

RESULTS

Of application of fertilizers for foliar nutrition
season 2018





5

Winter cereals



15

Winter oilseed rape



25

Sunflower



31

Corn



37

Soybean



41

Potato

Dear partners!

Company "ECOORGANIC " is a national manufacturer of highly – effective fertilizers for foliar nutrition of plants. All products of our company meet the world requirements for the newest systems of foliar nutrition.

Fertilizers of "ECOLINE" and "GROS" lines are made on high-tech equipment using raw materials of the leading world companies.

In this catalogue, we present the results of application of products for the foliar nutrition in 2018 from "ECOORGANIC" LLC.

Scientists of the company used various systems of foliar nutrition of the main agricultural crops in all soil-climatic conditions of Ukraine. Depending on the combination of various factors (main nutrition systems, the use of plant protection technologies, soil characteristics and weather conditions, etc.), the final results, of course, were different. All the nutrition systems showed positive results of ECOORGANIC fertilizers application.

We want to present you these results.

For additional information on the systems of non-root nutrition from "ECOORGANIC" LLC and advice on their use you can get by contact us by email export@ecoorganic.ua

We are sure that you will always have high yields with fertilizers from "ECOORGANIC"!

**With best regards to you and your business,
Team of "ECOORGANIC" LLC**

WINTER CEREALS

Winter cereals are among the main "bread" crops that provide food stability and have significant export potential. They are grown in all natural and climatic zones of Ukraine. This group of crops has a significantly higher yield potential compared to spring crops, however, the crop largely depends on the wintering conditions. The agrotechnical measures in the period from the pre-seeding treatment of seeds are just aimed at mitigating unfavorable conditions in order to achieve optimal thickness and normal development of the root system at the early start of spring vegetation. The next important period in the ontogenesis of winter crops continues from the vegetation to the start of stem extension. During this period, plants actively absorb nitrogen and phosphorus. If with the absorption of nitrogen, if it is present in the soil, problems usually do not occur, then at low temperatures at this time, even in the presence of available forms in the soil, phosphorus may be limited to the root system, because its active assimilation begins when the temperature of the soil is about 15 ° C. The lack of phosphorus in such conditions is visually manifested in the form of violet staining of leaves, which disappears when the required temperatures are reached. (Special compositions with phosphorus in the form of phosphites are necessary in this period).

At the beginning of stem extension, the formation of the yield elements takes place, and therefore it is extremely important to ensure proper conditions of mineral nutrition. There is an increasing need for both macro and microelements. In the absence of these elements there is a reduction of part of the productive stems and elements of the ear. The period from the beginning of stem extension is characterized by the spread and development of diseases. Plants need additional nutrition elements responsible for activation of the process of photosynthesis (magnesium, iron)



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1
Seed treatment (BBCH 00)	Without fertilisers for foliar application	GROS Root Growth 1,0 l/t of seeds + ECOLINE Universal Seeds (Chelates) 0,5 l/t of seeds
Tillering autumn (BBCH 21-23)		ECOLINE Phosphite (K) 1,0 l/ha
Tillering spring (BBCH 25 - 29)		ECOLINE Phosphite (K- Amino) 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha

Location:

village Novyy Starodub, Petrovsky
district, Kirovograd region

Responsible for the trial:

sales representative of «Agrotok» LLC
O.Pomogaev
tel. +38 (068) 483 89 51

Previous crop:

Clearfield sunflower

Soil treatment:

surface treatment

Sowing date:

27.09.2017

Main fertilizer:

lime - ammonium nitrate 300 kg/ha

Type of soil:

black soil



INTERMEDIATE RESULTS

Indicator	Control	Variant 1
Root weight, g	0,74	1,02
Plant weight, g	2,54	2,8
Plant height, cm	16	19



Intermediate check 21.10.2017



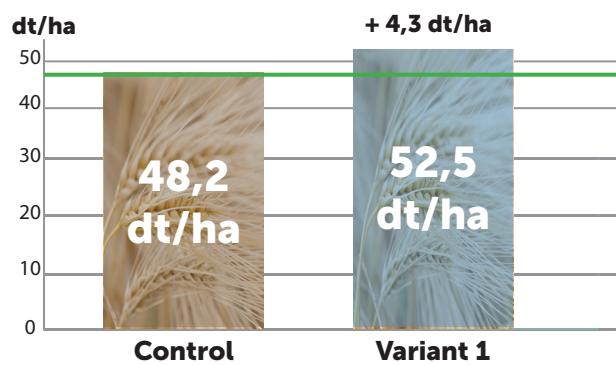
Intermediate check 09.04.2018



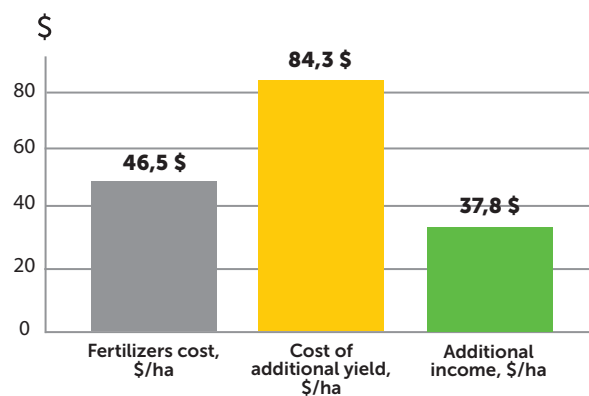
Intermediate check 19.06.2018

RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated from the price of \$ 196 per 1 ton of wheat)



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2
Seed treatment (BBCH 00)	Without fertilisers for foliar application	GROS Root Growth 1,0 l/t	GROS Root Growth 1,0 l/t
Tillering (BBCH 21-23)		GROS Phosphito-NP 1,5 l/ha	GROS Phosphito-NP 2,0 l/ha
Stem extension (BBCH 30-32)		ECOLINE Phosphite (K) 1,5 l/ha + ECOLINE Grain (Chelates) 1,5 l/ha	ECOLINE Grain (Chelates) 1,5 l/ha + GROS Health 1,0 l/ha
Flag leaf (BBCH 37-39)		ECOLINE Calcium-Boron (Chelate) 1,0 l/ha	ECOLINE Magnesium (Chelates) 2,0 l/ha
Milky ripening (BBCH 73-75)		ECOLINE Calcium-Boron (Chelate) 1,0 l/ha	ECOLINE Phosphite (K) 1,5 l/ha
Waxy ripening (BBCH 83-85)		-	ECOLINE Calcium-Boron (Chelate) 1,0 l/ha

DEMO - FIELD LLC «Biotech LTD»

Location:
LLC «Biotech LTD», vil. Gorodyshche,
Boryspilsky District, Kyiv Region.

Responsible agronomist:
Sergei Zhereb
tel. +38 (067) 249-15-06

Wheat variety:
Mulan

Previous crop:
Sunflower

Soil treatment:
surface treatment

Sowing date:
27.09.2017

The main fertilizer:
N₁₁₀ P₃₂ K₃₂

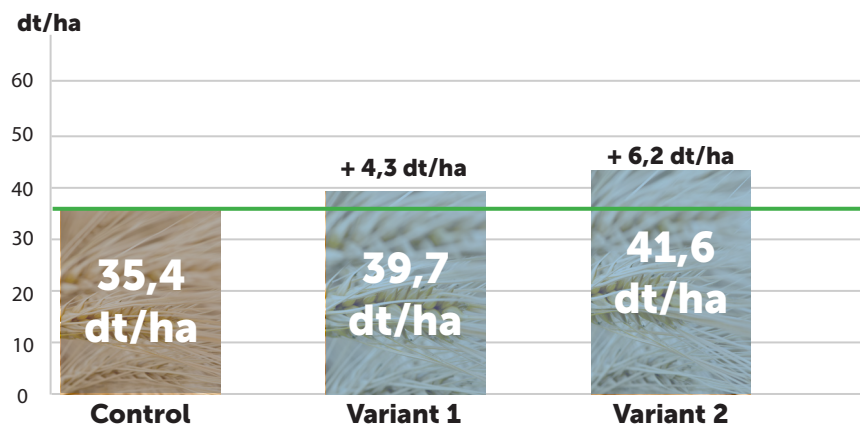
Type of soil:

dark gray podzolized on the loess of the light-loamy granulometric composition, with a slightly acidic reaction (pH 5.2), low content of mineral nitrogen (13.4 mg/kg), high content of phosphorus and potassium - 168 and 174 mg/kg respectively.

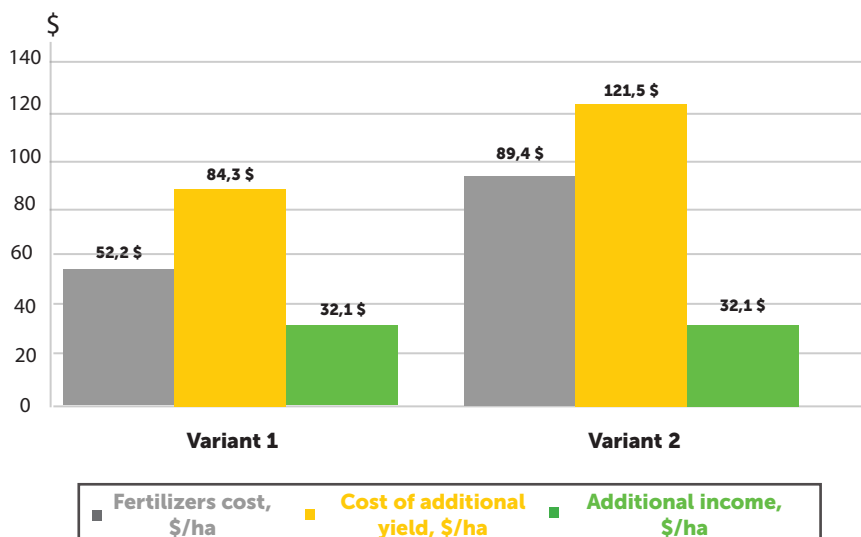


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



**The financial efficacy of application of fertilizers «ECOORGANIC» LLC.
(calculated from the price of \$ 196 per 1 ton of wheat)**



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1
Tillering spring (BBCH 25 - 29)	Without fertilisers for foliar application	GROS Health 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha
The appearance of the flag leaf (BBCH 32 - 39)		ECOLINE Grain (Chelates) 1,0 l/ha
Beginning of grains filling (BBCH 73 - 85)		ECOLINE Grain (Chelates) 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha

DEMO - FIELD Farm "Niva"

Location:
v. Privolne, Nikopol district,
Dnipropetrovsk region.

Regional representative of EOORGANIC LLC

Yurii Ambroziak
tel. +38 (067) 463-24-11

Previous crop:
Sunflower

Soil treatment:
surface treatment

Sowing date:
25.09.2017

Main fertilizer:
Ammophos simultaneously with the
sowing 100 kg/ha + ammonium nitrate
early in the spring 100 kg/ha.

Total:
N₄₆ P₅₂

Type of soil:
Typical chernozem



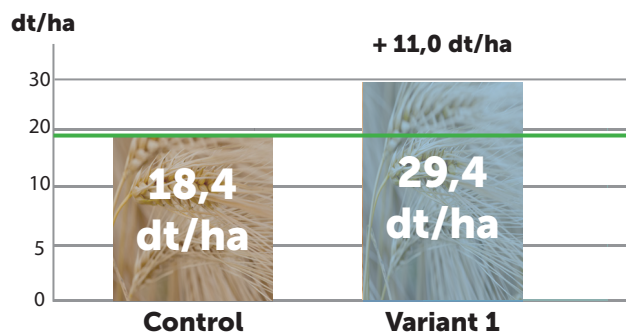
INTERMEDIATE RESULTS

Indicator	Control	Variant 1
1 intermediate check 02.05.2018		
Density, plants/m ²	500	510
Plant height, cm	35	55
Plant weight, g	64	219
2 intermediate check 28.05.2018		
Density, plants/m ²	500	510
Number of productive stems, pc/m ²	560	620
Coefficient of productive tillering	1,2	1,3
Plant weight, g/m ²	3360	4560
Ear weight, g/m ²	280	440

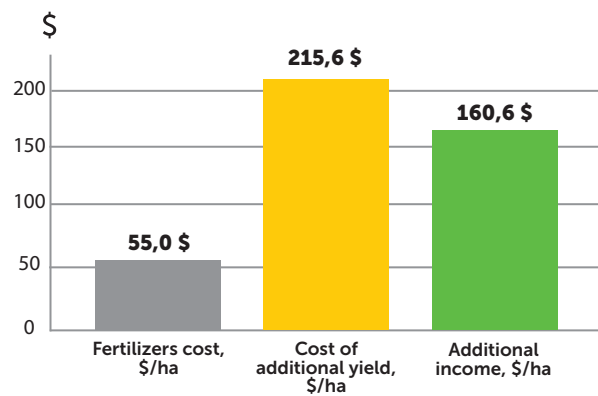


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated from the price of \$ 196 per 1 ton of wheat)



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2	Variant 3
Spring tillering (BBCH 25–29)	Without fertilisers for foliar application	ECOLINE Phosphite (K) 1,0 l/ha	ECOLINE Phosphite (K) 1,0 l/ha	ECOLINE Phosphite (K) 1,0 l/ha
Stem development (BBCH 45–49)		-	GROS Phosphito-LNPK 1,0 l/ha	ECOLINE Universal Growth (Amino) 1,0 l/ha
Ear formation (BBCH 51–58)		-	ECOLINE Grain (Chelates) 1,0 l/ha	ECOLINE Grain (Chelates) 1,0 l/ha
Grain formation (BBCH 59–65)		-	ECOLINE Phosphite (K) 1,0 l/ha + ECOLINE Grain (Chelates) 1,0 l/ha	ECOLINE Phosphite (K) 1,0 l/ha + ECOLINE Grain (Chelates) 1,0 l/ha

DEMO - FIELD LLC «TD Demetra»

Location:

v. Stepove, Dnipropetrovsk District,
Dnipropetrovsk Region.

Regional representative of EOORGANIC LLC

Yurii Ambroziak
tel. +38 (067) 463-24-11

Wheat variety:

Mulan

Previous crop:

Pea

Soil treatment:

Plowing

The main fertilizer:

at sowing 200 kg/ha of compound fertilizers $N_{8}P_{26}K_{26}$, on the cryomorphic soil 100 kg/ha of ammonium nitrate, in the tillering phase 120 kg/ha of ammonium nitrate before the rain.

Total main fertilizer:

$N_{92}P_{52}K_{52}$

Type of soil:

heavy-loam black soil



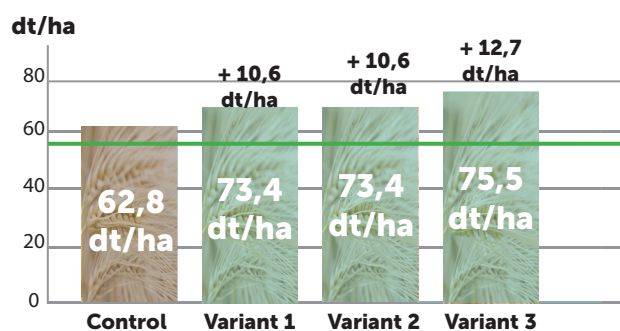
INTERMEDIATE RESULTS

Indicator	Control	Variant 1	Variant 2	Variant 3
1 intermediate check 02.05.2018				
Density, plants/m ²	400	410	405	400
Plant height, cm	42	45	42	48
Plant weight, g	158	164	196	205
2 intermediate check 21.05.2018				
Density, plants/m ²	400	410	405	400
Number of productive stems, pc/m ²	450	570	570	560
Weight of plants, g/m ²	2460	3260	3340	3400

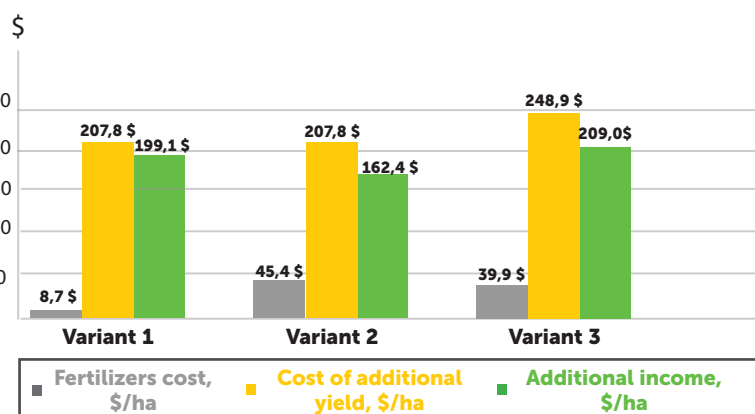


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Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated from the price of \$ 196 per 1 ton of wheat)



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1
Seed treatment (BBCH 00)	Without fertilisers for foliar application	GROS Root Growth 1,0 l/t
Tillering (BBCH 21-23)		GROS Phosphito-NP 2,0 l/ha
Stem extension (BBCH 30-32)		ECOLINE Phosphite (K) 1,5 l/ha + ECOLINE Grain (Chelates) 1,5 l/ha
Ear formation (BBCH 45-50)		ECOLINE Calcium-Boron (Chelate) 1,0 l/ha
Milky ripening (BBCH 73-75)		ECOLINE Calcium-Boron (Chelate) 1,0 l/ha

SPELTA

DEMO - FIELD LLC "Biotech LTD"

Location:

vil. Gorodyshche, Boryspilsky District, Kyiv Region.

Responsible agronomist:

Sergei Zhareb
+38 (067) 249-15-06

Previous crop:

Sunflower

Soil treatment:

surface treatment

Main fertilizer:

Without main fertilizer

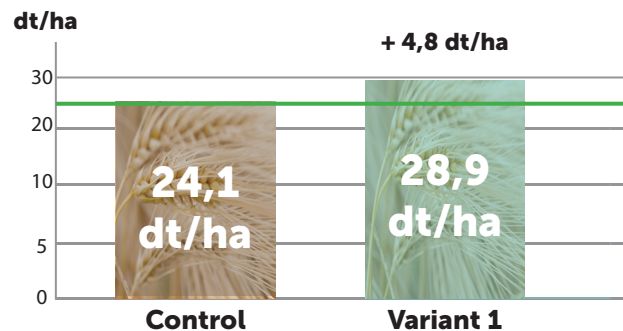
Type of soil:

Dark gray podzolized on the loess of the light-loamy granulometric composition, with a slightly acidic reaction (ph 5.2), Low content of mineral nitrogen (13.4 Mg / kg), high content of phosphorus and potassium - 168 and 174 mg / kg respectively.

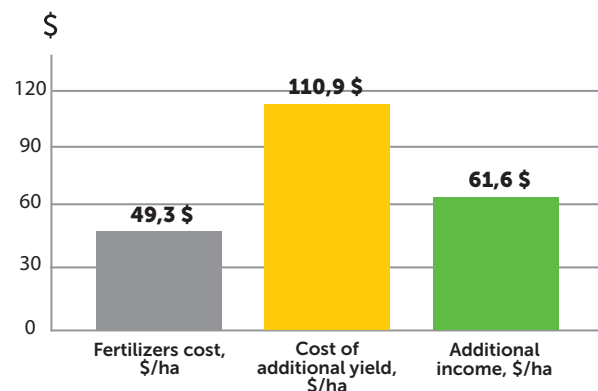


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated from the price of \$ 231 per 1 ton of spelta)



WINTER OILSEED RAPE

Important moments in the mineral nutrition of winter oilseed rape

Winter oilseed rape is one of the crops which provide solid financial revenues, but it requires increased attention to the technology of growing, including fertilization. There are several critical periods in the ontogenesis of the crop that are associated with the conditions of mineral nutrition.

The first one is from the appearance of seedlings till the beginning of nutrition from the own root system. The reserves of the seed itself are rather poor, and therefore, during the pre-sowing treatment of seeds, trace elements must be added together with the seed treatment. The most important of them in this period are manganese and zinc.

The second period is from the formation of 4 leaves till the formation of the rosette. At this time, the formation of a powerful root system, conductive beams and generative organs begins. The plant needs a moderate nitrogen supply, sufficient phosphorus and potassium. Quite often, plants suffer from lack of phosphorus, which has visual manifestations. The phenomenon is associated with soil temperature decrease which reduces phosphorus availability from the soil reserves, sometimes because of the action of retardants that affect the flow of biochemical processes in the plant. Oilseed rape is a crop which demands nutrition with boron, therefore the provision of plants with boron during this period is of extreme importance. In the fall, providing plants with boron contributes to the formation of healthy lead beams and the accumulation of sugars in the root neck to confront low temperatures during wintering. The best forms of boron fertilizers are compositions with monoethanolamine with the addition of L- α -amino acids.

The third period is from the beginning of the restoration of the vegetation till the beginning of flowering. Plants need enhanced nutrition with nitrogen, potassium, magnesium, sulfur, manganese, boron. Sulfur, magnesium and manganese contribute to a better absorption of nitrogen, while boron contributes to the processes of flowering and pollination.



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2
6-9 leaves (BBCH 16-19)	Without fertilisers for foliar application	ECOLINE Phosphite (K) 1,5 l/ha	ECOLINE Phosphite (K) 1,0 l/ha + GROS Amino-Mg 1,0 l/ha
Budding (BBCH 53-57)		ECOLINE Boron (Premium) 1,0 l/ha	ECOLINE Boron (Premium) 1,0 l/ha + GROS Health 1,0 l/ha
Beginning of pods formation (BBCH 69-73)		ECOLINE Oilseed (Chelates) 1,0 l/ha + GROS Quitcelium 1,0 l/ha	ECOLINE Oilseed (Chelates) 1,0 l/ha + GROS Quitcelium 1,5 l/ha

DEMO - FIELD LLC "ECOORGANIC" AND LLC "IVPAT - AGRO"

Location:

farm "ZOLOTIY KOLOS", v.Vendichani,
Mohyliv-Podilskyi district, Vinnitsa
region.

Farm director:

Mykhailo Yefremov
tel. +38 (067) 307-72-65

Director of LLC "Ivpato-Agro":

Mykhailo Lysyanyi
tel. +38 (067) 430-57-39

Sowing date:

05.08.2017

Main fertiliser:

autumn – 150 kg of nitroammophos
(N₁₆P₁₆K₁₆), December : 130 kg
ammonium sulfate (N₂₁S₂₄), March: per
frozen soil 200 l CAM (N₂₈)

Total main fertilizer, kg/ha of active ingredients:

N₁₀₇ P₂₄ K₂₄ S₃₁

Type of soil:

dark gray podzolized, mildly acid with an
average level of supply of mobile forms
of phosphorus and potassium



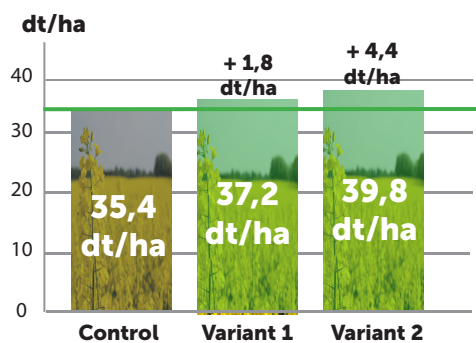
INTERMEDIATE RESULTS

Indicator	Control	Variant 1	Variant 2
intermediate check 24.05.2018			
Plant height, cm	140	148	150
Root neck, cm	1,4	1,6	1,7
Plant weight, (green mass), g	142	219	252
Root weight, g	15	25	23
Average number of branches per plant, pc	7	9	10
Average number of pods per plant, pc	139	146	163

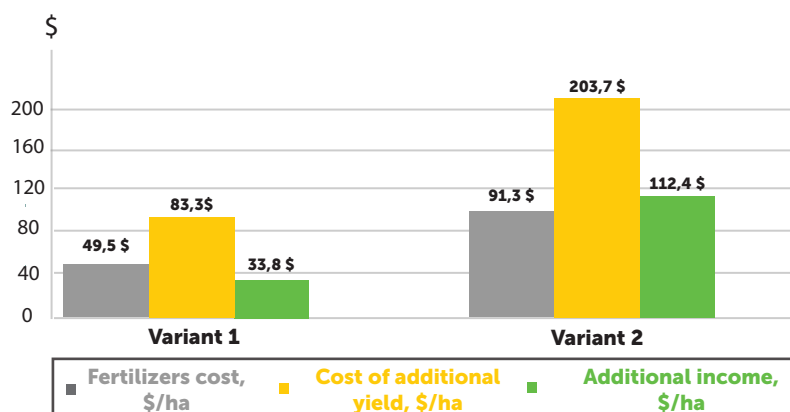


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated at cost of 463 USD per 1 ton of oilseed rape)





NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2
6-9 leaves (BBCH 16-19)	Without fertilisers for foliar application	ECOLINE Boron (Premium) 1,0 l/ha	ECOLINE Boron (Premium) 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha
Budding (BBCH 52-54)		ECOLINE Boron (Organic) 1,0 l/ha	ECOLINE Boron (Organic) 1,5 l/ha

INTERMEDIATE RESULTS

Indicator	Control	Variant 1	Variant 2
1 intermediate check 01.12.2017			
Density, plants /m ²	53	40	53
Root neck diameter, mm	6	9	14
Plant weight, g/m ²	840	2108	2254
Root weight, g/m ²	173	373	494
2 intermediate check 16.04.2018			
Density, plants /m ²	50	37	52
Root neck diameter, mm	14	18	22
Plant weight, g/m ²	93	110	148
Root weight, g/m ²	16	23	50
3 intermediate check 09.05.2018			
Plant height, cm	127	128	125
Number of floriferous shoots, pcs	10	6	11
Root weight, g	14	11	31
Leaves weight, g	26	26	45
Stem weight, g	88	79	169
4 intermediate check 05.06.2018			
Plant height, cm	129	132	155
Plant weight, g	148	201	329
Root weight, g	15	21	30
Number of 1 level branches	8	9	12
Number of 2 level branches	0	1	6
Number of pods	141	200	446
Number of seeds in the pod	20	25	40

DEMO - FIELD "PIONEER NASINNIA UKRAINA"

Location:

farm "Mshanetske", Terebovlyansky District, Ternopil Region

Regional representative of LLC "Pioneer Nasinnia Ukraina":

Mykola Kostyuk
tel/ +38 (095)-282-73-76

Hybrid:

PR46W20 (Pioneer)

Previous crop:

Winter wheat

Soil treatment:

autumn - stubble disking (5-8 cm),
ploughing (30 cm), spring - cultivation (8-10 cm), combinator (4-5 cm)

Sowing date:

05.08.2017

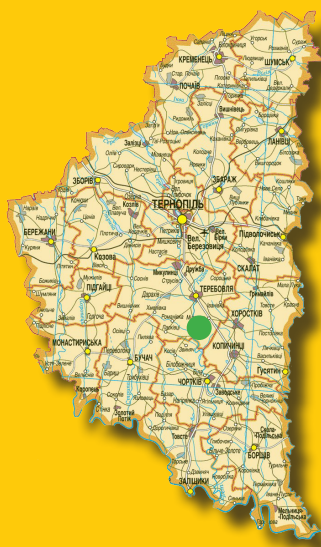
Main fertiliser:

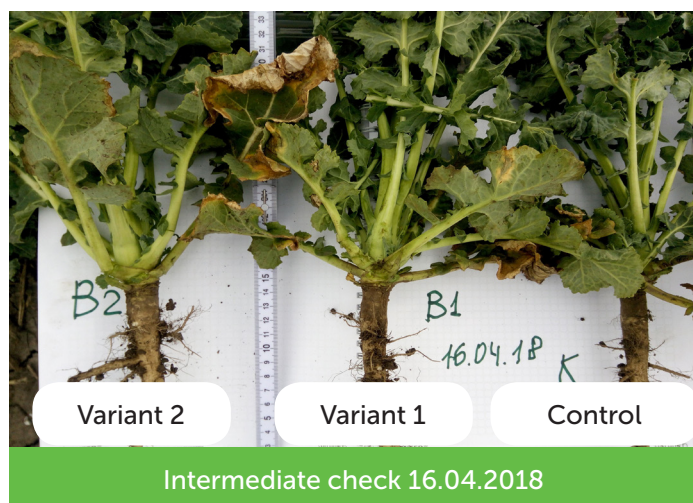
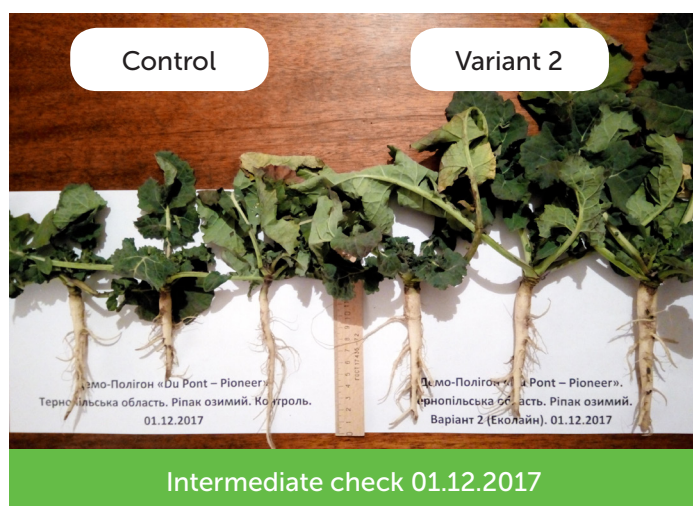
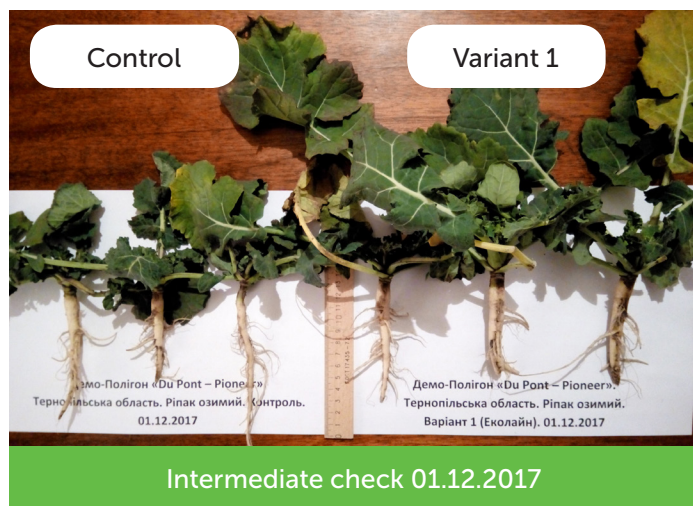
ammonia water - 500 l/ha + complex
nitrogen-phosphorus-potassium fertilizer
(N₁₀P₂₆K₂₆) - 300 kg/ha

Total main fertilizer, kg/ha in

a.i.:

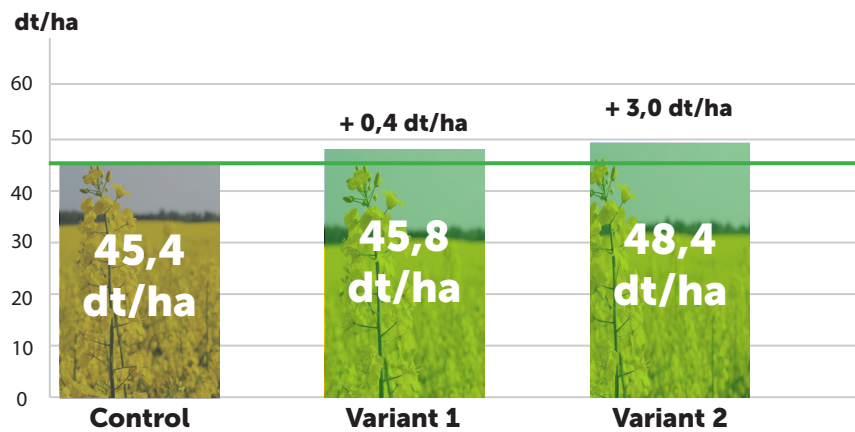
N₁₃₀P₇₈K₇₈



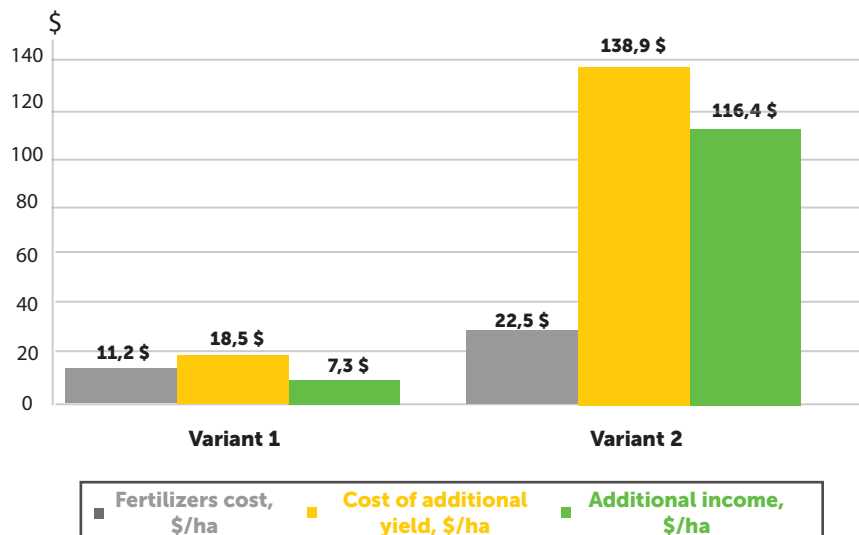


RESULTS

Productivity and yield growth due
to application of nutrition from
ECOORGANIC LLC, dt/ha



The financial efficacy of application
of fertilizers «ECOORGANIC» LLC.
(calculated at cost of 463 USD per 1 ton of oilseed
rape)





NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 2
Stem formation (BBCH 28-32)	Spektrum Mn + Zn 1,0 l/ha	ECOLINE Phosphite (K) 1,0 l/ha
Budding (BBCH 52-54)	Spektrum Mo + B 2,0 l/ha	ECOLINE Boron (Premium) 1,0 l/ha + GROS Quitcelium 1,0 l/ha
Pods development (BBCH 70-74)	Spektrum Mo + B 2,0 l/ha	ECOLINE Oilseed (Chelates) 1,0 l/ha

DEMO - FIELD Farm "NIVA"

Location:

v. Privolne, Nikopol district,
Dnipropetrovsk region.

Regional representative of EOORGANIC LLC

Yurii Ambroziak
tel. +38 (067) 463-24-11

Sowing date:

10.08.2017

Main fertilization:

At planting 100 kg/ha of ammophos,
in the spring 100 kg/ha of ammonium
nitrate.

Total main fertiliser, kg/ha of active ingredients:

N₄₆ P₅₂

Type of soil:

typical black soil of the loamy
granulometric composition



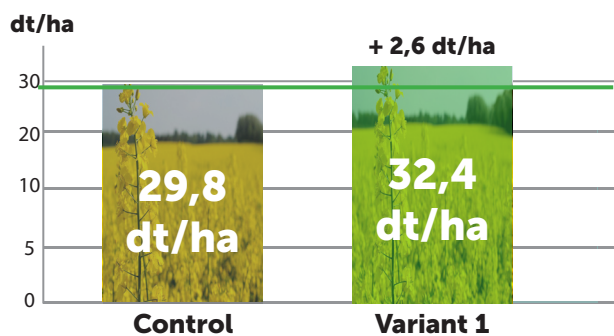
INTERMEDIATE RESULTS

Indicator	Control	Variant 1	+/- to control
intermediate check 21.05.2018			
Plant height, cm	118	120	+2
Average weight of 1 plant, g	392	937	+545
Number of branches per plant, pc	6,4	8,8	+2,4

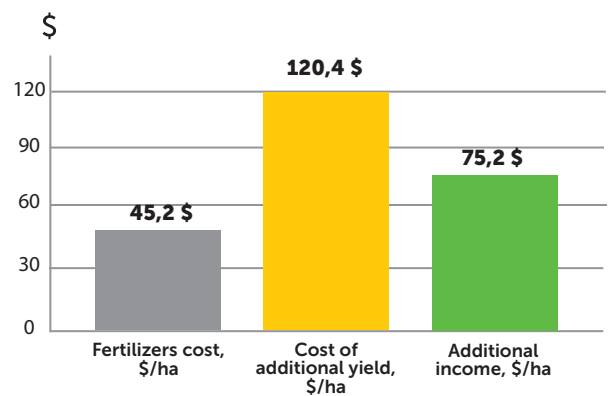


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated at cost of 463 USD per 1 ton of oilseed rape)





DEMO - FIELD LLC "TD Demetra"

Location:

v. Stepove, Dnipropetrovsk District,
Dnipropetrovsk Region.

Regional representative of EOORGANIC LLC

Yurii Ambroziak
tel. +38 (067) 463-24-11

Sowing date:

20.08.2017

Main fertilization:

Pre-planting cultivation - 200 kg of
nitroammophos, on the cryomorphic soil
- 300 kg/ha of ammonium nitrate; 160
kg/ha of ammonium sulphate - beginning
of budding.

Total main fertiliser, kg/ha of active ingredients:

N₁₆₇ P₃₂ K₃₂

Type of soil:

Typical black soil of the loamy
granulometric composition



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1
Budding (BBCH 52-54)	Without fertilisers for foliar application	ECOLINE Boron (Premium) 1,0 l/ha
Beginning of flowering (BBCH 60-64)		ECOLINE Phosphite (K) 1,0 l/ha
Pods development (BBCH 70-74)		ECOLINE Boron (Premium) 1,0 l/ha + ECOLINE Magnesium (Chelate) 1,0 l/ha

INTERMEDIATE RESULTS

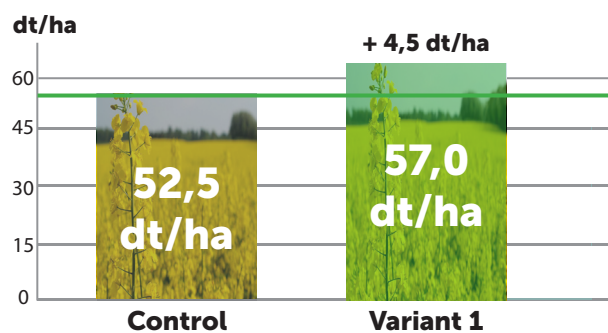
Indicator	Control	Variant 1	+/- to control
Intermediate check 02.05.2018			
Plant height, cm	112	125	+13
Average plant weight, g	625	680	+55
Average number of branches per plant, pc	8,3	12	+3,7

Indicator	Control	Variant 1	+/- to control
Intermediate check 02.05.2018			
Weight of plant, g/m ²	6020	7062	+1042
Weight of pods, g/m ²	598	668	+70
Average number of branches per plant, pc	8,3	12	+3,7

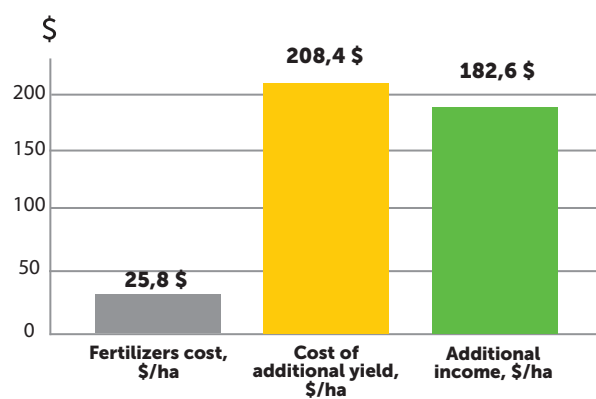


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated at cost of 463 USD per 1 ton of oilseed rape)





SUNFLOWER

Specifics of sunflower nutrition

During the growing season, sunflower absorbs the nutrients unevenly. At the beginning of growth, it does not need a lot of nutrients, but absorption of them is ahead of the growth rate of dry matter. During the first month of vegetation, sunflower absorbs out of total demand: 15% nitrogen, 10% phosphorus and 10% potassium. By the end of flowering, sunflower intensively absorbs 80% nitrogen, 70% phosphorus and only 50% potassium. The rest (40%) of potassium is absorbed by plants during the formation of seeds.

Potassium improves the process of photosynthesis and hydrocarbon metabolism in plants. Magnesium is involved in the exchange of nitrogen, phosphorus and protein synthesis. Due to its lack the yellowing between veins is observed, which begins with the tops and edges of the leaves. Old leaves are affected first and fade. Lack of magnesium in sunflower nutrition manifests itself on sandy and acid soils, as well as at high potassium content in the soil and at low temperatures. Magnesium fertilizers are applied into the soil with dose rate of 50-80 kg/ha of MgO, or as foliar nutrition.

Nutrition optimization with sulfur improves the absorption of nitrogen by plants, increases the oil content and increases the yield of sunflower. Due to its lack the young leaves get pale green or yellow color, spotted chlorosis appears. Lack of sulfur in the nutrition of sunflower appears on soils of light granulometric composition, with acid reaction of soil solution, poorly aerated, with low humus content.

Foliar nutrition

The nutrition of sunflower with trace elements helps to increase the yield and quality of the seeds. According to the Institute of Agriculture of the steppe zone NAAS, sunflower is a microelements demanding crop.

The lack of trace elements is crucial for phases of 2-3 pairs of leaves and budding (8-10 pairs of leaves). Lack of boron, zinc, manganese in the first period leads to yield decrease. Other important trace elements for sunflower are molybdenum, copper and iron.

Sunflower is very sensitive to the lack of boron, especially during drought and on carbonate soils. Boron provides germination of pollen and fertilization of flowers, its shortage leads to young leaves deformation due to the dying of tissues at their base, plants are lagging in growth, the heads are deformed, the seeds are uneven, the growth points die. Lack of boron in sunflower nutrition is manifested on sandy soils, with high nitrogen or calcium content, at low temperatures or drought. The critical content of boron in the soil is 0.5-3.0 mg / kg.

Manganese activates the enzymatic processes involved in nitrogen metabolism, the process of photosynthesis and the synthesis of proteins, which has a significant effect on yield. Lack of this element is manifested in the form of chlorotic spots on young leaves. In this case, old and very young leaves are not damaged.



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1
Pre-sowing seed treatment (BBCH 00)	Without seed treatment	GROS Root Growth 1,0 l/t
3-5 leaves (BBCH 13-15)	Without fertilisers for foliar application	ECOLINE Boron (Premium) 1,0 l/ha + ECOLINE Phosphite (K-Zn) 1,0 l/ha
6-9 leaves (BBCH 16-19)		ECOLINE Boron (Premium) 1,0 l/ha + GROS Quitcelium 1,0 l/ha

DEMO - FIELD LLC "ECOORGANIC" with "Dow Seeds" (BREVANT SEEDS)

Location:

Farm "Serdyukovsky", Smiliansky District, Cherkasy Region.

Agronomist:

Mykola Kucher
+38 (097) 823-01-06

Hybrid:

8H421CLDM

Previous crop:

corn

Soil treatment:

autumn - plowing, harrowing, spring
- cultivation

Sowing date:

26.04.2018

Main fertilizers:

spring 200 kg of urea, at sowing 70 kg of nitroammophos

Total main fertilisers, kg/ha of active ingredients:

$N_{103,6} P_{11} K_{11}$

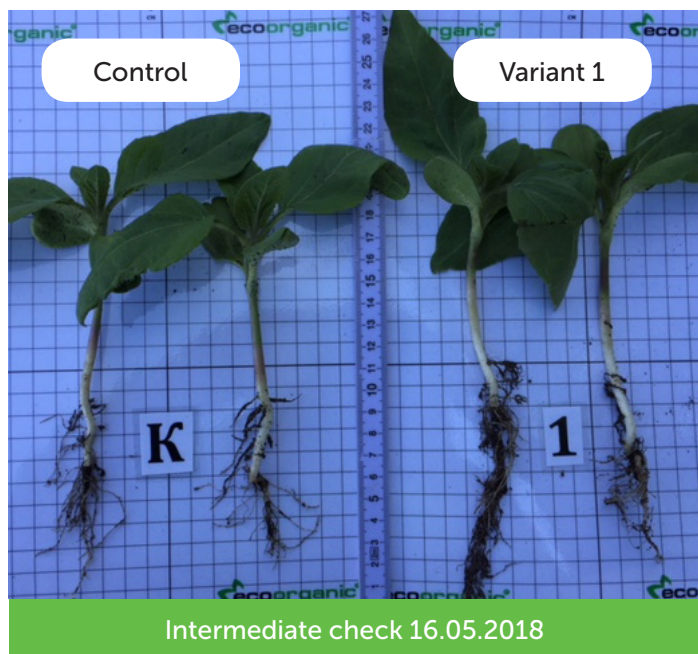
Type of soil:

black soil



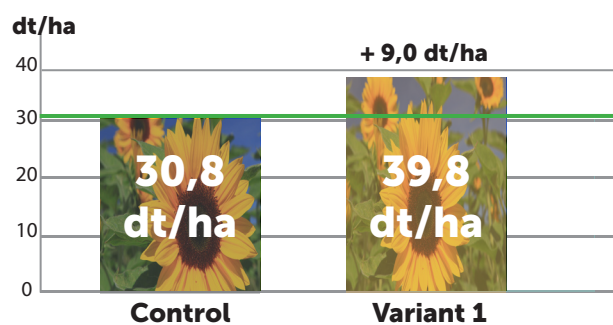
INTERMEDIATE RESULTS

Indicator	Control	Variant 1	+/- to control
Check results 16.05.2018			
Root weight, g	6	9	+3
Plant weight, g	18	33	+15
Plant height, cm	10	12	+2
Check results 11.06.2018			
Root weight, g	58	64	+6
Plant weight, g	455	650	+195
Plant height, cm	74	80	+6
Check results 18.08.2018			
Plant height, cm	130	149	+19
Leaves weight, g	178	217	+39
Stem weight, g	168	329	161
Head weight, g	310	575	+265
Head diameter, cm	16	21	+5
Thickness of stem near root, cm	2	2,4	+0,4
Weight of seeds, g	176	202	+26

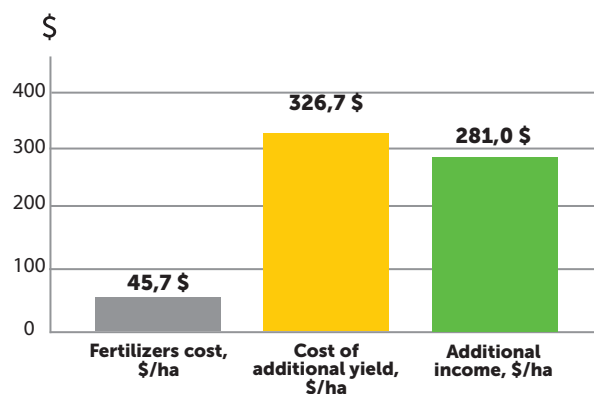


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated at cost of 363 USD per 1 ton of sunflower)





NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2	Variant 3
2-4 pairs of leaves (BBCH 16-18)	Without fertilizers for foliar application	ECOLINE Boron (Premium) 1,0 l/ha	ECOLINE Boron (Premium) 2,0 l/ha	ECOLINE Phosphite (K) 2,0 l/ha + ECOLINE Boron (Premium) 1,0 l/ha

DEMO - FIELD LLC "PIONEER NASINNIA UKRAINA"

Location:

farm "Mshanetske", Terebovlyansky District, Ternopil Region

Regional representative of LLC "Pioneer Ukraine":

Mykola Kostyuk
+38 (095)-282-73-76

Hybrid:

P63LL06 (Pioneer)

Previous crop:

winter wheat

Soil treatment:

autumn - stubble disking (5-8 cm), ploughing (30 cm), spring - cultivation (8-10 cm), combinator (4-5 cm)

Sowing date:

23.04.2018

Main fertilizers:

ammonia water - 500 l/ha +
diammophos $N_{10}P_{26}K_{26}$ - 300 kg/ha

Total main fertilizers, kg/ha of active ingredients:

$N_{130}P_{78}K_{78}$

Type of soil:

black soil



INTERMEDIATE RESULTS

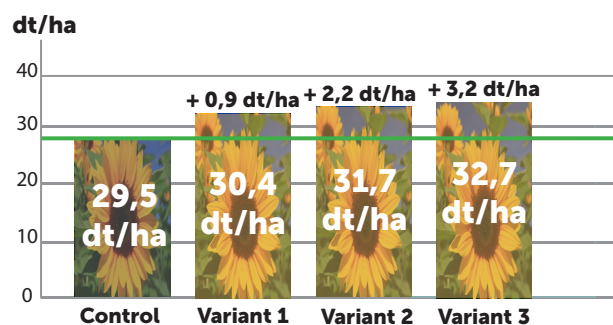
Indicator	Control	Variant 1	Variant 2	Variant 3
check results 05.06.2018				
Plant weight, g/m ²	173	200	258	270
Root weight, g/m ²	20	22	29	31
Plant height, cm (without roots)	20	23	27	33



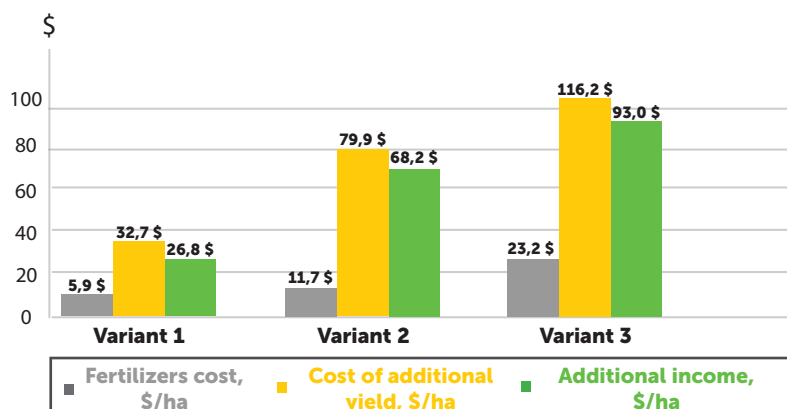


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha




The financial efficacy of application of fertilizers «ECOORGANIC» LLC. (calculated at cost of 363 USD per 1 ton of sunflower)





CORN



The crop is demanding for the conditions of mineral nutrition throughout the entire period of vegetation. Most of the nitrogen and potassium are absorbed mainly prior to the phase of tasseling, phosphorus is more actively absorbed in the period from seed germination to the formation of 4 to 6 leaves, and the second peak period is during the time of formation and ripening of the grain. For formation of 1 ton of grain and the corresponding mass of byproducts, different corn hybrids absorb from the soil and fertilizers on average 24-30 kg of nitrogen, 10-12 kg of phosphorus, 25-30 kg of potassium, 6-10 kg of magnesium and calcium, 3- 4 kg of sulfur, 11 g of boron, 14 g of copper, 110 g of manganese, 0.9 g of molybdenum, 85 g of zinc and 200 g of iron. The root system of corn plants has high ability to absorb elements from the soil and effectively uses the residues of nutrients from fertilizers that were applied for the previous crop. According to scientific data, corn plants on black soils are able to provide themselves with nitrogen for 78% of their need, and phosphorus and potassium, respectively 8 and 26%.

Achieving corn yield potential depends significantly on the soil and climatic conditions, but it is equally important in modern cultivation technologies to have a balanced plant nutrition system, which includes pre-planting seed treatment with trace elements, application of the main fertilizer before sowing and foliar fertilization.

Pre-sowing seed treatment


The purpose of pre-sowing seed treatment is to create comfortable conditions for young plants in the period from germination till they start feeding from their own root system, which provides a quick and powerful start of plant growth. Pre-sowing treatment of seeds with fertilizers not only increases the yield and quality of the products obtained, but also ensures the resistance of plants to the complex of diseases, adverse environmental conditions (low or high temperatures), accelerates the growth and development of plants, promotes more productive use of moisture. Often pre-sowing seed treatment with trace elements gives a better effect than soil fertilization, even at higher dose rates.

Foliar nutrition

In modern cultivation technologies, application of complex foliar fertilizers with trace elements in chelate form, as well as with other active substances like amino acids and phytohormones, is a rather effective method. The main objective is to improve plants nutrition and support them in the most critical periods of growth and development, to reduce the negative impact of environmental conditions (weather conditions, chemical treatments), increase the intensity of the formation of individual plant organs, the impact on nutrient outflow and the improvement of product quality. The phases of three - five and six - eight leaves are considered the most critical in terms of macro- and trace elements availability.

The phase of three - five true leaves is important because at this time, corn forms generative organs that determine the future yield. The number of cobs on the plant and the seeds in them depend on presence of nutrition elements, especially phosphorus. Young corn plants grow slowly, their root system is not well developed and can not absorb nutrients from hard-to-reach compounds, so it is important to provide corn plants not only with phosphorus but also with manganese (Mn), zinc (Zn) and boron (B).

In the phase of six - eight leaves the rapid growth of the vegetative mass begins and, accordingly, the need for nutrition elements grows. Often corn plants are subjected to herbicide stress, and therefore during this period it is recommended to use compositions containing phosphites, amino acids, phytohormones.





NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2	Variant 3	Variant 4
3-5 leaves (BBCH 13-15)	Without fertilizers for foliar application	ECOLINE Zinc (Chelate) 1,0 l/ha	ECOLINE Zinc (Chelate) 1,0 l/ha + GROS Root Growth 1,0 l/ha	ECOLINE Zinc (Chelate) 2,0 l/ha	ECOLINE Zinc (Chelate) 2,0 l/ha + GROS Root Growth 1,0 l/ha

DEMO - FIELD LLC "PIONEER NASINNIA UKRAINA"

Location:

farm "Mshanetske", Terebovlyansky District, Ternopil Region

Regional representative of LLC "Pioneer Nasinnia Ukraina":

Mykola Kostiuk
+38 (095)-282-73-76

Hybrid:

P8567 (FAO 290) (Pioneer)

Previous crop:

Winter wheat

Soil treatment:

autumn - discarding stubble (5-8 cm),
plowing (30 cm), spring – cultivation
(8-10 cm), combinator (4-5 cm)

Sowing date:

23.04.2018

The main fertilizer:

ammonia water - 500 l / ha + complex
nitrogen-phosphorus-potassium
fertilizer N₁₀P₂₆K₂₆ - 300 kg / hectare.

Total main fertilizer, kg/ha in a.i.:

N₁₃₀P₇₈K₇₈

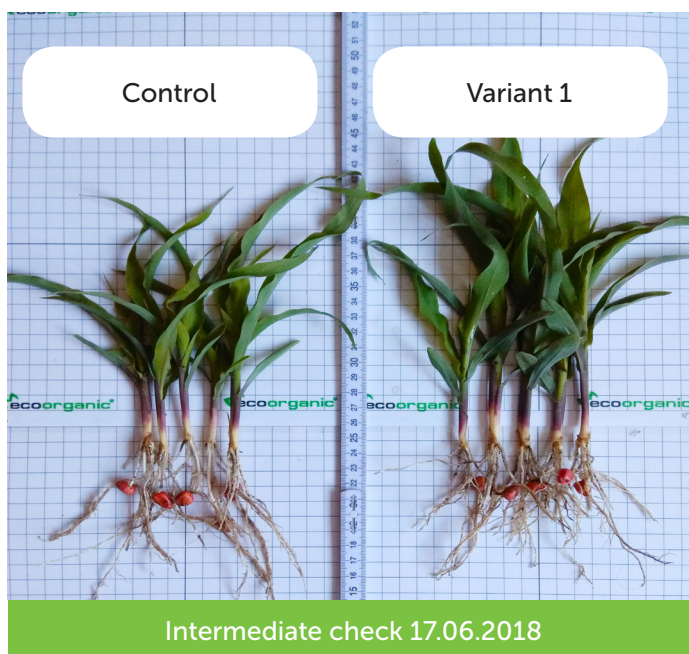
Type of soil:

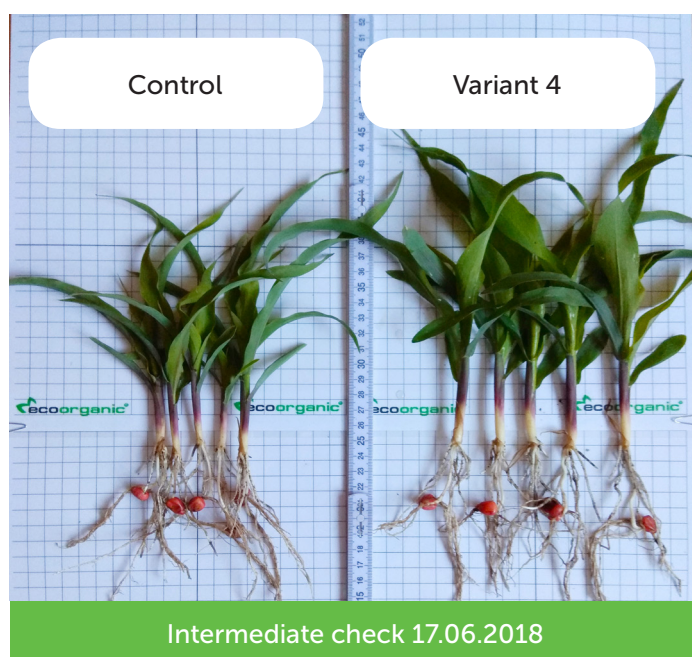
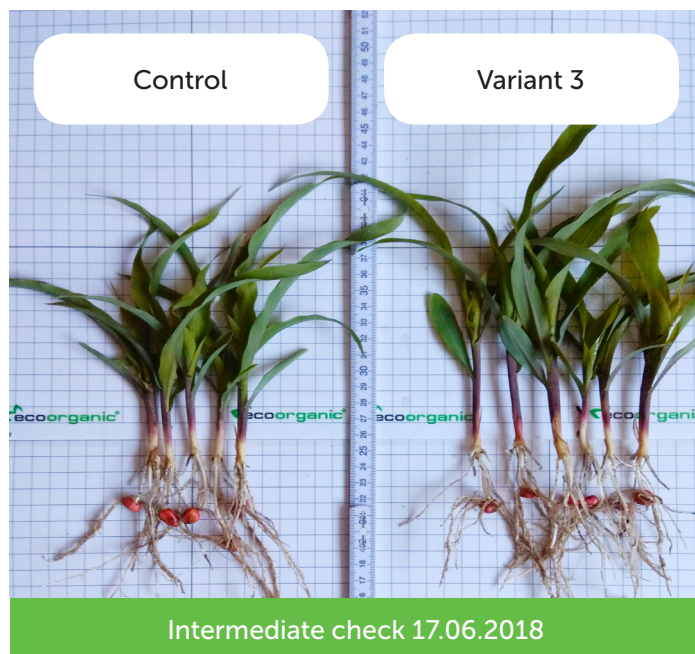
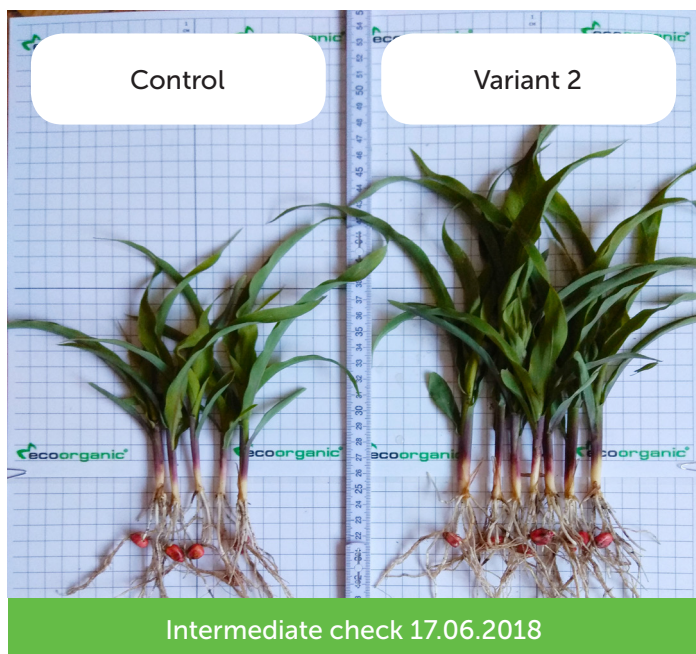
Black soil



INTERMEDIATE RESULTS

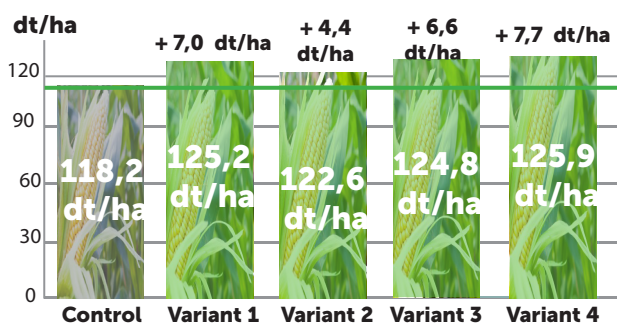
Indicator	Control	Variant 1	Variant 2	Variant 3	Variant 4
17.06.2018					
Weight of plant, g/m ²	17	26	39	23	29
Weight of root, g/m ²	7	10	14	11	10
Plant height, cm (without root)	20	27	28	25	26



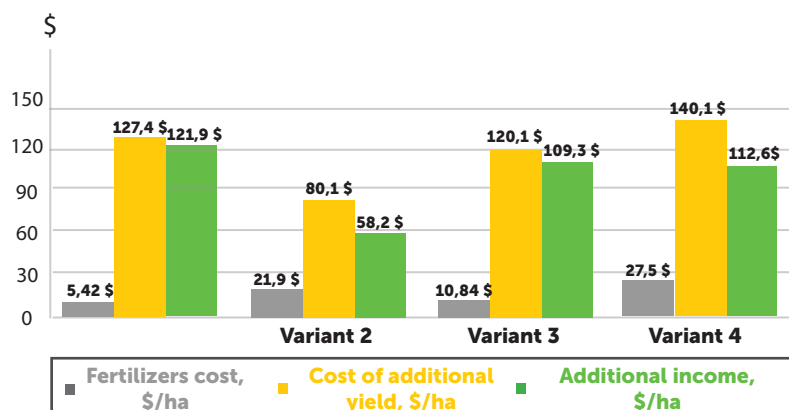


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



**The financial efficacy of application of fertilizers «ECOORGANIC» LLC.
(calculated from the price of \$ 182 per 1 ton of corn)**





NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2	Variant 3	Variant 4
3-5 leafs (BBCH 13-15) Date 30.05.18	Without fertilizers for foliar application	ECOLINE Zinc (Chelate) 1,0 l/ha	ECOLINE Zinc (Chelate) 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha	ECOLINE Zinc (Chelate) 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha + ECOLINE Universal Growth (Amino) 1,0 l/ha	ECOLINE Zinc (Chelate) 1,0 l/ha + ECOLINE Phosphite (K) 1,0 l/ha + ECOLINE Universal Growth (Amino) 1,0 l/ha
6-9 leafs (BBCH 16-19) Date 16.06.18	Without fertilizers for foliar application	ECOLINE Corn (Chelates) 1,0 l/ha	ECOLINE Corn (Chelates) 1,0 l/ha	ECOLINE Corn (Chelates) 1,0 l/ha + GROS Phosphito-NP 1,0 l/ha + ECOLINE Boron (Premium) 1,0 l/ha	ECOLINE Corn (Chelates) 1,0 l/ha + GROS Phosphito-NP 1,0 l/ha + ECOLINE Boron (Premium) 1,0 l/ha

DEMO - FIELD LLC «PC TECHNOLOG»

Location:

Kropyvnytskyi city

Agronomist:

Oleksandr Bilichenko
+38 (066) 114 79 16

Hybrid:

ES Metod

Previous crop:

Corn

Soil treatment:

Autumn - plowing, harrowing, spring – cultivation

Sowing date:

15.04.2018

The main fertilizer:

In the autumn 100 kg of complex nitrogen-phosphorus-potassium fertilizer 9:19:29 + 3S, + under pre-sowing cultivation 100 kg of complex n-p-p fertilizer 9: 19: 29 + 3S, 200 kg of urea, 100 liters KAS

Total main fertilizer, kg / ha in a.i.:
N142P38K28S6

Type of soil:

Black soil



INTERMEDIATE RESULTS

Indicator	Control	Variant 1	Variant 2	Variant 3	Variant 4
16.07.2018					
Height of one plant, cm	204	244	243	247	233
Weight of leaves from one plant, g	104	139	148	160	165
Weight of stem from one plant, g	339	424	403	416	430
Weight of plant, g	776	956	977	1012	924
Cob weight, g	333	396	426	436	429



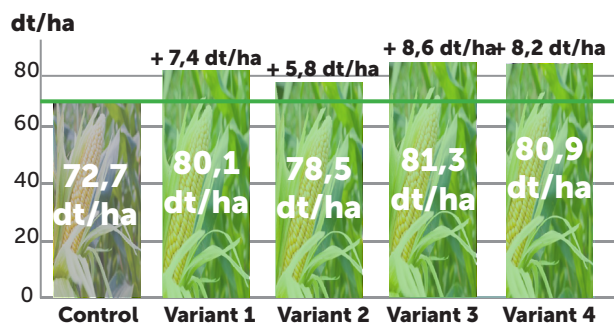
Intermediate check 16.07.2018



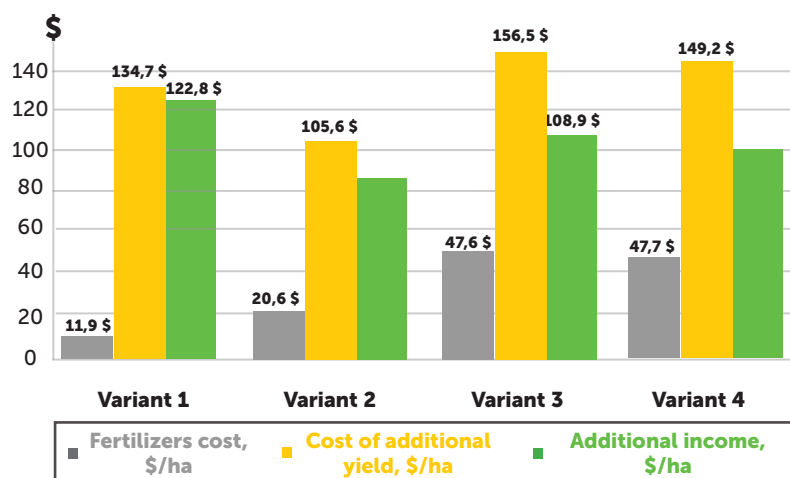
Intermediate check 16.07.2018

RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha




**The financial efficacy of application of fertilizers «ECOORGANIC» LLC.
(calculated from the price of \$ 182 per 1 ton of corn)**








LEGUMINOUS CROPS



The following leguminous crops are grown in Ukraine: soybeans, peas, chickpea, lentils, various kinds of lupins, fodder beans and beans, perennial grasses, mainly clover and alfalfa. The special value of leguminous in crop rotation is their ability to fix nitrogen from soil and air in symbiosis with nitrogen fixing bacteria. A part of this nitrogen is used by the crop and the other part is left for the following crop. In this regard, the scientific recommendations of local and foreign research institutions emphasize the minimization, or the complete exclusion of nitrogen fertilizers from nutrition systems of these crops. As for other elements of mineral nutrition, legumes respond positively to the optimization of nutrition with phosphorus, potassium, magnesium, sulfur, boron, molybdenum and zinc. The best form of boron is a complex with monoethanolamine. For good assimilation of molybdenum by plants it is better to use organo-mineral fertilizers in the form of phosphorus-molybdenum complex, and zinc in the form of chelate.

The critical period of molybdenum nutrition is the beginning of the formation of colonies of nodule bacteria on the roots, that is the beginning of the process of nitrogen fixation. The need for boron nutrition starts from the appearance of the first buds to the beginning of ripening. Zinc is needed for plants practically throughout the entire period of vegetation.



NUTRITION PROGRAM FROM "ECOORGANIC"



DEMO - FIELD LLC "AGROLAN"

Location:

village Krupets, Radyvyliv District,
Rivne region

Contact person:

Oleksandr Myronchuk
tel. + 38 (067) 363-48-03

Previous crop:

Sunflower

Soil treatment:

autumn - discarding stubble (5-8 cm),
plowing (30 cm), spring – cultivation
(8-10 cm), combinator (4-5 cm)

Sowing date:

26.04.2018

Main fertiliser:

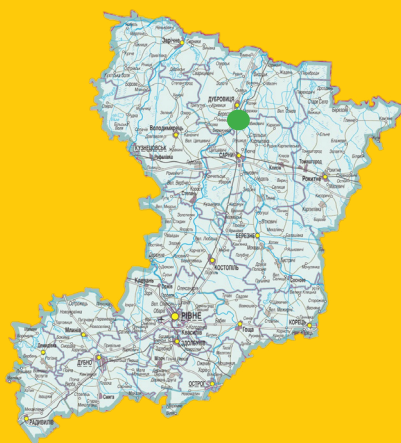
Spring: 200 kg of complex nitrogen-
phosphorus-potassium fertilizer
7-19-29

Total main fertilizer, kg / ha in ai:

N₁₄P₃₈K₅₈

Type of soil:

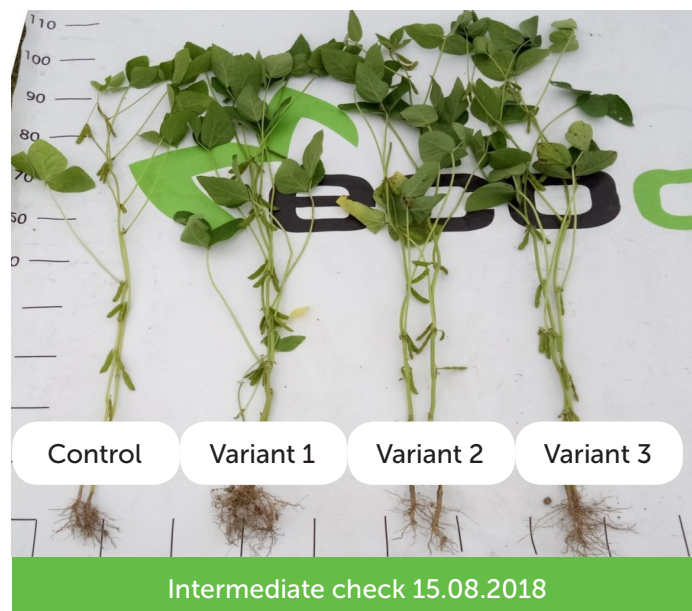
Dense carbonates



Phase of growth	Control	Variant 1	Variant 2	Variant 3
2 - 4 pairs of leaves (BBCH 16-18)	Without fertilizers for foliar application	ECOLINE Molybdenum (Complex) 1,0 l/ha	ECOLINE Molybdenum (Complex) 1,0 l/ha	ECOLINE Molybdenum (Complex) 1,0 l/ha + GROS Root Growth 1,0 l/ha
Budding (BBCH 51-61)		ECOLINE Boron (Organic) 1,0 l/ha	ECOLINE Boron (Organic) 1,0 l/ha + ECOLINE Zinc (Chelate) 1,0 l/ha	ECOLINE Boron (Premium) 1,0 l/ha + ECOLINE Zinc (Chelate) 1,0 l/ha + GROS Quitcelium 1,5 l/ha
Beginning of bean formation (BBCH 69-75)		-	ECOLINE Bean (Chelates) 1,5 l/ha	ECOLINE Bean (Chelates) 1,5 l/ha + ECOLINE Phosphite (K) 2,0 l/ha

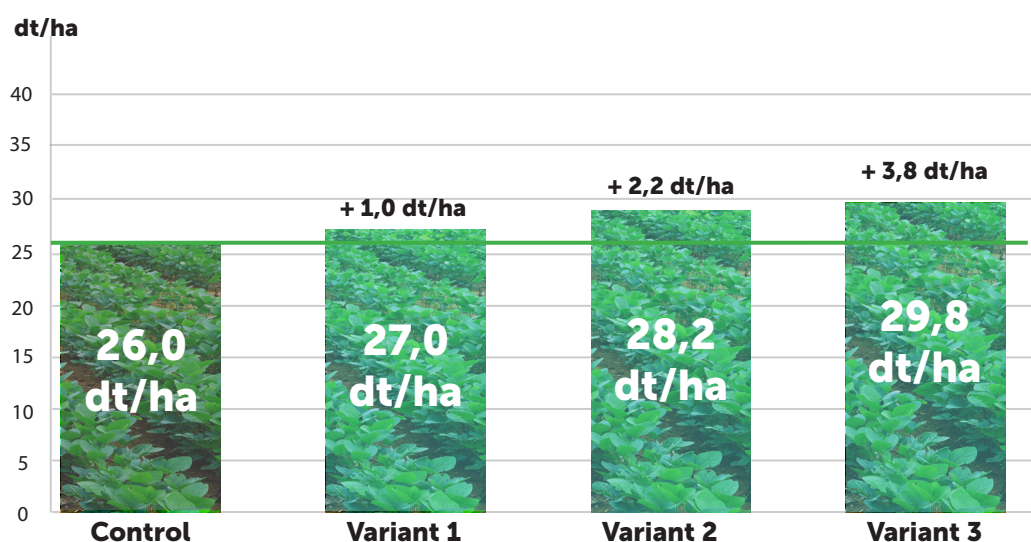
INTERMEDIATE RESULTS

Indicator	Control	Variant 1	Variant 2	Variant 3
15.08.2018				
Plant height, cm	99	103	109	110
Number of beans per 1 plant	9	16,5	14,5	17
Weight of beans, g	5	10,5	8	18

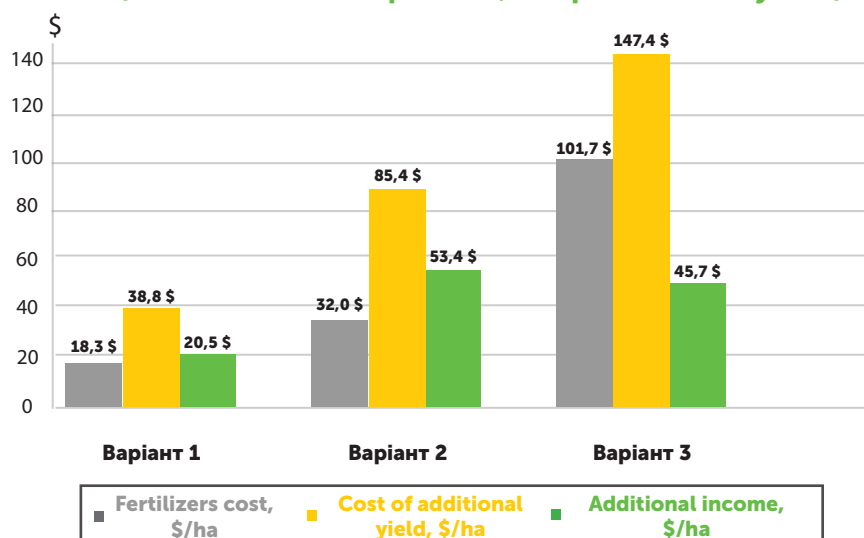


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



**The financial efficacy of application of fertilizers «ECOORGANIC» LLC.
(calculated from the price of \$ 388 per 1 ton of soybean)**







POTATO

Potatoes are an important food crop and raw material for processing. The size and quality of the crop is largely dependent on the condition of mineral nutrition during the growing season. It reacts well to the main fertilization with organic fertilizers. It require 90-120 kg / ha of nitrogen, 60-90 kg / ha of phosphorus and 120-150 kg of potassium for crop formation. Excess nitrogen nutrition leads to accumulation of nitric nitrogen in the crop and darkening of the tubers in the process of cooking. Phosphorus has an effect on the quality of starch grains, potassium - on the synthesis of the main spare substance - starch. Potatoes are sensitive to chlorine in fertilizers - therefore, the best forms of fertilizers for potatoes are those that do not contain chlorine, and potassium chloride must be applied during the main fertilization in autumn. Potato plants react positively to application of magnesium, zinc, manganese, boron.



NUTRITION PROGRAM FROM "ECOORGANIC"

Phase of growth	Control	Variant 1	Variant 2
Treatment of the planting material (BBCH 00)	Without fertilizers for foliar application	GROS Root Growth 1,0 l/t	GROS Root Growth 1,5 l/t
Rosette stage (4 - 6 leaves) (BBCH 13-15)		-	GROS Root Growth 2,0 l/ha
Stem development (BBCH 21-39)		ECOLINE Phosphite (K) 1,5 l/ha	GROS Phosphito-NP 2,0 l/ha + ECOLINE Boron (Premium) 1,0 l/ha
Budding (BBCH 51-59)		GROS Health 1,0 l/ha+ ECOLINE Calcium-Boron (Chelate) 1,0 l/ha	GROS Health 1,0 l/ha + ECOLINE Calcium-Boron (Chelate) 2,0 l/ha 2 times with interval 2 weeks
Tuber initiation (BBCH 70-73)		GROS Health 1,0 l/ha+ ECOLINE Calcium-Boron (Chelate) 1,0 l/ha	GROS Health 1,0 l/ha + ECOLINE Calcium-Boron (Chelate) 2,0 l/ha
Tuber bulking (BBCH 75-79)		ECOLINE Calcium-Boron (Chelate) 1,0 l/ha	ECOLINE Calcium-Boron (Chelate) 2,0 l/ha + ECOLINE Magnesium (Chelates) 2,0 l/ha + ECOLINE Phosphite (K) 2,0 l/ha

DEMO - FIELD LLC "Biotech LTD"

Location:

LLC "Biotech LTD", vil. Gorodyshe, Boryspilsky District, Kyiv Region.

Responsible agronomist:

Sergei Zhereb
+38 (067) 249 - 15 - 06

Previous crop:

winter wheat

Soil treatment:

surface treatment

Sowing date:

26.04.2018

Potato variety:

Carrera

Main fertilizer:

N₁₅₀P₉₂K₂₀₀

Type of soil:

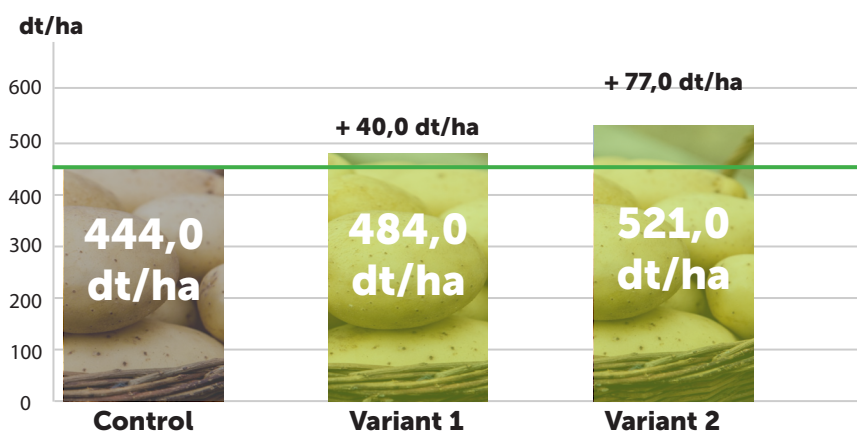
dark gray podzolized on the loess of the light-loamy granulometric composition, with a slightly acidic reaction (pH 5.2), low content of mineral nitrogen (13.4 mg/kg), high content of phosphorus and potassium - 168 and 174 mg/kg respectively.



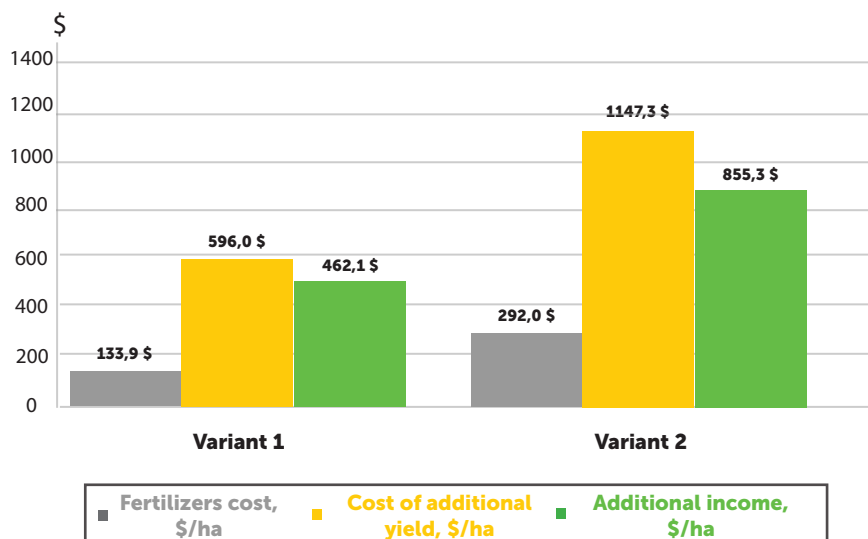


RESULTS

Productivity and yield growth due to application of nutrition from ECOORGANIC LLC, dt/ha



**The financial efficacy of application of fertilizers «ECOORGANIC» LLC.
(calculated from the price of \$ 149 per 1 ton of potato)**





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