutions dissolved substance is smoothly distributed as separate molecules. The higher the substance concentration is the higher his activity and thus its chemical strength. But the membranes of the live cells can transport certain molecules of substances presenting selective ability that depends on the membrane nature. Besides, a molecule is bigger than an ion and so their transportation through a membrane is always more difficult and slower.

All the interactions of a cropper and water have not biochemical but biophysical properties and perhaps physical and chemical.

«Riverm» is a substance with electrovalent (ionic) bond that consists of positively and negatively charged ions, bounded with electrostatic attraction. The concentration of microelements in it is not higher than 1,5% of the total volume that corresponds the European standard. Furthermore, disperse biohumus play the role of ions carrier. Because of the difference of electric potentials, which arise on both sides of a membrane, cations and anions come through it faster and quickly take part in metabolic processes in cytoplasm. Their excess diffuses with vacuole. Because of that there is no balance between ions’ composition in outward solution and their presence in a cell sap. It ensures normal functioning of all the parts of the cropper and, what is very important, the phloem unloading. At that, “Riverm”

performs not only the function of plants nutrition, but the ability to remove toxins and other products of vital activity.

The cells’ vacuoles contain saline solutions, glucose, organic substances and amino acids, that is why they are constantly absorbing water producing the turgor pressure. Therefore the “Riverm” working solution is close to clear water activity. If the solution will be more concentrated than a cell, water from the cell will transmit to the solution. That is why usage of chemical solutions, the molecules of which does not contain ions, depends on the concentration gradient. Real flow for the molecules of such solutions is always performing from the source, where the concentration is higher, to those areas where the concentration is lower. At that, the higher the concentration is the higher the solution activity is and consequently the osmotic pressure. Applying such solutions a cell is forcedly filled with substances restoring the balance between itself and the solution. Water stops entering a cell and the activity of photosynthesis decreases. If the vegetative period of a plant is determined wrongly, there is a probability of water outflow from a cell to the solution. This is the difference between biochemical and biophysical solutions to which “Riverm” is relative.

Preparing of the “Riverm” working solution depends on physical and chemical properties of water in which it is diluted. At that, percentage in water amount is more important than the fertilizer’s amount per a unit of square. Water molecular lattice that has different composition can take different amount of “Riverm” (from 1% to 5%). Rate of “Riverm” application also depends on species of plants and their vegetative periods.

Being an alkalescent solution “Riverm” has good fungicidal properties and protects plants from grey foot rot, odium and other fungus disease.

“Riverm” mixes well with other crop protecting agents and at the same time their quantity per a unit of square decreases but the effectiveness increases.

The most important property of “Riverm” is its enrichment with azotobacters and phosphobacters, which fix air nitrogen and deminerelize heavy and saline soils, and thus increasing their fertility.

Nowadays “Riverm” has shown itself to good advantages not only in Ukraine but in such countries like Pakistan, Turkey, and Poland and so on. Environmently safe products of natural origin are the future of farm production.

“RIVERM” AND SEEDS.

There is something mysterious in seeds. Most likely it is a latent and sleeping life which comes out unexpectedly.

From the outside seed activities are its swelling, breaking its shell and appearance of radicle firstly and then pedicle with leaves. However, in spite of quick evolution it is the period of germination when plants do not depend on soil.

The protoplasm isolation is disturbed when the seeds are out of their quiescence. It goes with the increasing of protoplasm hydraulic capacity and decreasing of thickness. The deep changes in metabolism are present. They are the hydraulic and oxidative processes intensification. The enzymatic processes are mentioned immediately after seeds swelling but before the appearance of any signs of growth.

Thus, if the rate of humidity rises from 12-14% to 28-30%, the intensity of wheat seeds breathing increases in thousands times. The level of separate enzymes activation depends on the peculiarities of seeds chemistry.

The enzymes help the complex compounds (proteins, polysaccharides, fats) to turn to decay products, which are used as energetic and yielded material in the biosynthesis processes of new germ tissues and cells.

Different studies show that the reasons of seeds ingemination can be various. One of them is the waterprofness of a seed coat. As for today the question of seeds waterproofness is not studied enough and because of that there are no reliable methods to overcome this property. One of the factors limiting seeds germination and also vegetative organs can be insufficient permeability of coating tissues for oxygen. Low permeability of a seed coat extends the seed rest period, and has an adverse effect on its germination.

“Riverm” is enriched with ions of microelements, which promote enzymes activity during complex compound decomposition, providing high level of seeds germination and further germs evaluation.

In seeds processed with “Riverm” solution there is the interchange of positive and negative charges between inner and outer sides of coating. When protein swells, the coat lacerates, and water penetrates inside the seed. It increases intensity and synchronism of sprouts and growthing capacity. Even in the condition of draught seeds have enough power to growth normally during 14-22 days. In the combination with other protectants “Riverm” distresses the germs. Processed seeds get into neutral environment which is necessary for their valuable evolution.

"RIVERM" APPLICATION INSTRUCTION

"Riverm" is an environmentally safe product for plants, animals and human beings, and does not require special precautions during its usage. Taking into account the specificity of "Riverm" it is necessary to follow strictly its application instruction.

It is urgent to prepare the working solution for seeds and croppers processing. At the same time the quantity of "Riverm" is determined not per a unit of square, but in the proportion of "Riverm" and water in which it is diluted. It is known that in the different regions water has different physical and chemical properties. Even in the same region they can use well water or water from surface source. Therefore it may be needed different amount of "Riverm" to fill water molecular lattice. For instance, water from the surface sources (pond, lake) has many diluted substances in its structure that's why you may need less "Riverm" to prepare working solution than for well water. Water temperature is very important for working solution preparing. The cold water density is higher than the density of worm water. The optimum temperature is 18-22°C. Anyway working solution should be under saturated, i.e. to give an opportunity to read standard face. One ought to remember that "Riverm" must be added to water but not inversely. At the same time it is forbidden to mix the solution. Anions and cations that are present in "Riverm" must freely fill the water molecular lattice during 5-10 minutes.

After that the solution can be used for top dressing, seeds processing, etc.

The working solution is not recommended to be stored for a long time. It is preferable to utilize it in 3-4 hours.

It is strictly forbidden to add in the reservoir with "Riverm" any amount of water as it may result in its regularity destroying and its precipitation.

In case of combined usage of "Riverm" herbicides and pesticides are firstly diluted in water. Then "Riverm" must be added in this solution. It is necessary to say that "Riverm" increases activity of pest-killers, and therefore their amount per 1 ha may be reduced depending on the state of processed area. It is preferable to utilize the combined solution during two hours. It is not recommended to dissolve "Riverm" in the salty solutions and in acidic medium. One should say that individual application of "Riverm" is more effective than its combined usage. If possible it is needly to use firstly crop protecting agents, and then in a few day to use "Riverm".

Many years experience of "Riverm" application in different regions has shown that you need 1,5% to 4% and rarer 5% of product per one unit of volume. The optimum amount of the working solution per 1 ha depends on leaf-area, its vegetative period, its state, and makes 150-250 l/ha. Besides, the amount of the working solution per 1 ha depends on the used sprayers, its speed, and spraying intensity. Anyway it is not recommended to use less than 100 l/ha.

If it is used less amount of the working solution per 1 ha (aviation, special sprayers), it must be prepared on the factory floor and on the individual order. It is desirable to perform top dressing in the afternoon. In this period the plants are in the highest point of wilting and the minimum turgor pressure in a cell, that's why they absorb the most solution.

At that the air temperature must not be lower than 8°C, as the photosynthesis activity decreases. The most effective "Riverm" application for top dressing is in the period when the

first leaves are formed. During florescence (especially vegetables, grounds) it is necessary to use “Riverm” after every ripening.

It is very important to process the seeds with the “Riverm” solution before sowing.

There is a process of chargers interchange between inner and outer sides of treated seeds coating resulting protein swelling. Even in the condition of drought the seeds have enough power to growth normally. The “Riverm” amount depends on the species of seeds and the terms of its sowing. It is recommended to sow the processed seeds immediately. Combination of “Riverm” and protectants is possible.

Usage of “Riverm” results in the soil demineralization. It activates evolution of nitrogen-fixing bacteria and thus significantly increases soil fertility.

“Riverm”, being used correctly, ensures the plants resistance to drought and frosts. It increases crop capacity and improves farm produce quality making your harvest environmentally sound.

WINTER GRAIN CROPS

Winter wheat, winter oats, triticale, winter rye.

Winter crops grow in autumn before frosts coming. When the temperature falls and the day length reduces the growth processes stop. The main characteristic of winter crops is their resistance to the low temperatures. In autumn when the temperature is 8-15°C, photosynthesis productivity is still high enough. The plants in this period accumulate soluble carbohydrates and amino acids. Most of them are in the tillering zones. Step by step the carbohydrates turn into sugar increasing their concentration up to 25% (reduced to dry matter) that provides frost-resistance.

When the temperature is below freezing point the cells are dehydrated and water from the cytoplasm goes to intercellular space. Cell cap concentration in tillering zones rises and prevents ice crystals development in plants tissues under the low temperature. Stasis and plants transition into sleeping state always increases their frost-resistance. To sustain winter conditions and then to restore vegetation and produce a good harvest, plant must have enough vital forces. The main reason of plants killing in this period is that in the intercellular space water freezes and dehydrates protoplasm. There is a process of colloid coagulation. This is irreversible process and it results in cells killing.

But plants perish not only in winter. Many of plants are lost in the sprout stage. Especially, if there is insufficient amount of water in soil. The plants loss during spring-and-summer vegetation exceeds the losses in the fall-and-winter period.

The simultaneous sprouts have the great importance for the future harvest. Often the seeds that are dipper fall behind in germination. This can lead to the stable stagnation of their root system and top part.

It is especially noticeable during footstalk growth and vegetative mass building. Many croppers fall during the period of steam elongation and ear formation.

More developed croppers consume water and nutritive substances more intensively, outgrowing weak plants and increasing their dejection shading them. The plants fall in future is increase by means of lying. The reason of lying is insufficient light penetration to the lower stem joints. In the neglected sowings there is a process of cells elongation and reducing of their walls. Great amount of nitrogen fertilizers stimulate extreme steam growth that results in

gapping between cells. The lower parts can't hold the top mass and the plant lies. Therefore during a period from sowing to ripening plants must get all the essential nutritive substances in certain quantity and in certain terms.

Winter wheat.

Winter wheat has minor capacity to take up nutritive substances from hardly soluble compounds in soil and worse stands the temperature drops and drought, than for example, rye. For tillering it consumes relatively small amount of nutritive substances, but very sensitive to the lack of them. Maximum consumption of plant food compounds is in the period dorm steam elongation to ear formation. However, the most important period for nutrients supply is the period from germination to sleeping state and also period of vegetation in spring. In order to ensure the simultaneous sprouts, growth and plants evolution, their entering in sleeping state, it is necessary:

- To perform semi humid processing of seeds with 3,0% solution of "Riverm" before sowing;
- For good growth and plant overwintering to perform top dressing with 1,0÷2,0% solution of "Riverm" (depending on seeds state) at the temperature not lower than 8-10°C.
- To perform spring treatment in the period from tillering to stem elongation with 3,0÷4,0% solution of «Riverm» (depending on seeds state).

In order to increase grain formation and its quality, it is desirable to perform plants top dressing with 1,0÷1,5% solution of «Riverm» in a week after florescence.

Winter rye.

Rye has a well-developed root system with high ability to take up. That is why it is less demanding to the edaphic-climatic conditions and fore crops than other grain crops. Winter rye is sowed earlier than wheat and therefore it has longer period to prepare for winter. Rye is more demanding to microelements supply than wheat, especially on soil with their small amount.

Before sowing rye seeds need to be processed with 2,0% solution of «Riverm» (combination with protectants is possible). Depending on the seeds state it is possible to perform autumn topdressing with 1,0÷2,0% solution of «Riverm». Spring dressing of rye is very important in the period from tillering to stem elongation. As rye is a tall corn crop it is more intent to lying. If stems are well formed and rather strong the risk of lying reduces. Therefore the spring top dressing of rye must be performed with 3,0÷4,0% solution of «Riverm» within the prescribed terms.

Winter oats.

Winter oats is the most frost-resistant among winter crops so it is sowed after all of other. It has a high potential of tillering and early stem elongation. Winter oats has a good reaction on microelements entering.

To increase regularity and growth power it is needly to process seeds with 4,0÷5,0% solution of «Riverm» before sowing. Autumn top-dressing should be performed with 2,0÷3,0% solution. Spring top-dressing must be made with 4,0÷5,0% solution of «Riverm» in the period of tillering.

Triticale.

Triticale takes intermediate place between winter wheat and rye. Having a well-developed root system triticale is less demanding to the edaphic-climatic conditions and forecrops. The seeds of triticale are bigger in size than other grain crops have; therefore the seeding depth is dipper. Hence, their growth energy must be greater.

It is necessary to process the seeds of triticale with 4,0÷5,0% solution of «Riverm».

In case of need autumn top-dressing must be performed with 1,5% solution of «Riverm». The spring top-dressing is needed in the period of good tillering with 3,0% solution of «Riverm».

EARLY SPRING GRAIN CROPS

Spring oats, spring wheat, oats.

Spring oats.

Among the grain crops, spring oats is the shortest-season crops. Having not well-developed root system, sort vegetative period and great tillering power it also having high intensity of nutrients consumption. Early top dressing of spring oats is performed in spring and the following – after florescence. The late top-dressing increases grain protein content and its technological properties.

Before sowing the seeds are processed with 1,0÷2,0% solution of «Riverm» (depending on the edaphic-climatic conditions).

The first top-dressing is performed with 1,5÷2,0% solution in the early period from sprouts to tillering with, and the second is made with 3,0÷4,0% solution of «Riverm» after florescence. If there is no opportunity it is necessary to conduct top-dressing with 3,0÷4,0% solution of «Riverm» in the period of tillering end.

Spring wheat.

Spring wheat is a cold-season crop which is able to withstand frosts up to 10°C below freezing point. This crop has a good tillering and good forming of a crown root system. But, during grain formation, spring wheat suffers from high temperatures.

At the temperature of 38-40°C in 17 hours the plant will have respiration palsy and as a result bad grain formation. In this period it needs the top-dressing for drought resistance. The root system of spring wheat has physiological hypo activity and thus it is necessary to process seeds with 3,0÷4,0% solution of «Riverm» before sowing.

The top-dressing is made with 2,0÷4,0% solution of «Riverm» in the period from tillring to stem elongation (depending on the edaphic-climatic conditions and seeds state).

Oats.

Oats is a cold-season and wet crop. It stands well gloom and fogs. It badly reacts on high temperatures during its florescence and grain formation. The root system of oats is well-developed and penetrates well at a depth of 1,2 m that makes it able to take up inaccessible nutrients. It should be said that oats takes up nutritive steady during the vegetation period. Owing to the grain hoodness oats needs more water for germination and the following growth and evolution. Besides, for sowing it must be used only dressed seeds. That is why proceeding treatment of seeds with 4,0÷5,0% solution of «Riverm» in combination with pest-

killers ensures simultaneous sprouts and their growth power. To provide simultaneous ripening and to except the second growth appearance it is essential to conduct the oats top-dressing with enriched 4,0÷5,0% solution of «Riverm» in the period of tillering ending and start of stems formation.

LATE SPRING CROPS

corn, rice, buckwheat and others.

Corn.

Corn takes up the nutrients during the whole period of vegetation, up to wax ripeness. Corn, especially silage one, is very responsive to organic fertilizers and microelements.

Corn grows slowly during the first month after sprouting, and takes up limited amount of food elements, lack of which adversely affect on the following plant evolution.

Before sowing the seeds of corn should be treated with 5,0% solution of «Riverm» (combination with pest-killers is possible). The most effective top-dressing with 4,0÷5,0% solution of «Riverm» is made in the phase of 8-10 leaves presence.

Top-dressing of silage corn is made with 3,0÷4,0% solution of «Riverm» in the phase of 6-8 leaves presence.

Rice

Rice is a worm-season crop of the tropical zone. If the temperature is lower 17-18°C, it does not maturate. Rice is cultivated with the help of impounding. The plants nutrition processes are inhibited under the water. Besides, most of them are washed out into sub-soil. Rice is characterized by insufficient germination and irregularity of sprouts.

To provide maximum regularity of sprouts the rice seeds must be treated with 2,0÷3,0% solution of «Riverm». Rice needs the most part of nutrients during germination, formation of generative organs, and grain formation.

The first top-dressing of rice need to be conducted in the phase of germination with 1,5÷2,0% solution of «Riverm», and the second one with 2,0÷3,0% solution of «Riverm» in the phase of tillering. If possible it is desirable to perform an extra dressing with 1,0% solution before paniculation and with 1,5% solution of «Riverm» after florescence in order to improve grain quantity and quality. If there is no such an opportunity it is necessary to make dressing with 3,0÷5,0% solution of «Riverm» in the period between tillering and paniculation depending on the seeds state.

Buckwheat.

Buckwheat is a worm-season and wet crop. To germinate the seeds need water in 50-60% of their weight. Decreasing of relative humidity up to 30-40% results in plants decay, button and grain perish. The root system is developed badly but it is able to take up hardly soluble compounds. Buckwheat is a crop of late sowing. It takes up the most of nutrients before the phase of florescence. The rest of them it takes up during the period of florescence-and-ripening.

The buckwheat seeds react well on top-dressing with «Riverm». Therefore before sowing they need to be processed with 2,0÷3,0% solution. The top-dressing of buckwheat is

performed once in a period of well-formed leaves by 3,0÷4,0% solution of «Riverm», but not later than 8-10 before florescence.

GRAIN LEGUMES.

pea, soya and others.

The main part of protein in grain and leaf-mass of legumes is formed by means of air nitrogen, which is fixed with the help of nodule bacteria placed in the root system.

If the humidity is low or the soil is dry, the tubers are not formed. Nitrogen in mineral fertilizers plays the role of inhibitor of nitrogen fixation.

Even the small doses of mineral nitrogen effect adversely on the tubers formation, because at that the plant start to consume it and there is no necessity for the tubers. Microelements, which raise the intensity of nitrogen fixation in several times, play the very important role in this process.

The grain legumes have the following stages of growth: germination, sprouting, stems branching, budding, florescence, legumes forming, ripening, and full ripening. The main are the phases of sprouting, budding, florescence and ripening. The phase of sprouting is marked by the appearance of the first leaves and seed lobes. The buds and flowers formation evidences of the transition to the budding and flowering phase. It is determined by the first lower flowers. The beginning of the ripening phase is determined by the browning of 1-2 bottom legumes, and the full ripening phase – when at least a half of legumes are brown. Grain legumes reacts well on "Riverm" application, which ensures the tubers formation in any the edaphic-climatic conditions, and thus the following growth and evolution. When the seeds are processed there is an interchange of positive and negative chargers through a husk that results in the fast swelling. The processed seeds must not be stored.

Pea.

To swell and to germinate the pea seeds need about 150% water of their weight. Having an underdeveloped root system and a short vegetative period the necessity of nutrients is rather great.

The processing of pea seeds before sowing has the importance for the following growth and evolution. The seeds should be processed with 8,0÷10,0% solution of «Riverm» depending on the soil state.

The first top-dressing is performed with 2,0÷3,0% solution of «Riverm» in the period from sprouting to budding depending on the climatic conditions and the plants state.

To increase the quality and quantity of grain it is necessary to perform the second top-dressing at the beginning of ripening phase with 1,5÷2,0% solution of «Riverm».

Soya.

Soya is the main grain legume in the world. It is demanding to worm weather during the vegetation period, especially during the florescence period. After sprouting the soya root system develops quickly, but the top part slowly. Soya takes up the most part of nutrients during the florescence period.

During the sprouting period and a week after that the germ uses nutritive substances of the seed. In two weeks after the sprouting period the nitrogen fixing bacteria start to

assimilate nitrogen from air and can fully supply the plant with this food element. The most amount of nitrogen is taken up by soya during the period from budding to flowering, when the vegetative mass grows intensively.

It is necessary to perform the seeds processing at the date of sowing with 8,0÷10,0% solution of «Riverm». In this case, the earlier the seeds are sowed after treatment, the better result will be.

The top-dressing must be performed not later than a week prior the budding period with 3,0÷4,0% solution of «Riverm» (depending on the seeds state).

OIL CROPS.

Sunflower, winter rape, spring rape, poppy and others.

Oil crops contain more than 15% of fat and are used for oil production. Ukraine takes the leading position in Europe in oil production. Crops acreage is about 2 million ha. More than 90% of this area is for sunflower.

Sunflower.

Sunflower is a crop of the steppe zone. If the optimum germination temperature is 20°C the sprouts come up in 7-8 days. The fresh sprouts stand spring frosts up to 4-6°C. It gives an opportunity to sow sunflower in early spring.

Owing to the well-developed root system and its suction force, sunflower takes water from the depth of more than 3 m, drying the soil layer of 1,5 m. The most part of food elements is taken up during the period of anthode formation and flowering.

Sunflower has a long period of nutrients taking up and thus it needs them more than other crops. It reacts positively on dressing with organic fertilizers. This process elongates the period of vegetation and seeds formation.

Before sowing the semi humid seeds processing should be done (not encrustated) with 4,0÷5,0% solution of «Riverm» (the combination with pest-killers is possible).

The basic top-dressing is done with 5,0% solution of «Riverm» in the period of 6-leaves formation. Depending on the sprouts state and the edaphic-climatic conditions it is possible to perform the top-dressing with 1,0÷1,5% solution of «Riverm» in the period of the first leaves formation.

Winter rape.

Winter rape is not only an oil crop but a feed crop of green forage chain. Rape is unpretentious to warm weather. The plant has the good vegetation at the temperature of 5-6°C and continues vegetation during the night frosts. If the seeds are sowed late the sprouts don't have enough time to temper and then perish. The plants with a well-developed rosette, which has 6-8 leaves, height of 10-15 cm, root cell thickness of 0,6-1,0 cm, winter well.

In the period between sprouts appearance and soil covering with leaves winter rape takes up a small amount of nutrients. The lack of nutrients in the period of stems intensive growth and vegetative mass building leads to early flowering and then lower fall.

During the period of pods formation and ripening rape is very demanding to nutrition. Dressing with nitrogen in autumn deteriorates rape wintering.

In order to provide the sprouts regularity and their growth power it is needly to perform seeds dressing with 4,0% solution of «Riverm» (in combination with protectants). The first autumn dressing is conducted depending on the seeds state and the edaphic-climatic conditions. It should be done with 1,0÷2,5% solution of «Riverm», but not later than in 2-3 weeks prior winter frosts coming.

The winter rape vegetative mass grows intensively during 2-3 weeks after spring vegetation restoring. In this period the top-dressing with 3,0÷4,0% solution of «Riverm» must be performed.

Rape is very demanding to the nutrients during the period of vegetative parts growth and grain formation. Therefore, dressing with 1,5÷2,5% solution of «Riverm» during the period of flowering and pods formation affects greatly on the quantity and quality of harvest.

In order to obtain the green food one dressing with 4,0÷5,0% solution of «Riverm» is sufficient when the leaves are already formed.

Spring rape.

The economic value of spring rape is that it may be cultivated in the zones risky for its cultivation.

The most part of food elements is taken up during the period of budding and flowering. It reacts well on dressing with organic fertilizers.

Use "Riverm" as it is described for winter rape, except the autumn dressing. For other oil crops it is effectively to apply "Riverm" before seeds sowing (4,0% solution), vegetative mass building (3,0÷4,0% solution), budding and ripening (1,5÷2,5% solution).

Poppy.

When dressing poppy the increased dose of nitrogen can be dangerous and results in morphine amount increasing. The main top-dressing of poppy is performed with 4,0÷5,0% solution of «Riverm» in the phase of well-developed rosette. For close sowing it makes sense to use 2,0÷3,0% solution.

ESSENTIAL OIL CROPS

hop, tobacco-plant, lavender, sage, coriander.

Essential oil crops are cultivated for essential oil production. Many of them are used in cosmetic, pharmaceutical, food-manufacturing and tobacco industries.

Therefore the cultivated products must be first of all environmently sound.

Hop.

Hop is cultivated in order to produce female inflorescences – cones. Hop is used in beverage processing industry, in cosmetic, pharmaceutical, baking and food-canning industries.

Hop is a plurannual crop cultivated on one area during 15 years. The main series of seeds is yearlings produced from stem cuttings and creepers.

Cuttings are bedded out in May-June at a small depth (6-8 cm). In autumn the stems should be cut at a height of 25-30 cm. In early spring nurslings are digged out and caltivated on planting.

Before cultivation cuttings must be soaked in 1,0% "Riverm" solution for 2-4 hours. The solution temperature must be 20-22°C, and the depth of immersion must be 5-6 cm.

Before spring cultivation nurslings should be soaked in 1,0÷1,5% solution of «Riverm» for 6-8 hours, at the temperature of 20-22°C.

During spring cultivation of nurslings it is very effective to dress them at the root with 1,5÷2,0% solution of «Riverm» at a rate 0,1 l per a nursling.

The first top-dressing must be performed with 1,5÷2,0% solution of «Riverm» when the stems height is 1,5-2,0 m. The second is performed with 3,0÷4,0% solution of «Riverm» before flowering.

It is desirable to process fertile hop yards with 2,0÷3,0% solution of «Riverm» in a week after harvest in order to provide good wintering. When dressing hop with fungicides it is preferable to use 1,0% solution of «Riverm» to distress the plants.

Tobacco-plant.

Tobacco belongs to the crops with increased demands to ecological clearness. The less proteins tobacco has, the better quality of tobacco is. Over nitrogen in soil deteriorates technological properties of raw material. This increases content of protein and nicotine. Tobacco-plant reacts well on the organic fertilizers.

Tobacco young plants must be cultivated only in growing houses.

For seeds germination it is necessary to perform their semi humid processing with 1,5% solution of «Riverm». If the seeding amount is not big, the seeds should be placed on sackcloth or polyurethane foam, humidified with 2,0% solution of «Riverm».

The seeds should be in wet state till one part of them germinates. Then they should be sowed mixing them with 30-40 parts of sand.

The first dressing should be performed with 2,0% solution of «Riverm» when two leaves appear. It is better to perform the top-dressing of young plants 2-3 times with under saturated 1,0÷1,5% solution of «Riverm». In this case young plants take roots well in field.

Not later than a week after young plants transplanting it is necessary to delete lower leaves and process plants with 1,0÷2,0 solution of «Riverm», increasing yielding and its quality.

Lavender.

Lavender is a plurannual evergreen plant that grows over 20 years. It is a short-rain and light demanding crop. It has a well-developed root system. Lavender is cultivated by young plants or mostly is sowed by seeds.

The top-dressing must be performed with 3,0÷4,0% solution of «Riverm» in the phase of formed leaves, but not later than 8-10 before inflorescence forming.

After inflorescences harvest and before bushes cutting it is desirable to perform dressing with 1,5÷2,0% solution of «Riverm» for the root system developing.

Clary sage.

The essential oil is contained in inflorescences. Clary sage has spring, winter and biennial forms. In industry winter sorts are very popular.

During autumn sowing it is not recommended to process sage seeds, because it may lead to their intensive germination up to frosts coming.

The first top-dressing need to be done with 2,0÷3,0% solution of «Riverm» in the phase of 1-2 leaves. If top-dressing is done during the closing crops, solution concentration must be 3,0÷4,0%. Anyway dressing should be performed not later than 8-10 prior inflorescence formation. Sage of the second year grows faster and therefore they use 4,0÷5,0% solution of «Riverm» for dressing.

Coriander.

The optimum temperature for coriander growth is 18-20°C. Young plants in the phase of rosette can stand frosts upto -13°C in the zone of root collar. High temperatures impact adverse on the process of flowering and fruits formation. In the period from sprouting to stemming coriander takes up the small amount of nutrients. The maximum demand of nutrients coriander has during the stem growth and the flowering period.

During the autumn sowing the seeds of coriander should be processed with 4,0% solution of «Riverm». The top-dressing must be done with 2,0÷3,0% solution of «Riverm» at the temperature of 8°C if the leaves appear. There must be at least 6-8 leaves before winter comes.

During the spring sowing the seeds of coriander should be processed with 3,0% solution of «Riverm». The first top-dressing must be done with 2,0÷3,0% solution of «Riverm» if two leaves are present. The second one is necessary during the stem active growth but not later than a week before flowering with 3,0÷4,0% solution of «Riverm».

MELONS AND GROUNDS

water-melon, melon, pumpkin.

Grounds belong to the appreciable dietary products.

If the composition of nitrogen fertilizers and other agrochemicals is not balanced it may be the source of poisoning. Therefore cultivating the grounds it is urgent to use environmentally safe fertilizers.

Water-melon, melon.

Water-melon is a worm-season, drought-resistant plant with a deeply extending root system (over 2 m).

Before sowing the seeds of water-melon are processed with 5,0% solution of «Riverm» (composition with protectants is possible). If the sowing is not big it makes sense to soak seeds (or hold in wet state) in 1,0% solution of «Riverm» 1-2 day prior sowing.

When the sprouts appear and the rows are noticeable the first top-dressing with 1,5÷2,0% solution of «Riverm» must be done. The second one should be performed with 2,0÷3,0% solution of «Riverm» during the sprouts active growth, but not later than 8-10 prior flowering. The following dressings with 1,0÷2,0% solution of «Riverm» should be performed after every harvest.

Melon is more thermofilic plant than water-melon, but it is less drought resistant.

Applying of "Riverm" for melon cultivation is the same as for water-melon cultivation.

Pumpkin.

Comparing to water-melon and melon, pumpkin is less warm-demanding and more cold-resistant. For early sowing the seeds are processed with 1,5% solution of «Riverm». For later sowing it makes sense to soak the seeds in 1,0% solution of «Riverm» till completely swelling.

The top-dressing must be done with 3,0÷4,0% solution of «Riverm» in the phase of the first leaf appearing but not later than 7-10 days before flowering. Depending on the edaphic-climatic conditions and plants state it is possible to perform an intermediate dressing with under saturated 1,0÷1,5% solution of «Riverm».

FIBER CROPS.

Flax, cotton.

Flax.

Flax is a genus of annual and plurannual herbaceous plant of flax family. It is a baste-fiber and oil crop. There are about 230 series of flax. For fiber and seeds the common flax (Linum usitatissimum L.) is mostly cultivated. Flax is developed well in temperate conditions. Its sprouts can stand frosts up to – 4°C. It is a very wet crop, especially in the period of budding and flowering. It is very demanding to digestible nutrients content in soil (as a result of the root system weak development). It is very sensible to the lack of barium. Vegetation period is 75-90 days.

The most productive part of a stem is fiber (20-30%). In order to get qualitative fiber the length of the stem should be over 70 cm. Slim stems give fiber of better quality.

"Riverm" correct application at flax cultivation ensures the stem height over 140 cm and increases flax-fiber harvest up to 46% (over 16,5 c per 1ha).

Fiber flax has the following phases of evolution: sprouting, fresh sprouts, budding, florescence and ripening.

In favourable conditions sprouts appear in 6-7 days after sowing having two leaves and a small button between them. This button gives a stem with flowers and bolls.

In the phase of fresh sprouts the plant can reach the height of 5-10 cm and has 5-6 pairs of leaves. Those phases duration is 15-20 days depending on weather conditions.

After the fresh sprouts phase the plant enters the period of stems active growth which lasts till the budding phase. The stem daily gain can exceed 5 cm. In this period the basic part of fiber is formed.

The flowering phase comes when the first bud turns into a flower. In this period the flax height gain reduces greatly because of inflorescence growth, and after flowering end completely stops. The phase duration is 7-10 days. Ripening phase is characterized by seeds forming and fast stiffness if stem.

Green, early yellow and full ripening are distinguished in this phase.

The green ripening begins on 60-62 day after sprouts phase or in two weeks after flowering. Yellow ripening begins on 35-40 day after flowering.

In the favorable conditions vegetative period can be reduced up to 60-65 days.

Cultivating flax it is necessary to use "Riverm" in the following way:

1. It is preferable to perform semi humid dressing of seeds (combination with other protectants is possible) with 2,0% solution of «Riverm». The dressing effectiveness lasts for 3 days.
2. To perform the first dressing by means of spraying in the sprouts phase. It is necessary to use 3,0% solution of «Riverm».
3. It is obligatory to do dressing by means of spraying in the fresh sprouts phase, but not later than 10 days after its beginning. It is necessary to use 3,0% solution of «Riverm». This dressing provides the stem intensive growth and fiber quality.
4. It is not recommended to use "Riverm" in the phase of budding and especially in the phase of flowering.
5. In order to improve seeds harvest and oil content it is desirable to use "Riverm" in the phase of green ripening, but not later than 4-5 days after flowering phase completeness. It is necessary to use 3,0% solution of «Riverm».

Cotton.

Cotton is the main fiber crop in the world. It is a very warm demanding crop. The optimum temperature of vegetation is 25-30°C. If the temperature drops below 20°C, the plant is depressed. The terms of cotton sowing are late. Before sowing seeds are processed with 4,0% solution of «Riverm». The first dressing must be performed with 2,0÷3,0% solution of «Riverm» in the period of two leaves formation (after plants density formation).

The second dressing is made with 3,0÷4,0% solution of «Riverm» after removing of top foliage in cotton till ball formation.

SUGAR BEET.

Cultivating sugar beet it is needly to use fertilizers with balanced content of nutritive substances which stimulate not only harvest increasing, but improve its quality and resistance to diseases.

Mostly sugar beet is sowed by encrusted seeds therefore treatment before sowing is not performed.

If the seeds are not encrusted it I necessary to perform semi humid treatment with 2,0÷3,0% solution of «Riverm» 2-3 days prior the sowing.

The seeds can be soaked during 24 hours in 1,0% solution of «Riverm» at the temperature of 18-22°C.

The first top-dressing is performed with 3,0÷4,0% solution of «Riverm» after 4-6 leaves appearance.

The second dressing is obligatory performed with 2,0÷3,0% solution of «Riverm» in the period of lower leaves falling (at the end of August) in order to increase the mass and sugar content.

POTETO.

Potato has a weak-developed root system which is located in topsoil. That is why it is less demanding to the presence of digestible nutrients in soil. Besides, potato accumulates a great amount of nutritive substances. As usual there is a lack of them in soil.

It should be said that increasing of fertilizers dose results in extending potato vegetation period, elongates the period of top gain, slows down tubers formation and decreases the quantity of harvest. If a great amount of fertilizers is used, the tubers become hollow, asperous; they dehisce and lose their market condition. If there is a lack of microelements, it creates favorable conditions for development of such diseases as potato scab, potato blight, stem and root eelworm, etc.

As for potato it is urgent to use fertilizers with balanced content of food elements, which promotes tubers harvest increasing, improves their quality and protects from illnesses.

Before planting it is necessary to worm up potato in the sun and to wet with 2,0% solution of «Riverm». If planting area is not big it is better to add 100-200 g of 1,0% solution of «Riverm» together with potato. The top-dressing is performed before flowering with 3,0÷4,0% solution of «Riverm» in combination with potato beetle protectants.

VEGETABLE CROPS.

Vegetable crops are mostly consumable fresh; therefore they should be ecologically sound. It is very important to choose fertilizers and protectants for vegetable cultivation. The main task of fertilizer is to provide a plant with necessary food elements in the phase it needs.

Vegetables can be sowed and planted by young crops. Before sowing with a spacer drill it is necessary to perform seeds treatment with 3,0% solution of «Riverm». It is effective to soak seeds in 1,0% solution of «Riverm» at the temperature of 20-25°C for 8-12 hours, or till their swelling. Swelled seeds are sowed or germinated.

Harvest and term of its ingathering depends on the young plants quality. It should be sound with a good root system and dark-green leaves.

Before planting out the roots of young plants must be soaked in 1,5% solution of «Riverm» for 6-8 hours at the temperature of 22°C. During planting it is permissible to add 100-200 g of 1,0-1,5% solution into a bed. It prevents the plant from stress. The top-dressing is made with 3,0÷4,0% solution of «Riverm» in the period of actual growth and productive organs formation. After every ingathering it is essential to dress plants with 1,0÷2,0% solution of «Riverm», that ensures flowers and buttons saving.

It is necessary to top-dress vegetables with 2,0÷3,0÷4,0% solution of «Riverm» once in a period the leaves appearance till productive organs formation depending on the plants state and agricultural climatic conditions.

Cultivating vegetables in growing houses the top-dressing is performed with intervals of 15-20 days and 2,0% solution of «Riverm» is used.

During hydroponic method application it is used 1,0÷1,5% solution of «Riverm» at 15-20 days intervals.

Cultivating flowers in growing houses the top-dressing is performed with 3,0% solution of «Riverm» in the budding period, and for hydroponic method with 1,5÷2,0% solution of «Riverm».

FRUIT CROPS.

Before planting out the young plants roots are soaked in 1,0% solution of «Riverm» for 8-12 hours, the solution temperature should be 18-22°C (the same for cuttings).

To accelerate the young plants growth (in the age under 4 years) it makes sense to dress their roots with 2,0% solution of «Riverm» before bud pushing (about 10 liters of the working solution per one fruit crop).

The soil dressing ensures season nutrition of young plants.

The top-dressing of fruit bearing plants is done when the leaf mass is formed well but not earlier than 8-10 days after flowering.

It is necessary to utilize 3,0% working solution of «Riverm». If there is a threat of frost it is desirable to perform the dressing of fruit bearing trees with 3,0% solution of «Riverm», but not later than 5-7 days prior flowering. It intensifies the resistance to frosts.

VINE CROPS.

Vine processing is made in two stages during two years.

During the first year dressing must be performed twice.

The first time vine crops are treated with 3,0% solution of «Riverm» in the period of leaf mass formation. This process improves the plants growth and sprouts evolution, which can give a good harvest next year.

The second treatment should be done during 8 days after ingathering before leaf fall at the rate of 1,0÷3,0% solution of «Riverm» depending on vine age. The older the vine crop is the greater amount of “Riverm” is needed.

This dressing ensures strong development of root system.

Next year it is permissible to perform one time dressing with 4,0÷5,0% solution of «Riverm» 8-10 days prior flowering. It is desirable to perform the same dressing in 8-10 after flowering that promotes less set fall and increases fruit growth.

PURPLE MEDIC (BLUE).

Purple medic is a main feeding leguminous with high feeding value and capacity. It may be used during 4-5 years after sowing.

Growing purple medic it is unpractical to use nitrogen fertilizers, because they inhibit the activity of legume bacteria.

On the day of sowing purple medic seeds must be treated with 5,0% solution “Riverm”. It activates the legume bacteria activity.

If purple medic is sowed together with coat crops its seeds must be treated with 2,0÷3,0% solution “Riverm”.

If purple medic is used as silage the first top dressing is performed with 3,0% solution of “Riverm“ during the period of vegetative mass forming, but not later than 10-15 days before budding. The following dressing with 3,0% solution of “Riverm” must be made in 10-15 days after hay cutting. Growing purple medic from seeds it is necessary to perform top dressing with 2,0÷3,0% solution “Riverm” in a week after florescence.

The top-dressing of other crops is performed with undersaturated solution of «Riverm» twice in the period of intensive growth and productive organs formation.

Except the top-dressing and the soil dressing of crops, it is reasonable to apply “Riverm” in order to improve fertility of low-humic soil, mineralized and salted lands. Microorganisms found in “Riverm” turn mineral substances and salts into organic substances, form humus layer and ensures free nitrogen fixation. On the soil surface it is applied by spraying 10,0% solution of «Riverm» in the evening or when the weather is cloudy at the temperature of +8°C.

It should be said that “Riverm” overdosing does not affect adverse on crops growth and evolution. The recommended doses of applied “Riverm” are determined for its optimal usage in view of economic effectiveness.

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