Grand Harvest Research
— innovative company —

Zerebra® agro

UNIQUE GROWTH STIMULATOR
WITH FUNGICIDAL PROPERTIES
BASED ON SILVER

SIGNIFICANT CONTRIBUTION
TO YOUR HARVEST!

Grand Harvest Research
— innovative company —

Grand Harvest Research is an international innovative company merging its own research potential with the potential of the leading commercial and non–commercial research institutes and centers all over the world.

The company develops and brings to the world market such kind of products, which are used in various spheres and aimed to reduce the toxicological impact on the natural resources of the planet.

In 2014 Grand Harvest Research patented and introduced to the world market a unique product – preparation Zerebra Agro, the numerous tests and application results of which have revealed its efficiency in 25 regions of Russia and the CIS countries.

Use
Increase of the crop capacity and improvement of the product quality.

The mechanism of action of the preparation is based on growth stimulating, fungicidal and synergistic effects. The nature of these effects is in the ability of active substances – colloidal silver and activating polymeric additives – to form in plants nonspecific, systemic, long–lasting resistance to fungi and bacteria, as well as to stimulate growth and biological processes. This ability beneficially influences the increase of the yield and quality of products.

The growth stimulating effect is observed in reduction of the negative impact of pathogenic microflora, stimulation of recovery processes and improvement of energy metabolism in plant tissues, as well as in activation of natural protective functions of a plant.

The fungicidal effect enables to inhibit and partially destroy pathogenic organisms mainly due to colloidal silver, a natural antiseptic, which is a part of the preparation. Silver nanoparticles undergo slow oxidative dissolution in the vicinity of bacteria and fungi, causing death of the pathogens by disrupting of the cellular membrane permeability and microbial cell metabolism.
It is important to notice the inhibition of bacterial diseases against which the known plant protection products work ineffectively.

The synergistic effect reveals prolonged and enhanced action of chemical fungicides: the application of growth stimulator Zerebra Agro enables to reduce the consumption rate of chemical fungicides to its minimum recommended in the regulations, as well as a to maintain the efficiency of suppression of harmful objects just like after application of a maximum dose of the preparation.

Bacterial properties of silver have been known since ancient times. Man uses silver as a natural biocide for over a hundred years. But there is one problem with the use of this metal: the silver in nature is not stable and that's why its stable formulations have not been obtained. The composition of Zerebra Agro, thanks to modern technologies, implements a stable activity of silver. The silver colloids namely kill bacterial and fungal infections by blocking its breathing and eating and also transportation of metabolites across the cell wall, causing irreversible structural damage of pathogenic cells at the level of the cytoplasmic membrane and cytoplasm of nucleotides.

ACTIVE SUBSTANCES:
colloidal silver 500 mg / L + polyhexamethylene biguanide hydrochloride 100 mg / L

FORMULATION:
Water solution.

SELECTIVITY:
The preparation is effective in application on many crops.

RESISTANCE:
No cases of resistance have been observed.

POSSIBILITY OF VARYING THE CROPS IN THE CROP ROTATION:
Does not affect the variation in crop rotation.

COMPATIBILITY:
The preparation is compatible with many herbicides, fungicides and insecticides.
In each case it is necessary to pre–check the components for mixing on the physical and chemical compatibility.

TOXICITY:
The preparation used in recommended concentrations and in accordance with proposed application method has no phytotoxicity.

Silver medal of Main Russian Agroforum «Golden Autumn –2014», Moscow

APPLICATION RESULTS

- Enhancement of seed vigor
- Uniformity of seedlings
- Activation of a strong root system development
- Productive growth and development of vegetative plant mass
- Effective inhibiting the development of fungi and bacteria
- Strengthening the immune system of plants and stress reduction
- Improving product quality
- Yield increase

> 10–15%
Power of seeds

>7–9%
Germination

>50–60%
Length of shoots and roots

>25%
Respiratory activity

>60–80%
Biomass accumulation rate

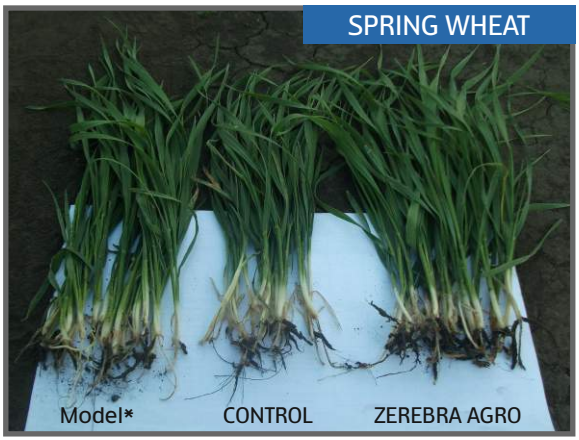
– seedlings appear simultaneously

– active growth and development of seedlings

– leaves develop more intensively

– no differences in plant height

PRODUCTIVE GROWTH AND DEVELOPMENT OF VEGETATIVE PLANT MASS

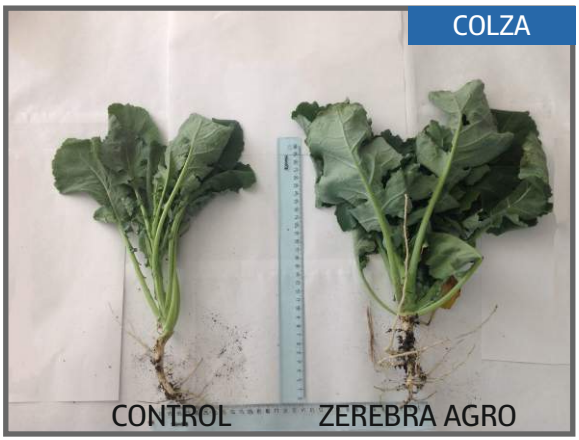


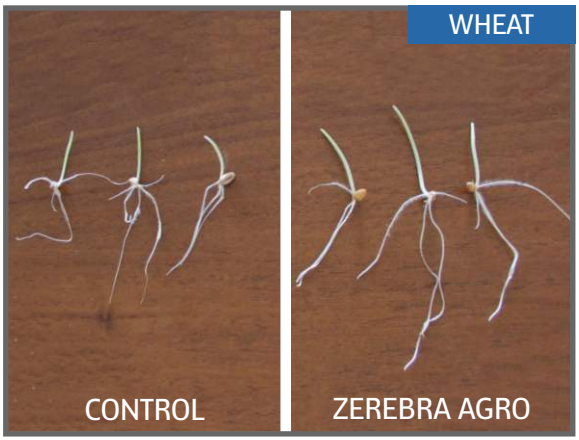
>11–17%

vegetative mass

- active growth and development of vegetative mass
- enlarged assimilative leaf surface
- dynamic branching and tillering processes
- increased photosynthetic leaf activity

ACTIVATION OF A STRONG ROOT SYSTEM DEVELOPMENT





>50–60%
increasing the length of roots

- additional roots form intensively
- roots become thicker
- secondary root system develops actively
- absorption capacity of roots increases

EFFECTIVE INHIBITING THE DEVELOPMENT OF FUNGI AND BACTERIA

Alternaria solani growth in the absence of the preparation

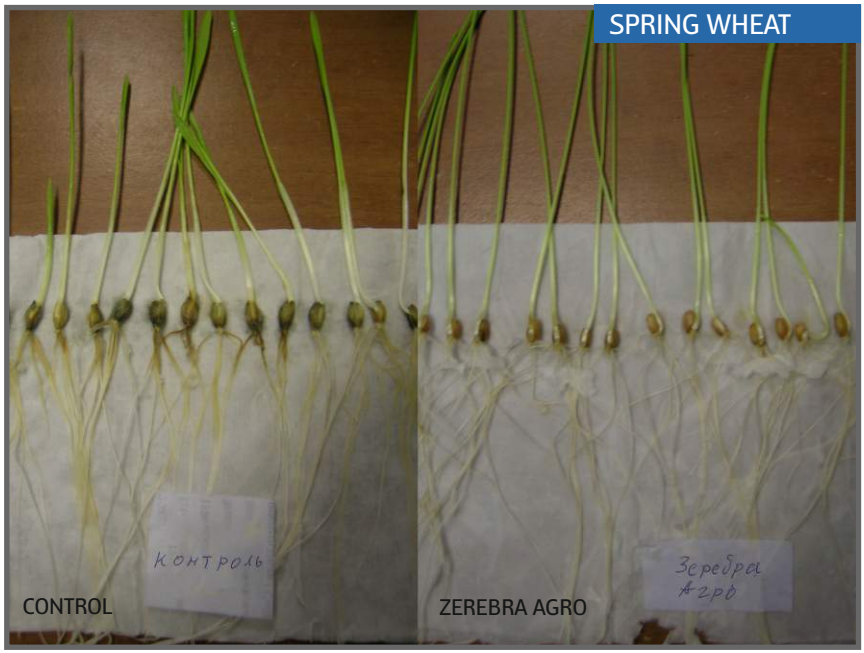
Inhibition of Alternaria solani growth in the presence of Zerebra Agro

до 50%

disease control

– reduced disease damage

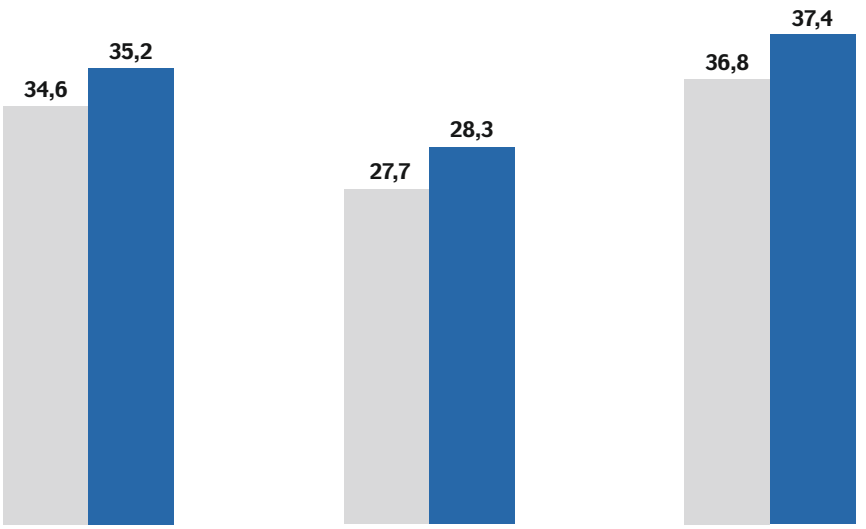
– increased resistance to stress factors



STRENGTHENING THE IMMUNE SYSTEM OF PLANTS AND STRESS REDUCTION

- strengthening the immune system of plants
- decrease of the damage caused by diseases
- increase of resistance to stress factors: frost, drought, high temperature
- reduction in pesticide load

Gluten content, %

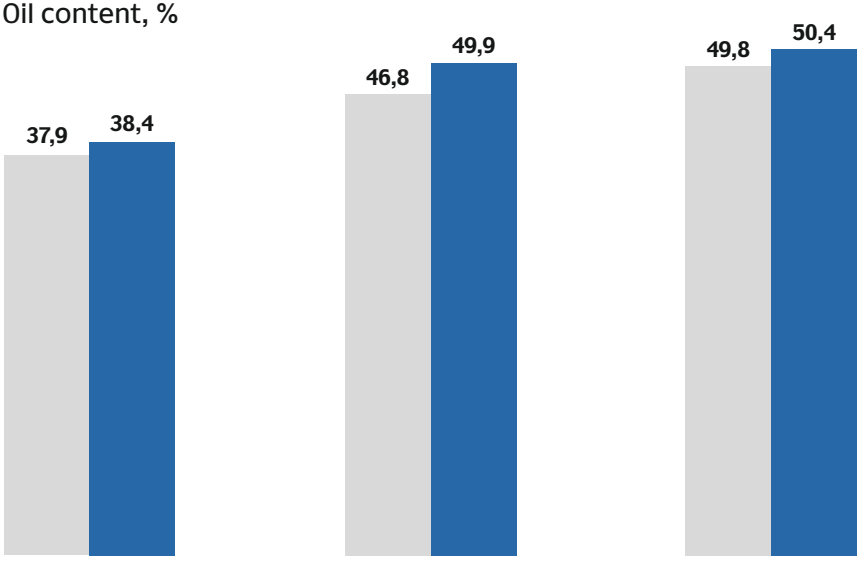


winter wheat,
sort «Kalym»

winter wheat,
sort «Moskovskaja 39»

spring wheat,
sort «Altaiskaja 70»

Oil content, %

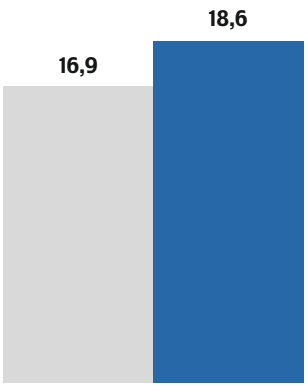


colza,
sort «Ratnik»

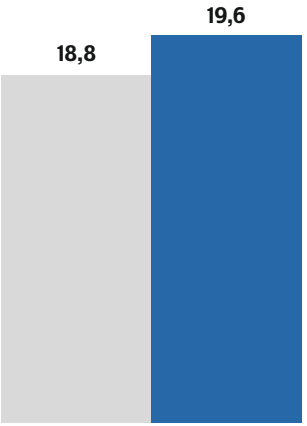
sunflower,
sort «Yenisei»

sunflower,
sort «Kubanskii 930»

Sugar content, %

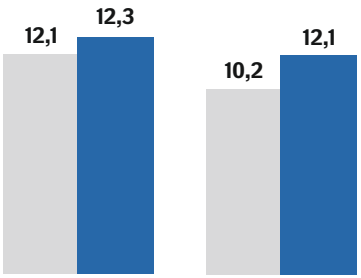


sugar beet,
sort «Kaskad»



sugar beet,
sort «Oriks»

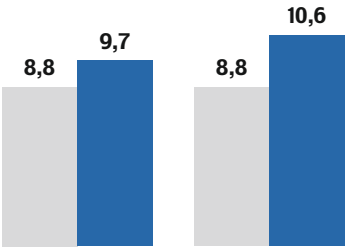
Total sugar content, %



apple-tree,
sort «Vishnevoie»

apple-tree,
sort «Lobo»

Ascorbic acid, mg, % (vitamin C)



apple-tree,
sort «Vishnevoie»

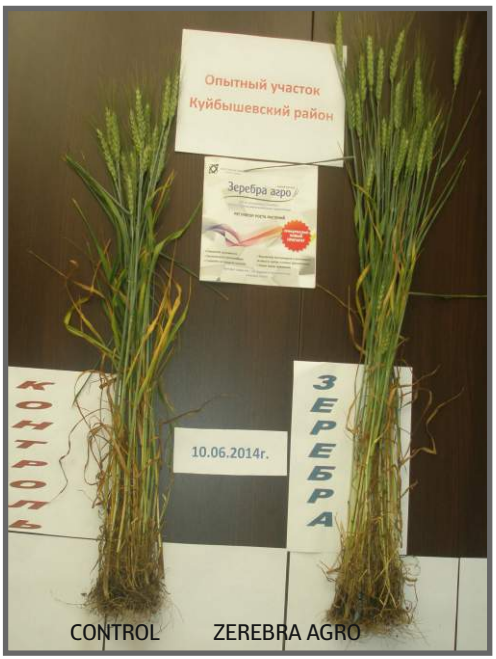
apple-tree,
sort «Lobo»

THE MARKS OF THE CHARTS

CONTROL

ZEREBRA AGRO

7–30%
Yield increase



Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Kalym	54,2	58,7	**8,3**
Moskvich	50,7	59,1	**16,6**
Moskovskaja 39	31,1	33,3	**7,1**
DonEko	39,2	42,3	**7,9**
Kollega	45,1	48,2	**6,9**
Zelenogradka 11	17,9	23,3	**30,2**

YIELD INCREASE
SPRING WHEAT

17–25%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Trizo	23,3	27,2	**16,7**
Altaiskaja 105	22,0	27,0	**22,7**
Altaiskaja 530	8,0	10,0	**25,0**
Voevoda	17,0	20,0	**17,6**
Omskaja 35	14,2	16,9	**19,0**

3–15%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Chakinskii 221	25,0	25,7	**2,8**
Danuta	31,2	34,4	**10,3**
Vorsinskii	7,4	8,5	**14,9**
Margaret	48,4	49,8	**2,9**

YIELD INCREASE
SUNFLOWER

8–28%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Yenisei	11,4	14,6	**28,1**
Kubanskii 930	26,8	29,0	**8,2**
Kulundinskii	7,5	8,8	**17,3**

7–19%
Yield increase

SOY

PEAS

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Soy «Vilana»	26,1	27,9	**6,9**
Soy «Svapa»	12,2	14,5	**18,9**
Soy «Niva 70»	10,0	11,3	**13,0**
Peas «Variag»	7,0	8,2	**17,1**

19–34%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Meteor	302,0	359,0	**18,9**
Adretta	178,8	231,9	**29,7**
Udacha	297,0	397,0	**33,7**
Alvara	174,8	221,7	**26,8**

20–24%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Kaskad	344,0	426,0	**23,8**
Oriks	366,6	441,4	**20,4**

9–29%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Colza «Tavrion»	16,5	21,3	**29,1**
Colza «Ratnik»	14,8	18,0	**21,6**
Colza «ANIISKh 4»	11,5	12,5	**8,7**
Buckwheat «Natasha»	8,9	10,5	**18,0**

4–32%
Yield increase

Sort, hybrid	Yield, hwt/ha		Increase to Control, %
	Control	Zerebra Agro	
Apple–tree «Martovskoie»	265,0	350,0	**32,1**
Apple–tree «Vishnevoie»	210,0	246,0	**17,1**
Apple–tree «Lobo»	280,9	291,3	**3,7**
Grape «Dmitrii»	80,5	101,0	**25,5**

Federal State Budget Institution «Rosselhoztsentr», Subdivision in Saratov region
Jakushev B.S., the main plant protection agro–specialist
Russia, Saratov region
Crop: potato, sort «Udacha»

«Zerebra Agro preparation has showed high efficacy in reducing the incidence of potato Phytophthora. Application on potato plants of sort «Udacha» in the budding phase has revealed biological productivity: in control – 29.7 t/ha; economic yield on plots of 1 ha in multiple replicates – 39.7 t/ha; yield increase of 10 t/ha. After application of the preparation in private farms absolutely no damage caused by Phytophthora and Macrosporiosis was observed. After application of the preparation in the recommended doses on apple–trees of sort «Berkutovskoie» no fruit scab or fruit rot was observed».

Research Institute of vegetable physiology of Academy of Sciences of the Republic of Tajikistan Karimov B., senior scientific researcher
Republic of Tajikistan, Varzob district
Crop: grape

«Observations indicate that Zerebra Agro preparation has a very large impact on the growth and development of vineyard, as a result we expect an increase of productivity. Harvesting has not started yet, but the bunches of grapes are large and their quality is much better than in the control variant».

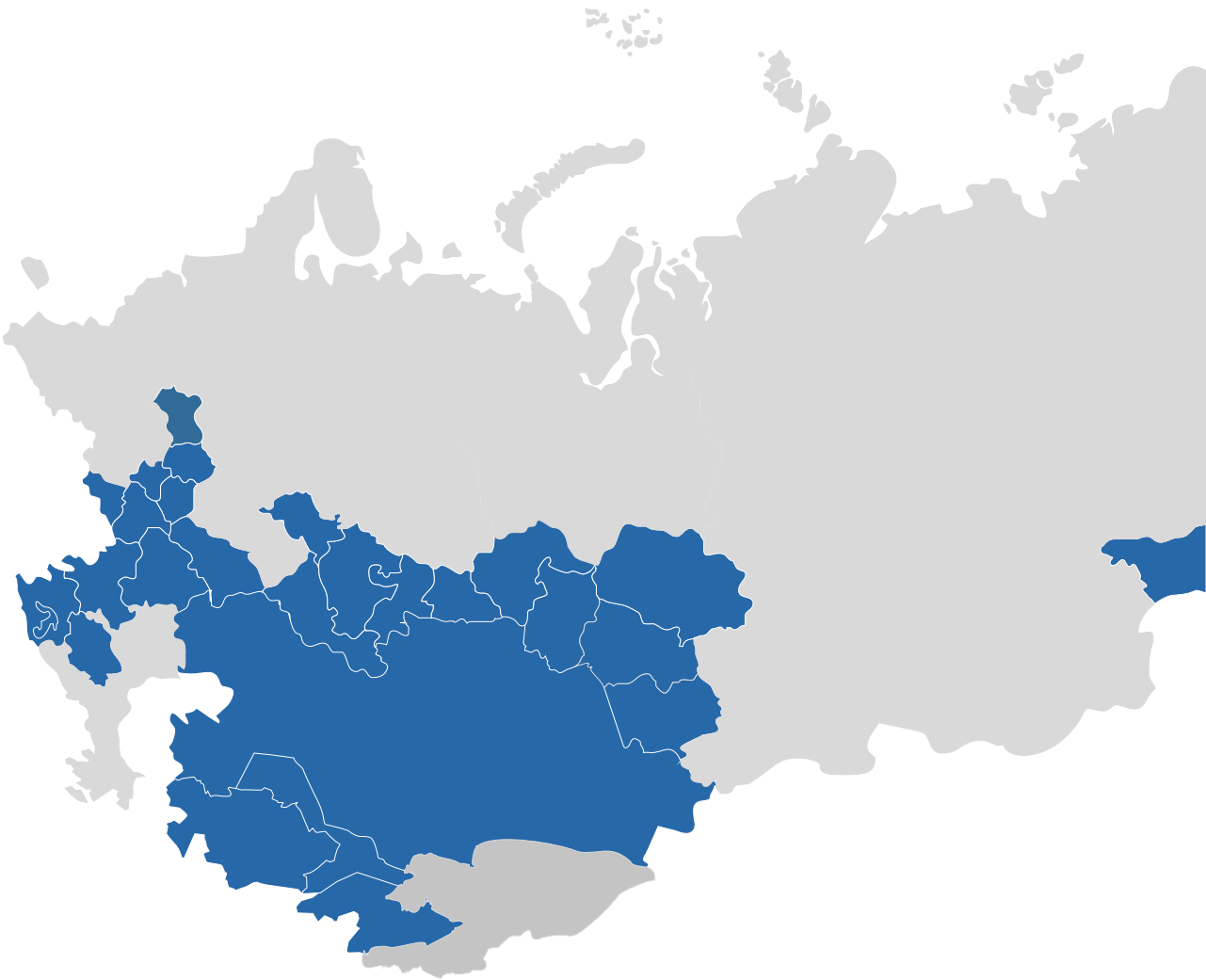
«Ruskom–Agro» LLC
Goman V.I., the general director, Deryuga V.N., the chief of plant growing department
Russia, Omsk region
Crop: spring wheat, sort «Omskaja 35»

«During the growing season we saw the visual effect of Zerebra Agro preparation. The yield of the control variant was 14.2 hwt/ ha and of the variant treated with Zerebra Agro – 16.9 hwt/ ha. The yield increase was 19%.
Application of Zerebra Agro enables to obtain reliable yield increase of spring wheat.
We were very satisfied with Zerebra Agro results».

Sukhomlinova O.V., individual entrepreneur, private farmer
Sukhomlinova O.V., the chief Kudinov I.V., the agro–specialist
Russia, Rostov regionCrop: winter wheat
Культура: пшеница озимая

«After application of Zerebra Agro the yield of the test area was 42 hwt/ ha, the yield of the control area was 39.1 hwt/ ha.
As a result, the test area was on 2.9 hwt/ ha more fertile than the control area».

GEOGRAPHY OF APPLICATION
IN RUSSIA AND CIS COUNTRIES



*the total treated with Zerebra Agro preparation area in 2014

Altai region
Amur region
Belgorod region
Volgograd region
Voronezh region
Jewish autonomous region
Krasnodar region
Kurgan region
Lipetsk region
Novosibirsk region
Novosibirsk region
Omsk region
Orenburg region
Primorsky region
The Republic of Bashkortostan
The Republic of Kazakhstan
The Republic of Tajikistan
The Republic of Tatarstan
The Republic of Turkmenistan
The Republic of Uzbekistan
Rostov region
Ryazan region
Saratov region
Stavropol region
Tambov region
Tomsk region
Tyumen region
Khabarovsk region
Chelyabinsk region

25
regions of Russia

4
countries of CIS

400
thousand hectares*

26
scientific institutions

A: for agriculture

Crops	Preparation consumption rate	Method, application period, consumption rate of working fluid
Winter wheat	80–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	80–100 ml/ha	Spraying in the end phase of tillering or in the beginning of stem elongation. Consumption 300 L/ ha
Spring wheat	60–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	60–100 ml/ha	Spraying in the end phase of tillering or in the beginning of stem elongation. Consumption 300 L/ ha
Winter barley	60–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	60–100 ml/ha	Spraying in the end phase of tillering or in the beginning of stem elongation. Consumption 300 L/ ha
Spring barley	60–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	60–100 ml/ha	Spraying in the end phase of tillering or in the beginning of stem elongation. Consumption 300 L/ ha
Sunflower	75–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the beginning phase of anthodium appearance. Consumption 300 L/ ha
Soy	75–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the budding phase. Consumption 300 L/ ha
Potato	75–100 ml/t	Tuber pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the budding phase. Consumption 300 L/ ha
Sugar beet	75–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the phase of 3–4 pairs of leaves. Consumption 300 L/ ha
Spring colza	75–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the budding phase. Consumption 300 L/ ha
Buckwheat	75–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the budding phase. Consumption 300 L/ ha
Peas	75–100 ml/t	Seed pre–treatment. Consumption 10 L/ t
	75–100 ml/ha	Spraying in the budding phase. Consumption 300 L/ ha
Apple–tree	150–200 ml/ha	Spraying: 1st – in the budding phase «rosebud», 2nd – in the phase of fruiting «walnut». Consumption 1000 L/ ha
Grape	150–200 ml/ha	Spraying: 1st –in the flowering stage, 2nd –15–25 days after the first spraying. Consumption 800 L/ ha

B: for private farms

Crops	Preparation consumption rate	Method, application period, consumption rate of working fluid
Potato	7.5–10.0 ml / L of water	Tuber pre–treatment. Consumption 1 L/ 100 kg
	1 ml / 3 L of water	Spraying in the budding phase. Consumption 3 L/ 100 m^2
Apple–tree	1.5–2.5 ml / 10 L of water	Spraying: 1st – in the budding phase «rosebud», 2nd – in the phase of fruiting «walnut». Consumption 10 L / 100 m2
Grape	1.0–2.0 ml / 8 L of water	Spraying: 1st –in the flowering stage, 2nd –15–25 days after the first spraying. Consumption 8 L/ 100 m2

Dates for manual and mechanized operations are not regulated.
The preparation use by the air method is prohibited.
The preparation use in a sanitary zone of fishery ponds is prohibited.

COOPERATION WITH SCIENTIFIC INSTITUTIONS

Lomonosov Moscow State University
SSI All–Russian Research Institute of Agrochemistry by D.N.Pryanishnikov, Moscow
Centre "Bioengineering", RAS, Moscow
SSI All–Russian research institute of potato farming by A.G.Lorh, Moscow
SSI All–Russian Breeding and Technological Institute of Horticulture and Nursery Growing of the Russian Academy of Agricultural Sciences, Moscow
SSI Moscow Research Institute of Agriculture "Nemchinovka" of the Russian Academy of Agricultural Sciences, Moscow
Federal State Institution "Centre of Agrochemical Service "Kaliningradskii", Kaliningrad
All–Russian Research Institute of Biological Plant Protection, Krasnodar
Kuban State Agrarian University, Krasnodar
FSBSI All–Russian Research Institute of oil crops by V.S. Pustovoit, Krasnodar
FSBSI Nizhne–Volzhskiy Scientific–Research Institute of Agriculture, Volgograd region
SSI All–Russian Research Institute of maize of the Russian Academy of Agricultural Sciences, Stavropol region
FSSI Stavropol Research Institute of Agriculture of the Russian Academy of Agricultural Sciences, Stavropol region
SSI Belgorod Research Institute of Agriculture of the Russian Academy of Agricultural Sciences, Belgorod
SSI Voronezh Research Institute of Agriculture by V.V. Dokuchaev of the Russian Academy of Agricultural Sciences, Voronezh region
SSI All–Russian Research Institute of leguminous and cereal crops of the Russian Academy of Agricultural Sciences, Orlov region
FSSI All–Russian Research Institute of colza, Lipetsk
FSSI All–Russian Research Institute of gardening by I.Michurin of the Russian Academy of Agricultural Sciences, Tambov region
Ryazan State Agrotechnological University by P.A. Kostychev, Ryazan
FSSI Bashkir Research Institute of Agriculture of the Russian Academy of Agricultural Sciences, Ufa
FSSI Altai Research Institute of Agriculture of the Russian Academy of Agricultural Sciences, Barnaul
FSSI Kurgan Research Institute of Agriculture of the Russian Academy of Agricultural Sciences, Kurgan
SSI All–Russian Research Institute of soy, Amur region
Research Institute of Plant Physiology and Genetics of Academy of Sciences of the Republic of Tajikistan, the Republic of Tajikistan
Research Institute of Biotechnologies of the Tajik Agrarian University, the Republic of Tajikistan