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"EFFECT OF NITROGEN FERTILIZER RATE ON MUTANT LINES YIELD AND SOIL FERTILITY"

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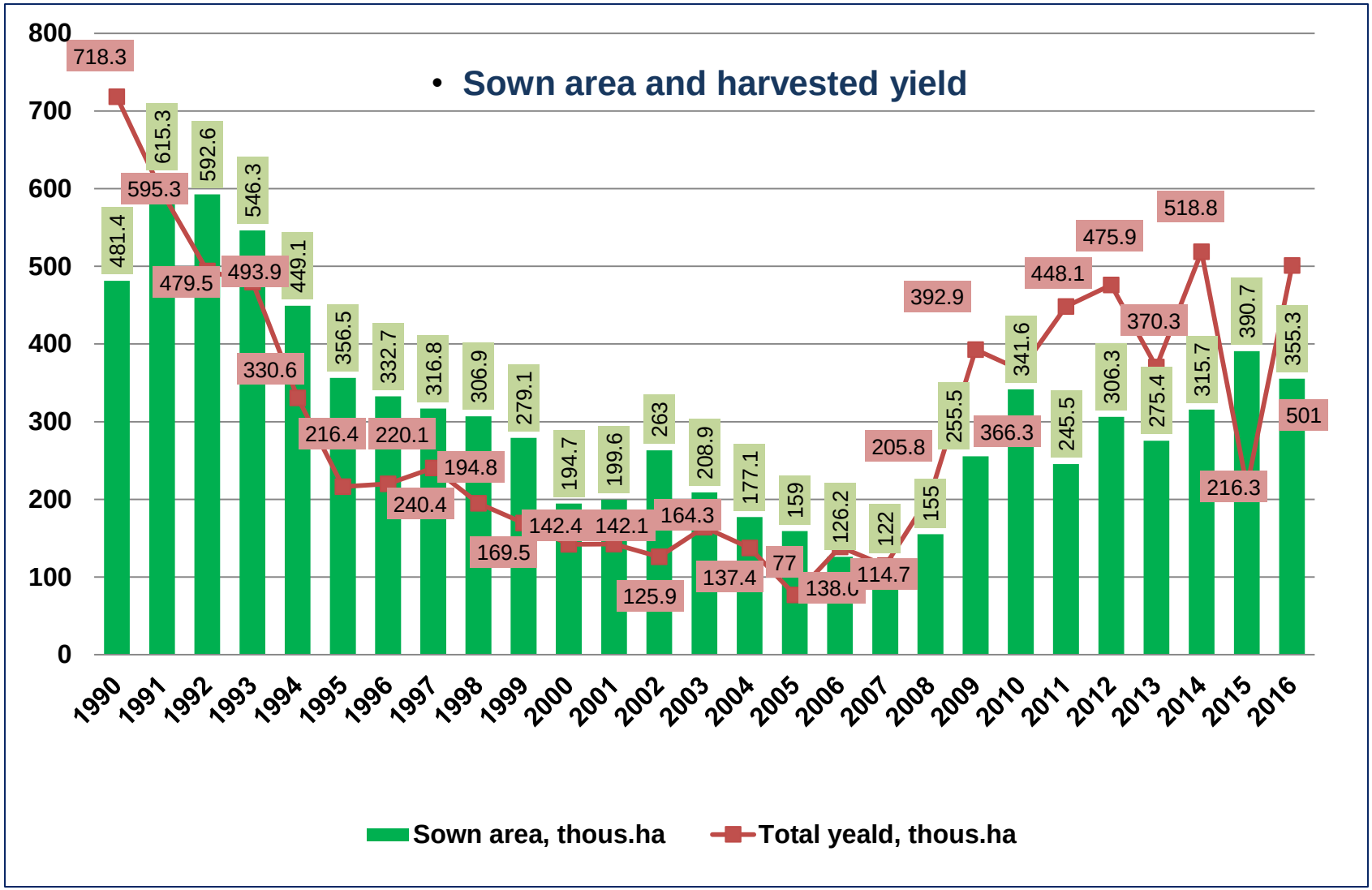
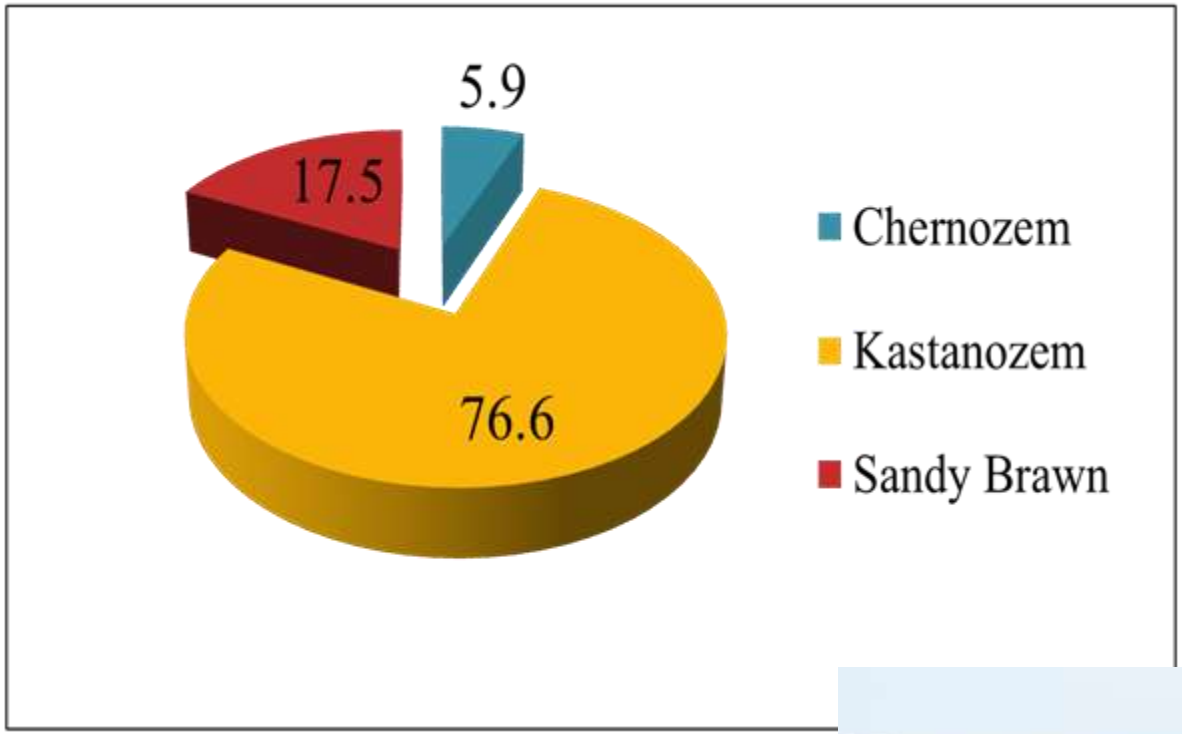
CULTIVABLE LAND

- The total cultivable area in Mongolia was estimated 1.7 million ha, which is about 1.1 % of the total area.
- Historically gains in agricultural production of Mongolia have come through expansion of area cultivated.

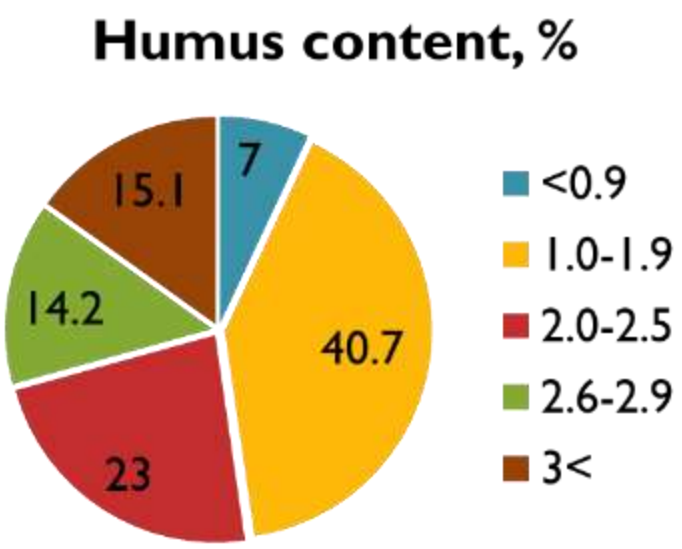
Cereal Crop Sown area (thous. ha), Harvested yield (thous. t)

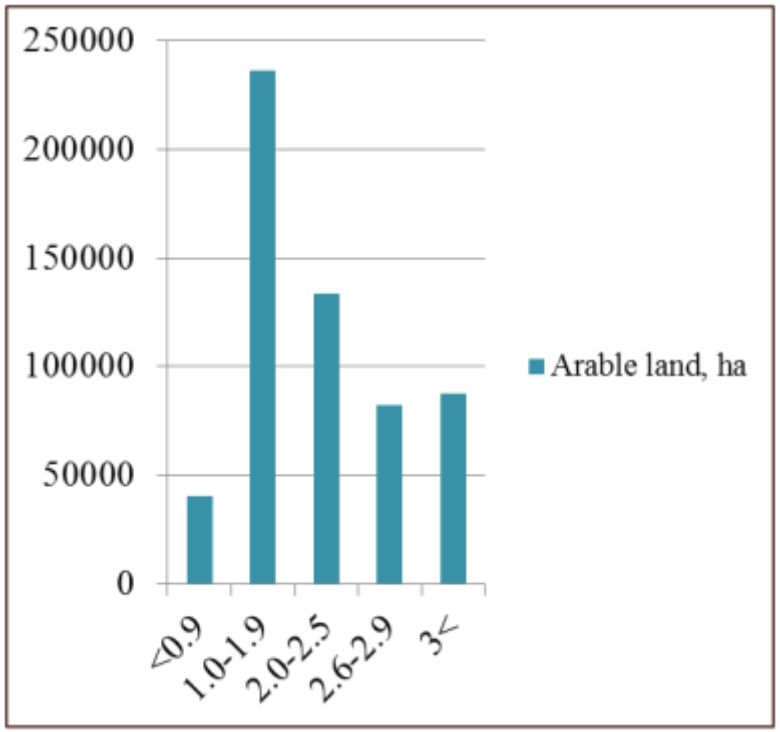


THE MAJOR SOIL TYPE OF CROPLAND, %

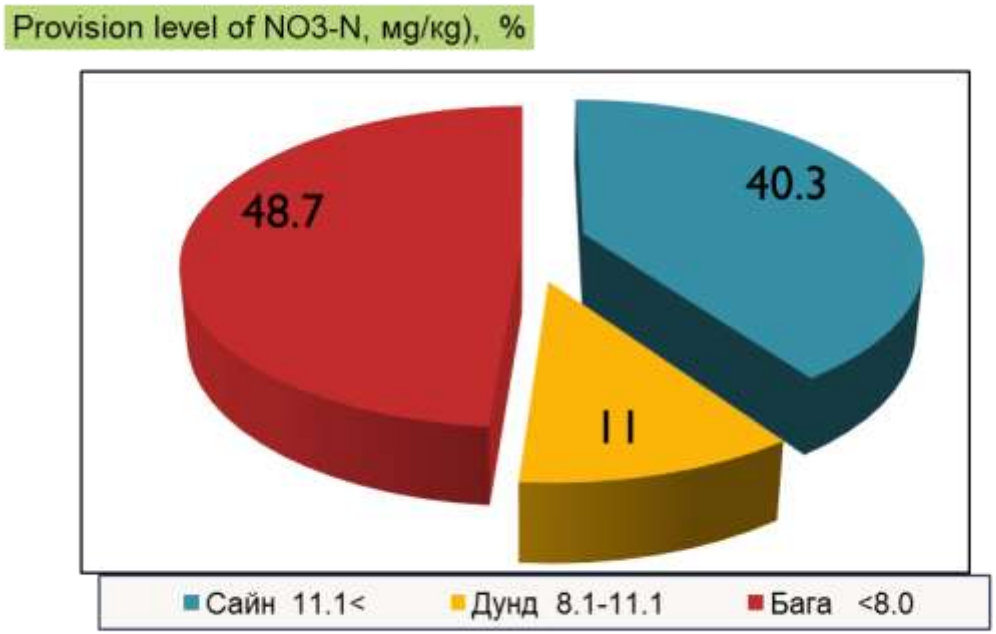


Soil Humus content of cropland, %

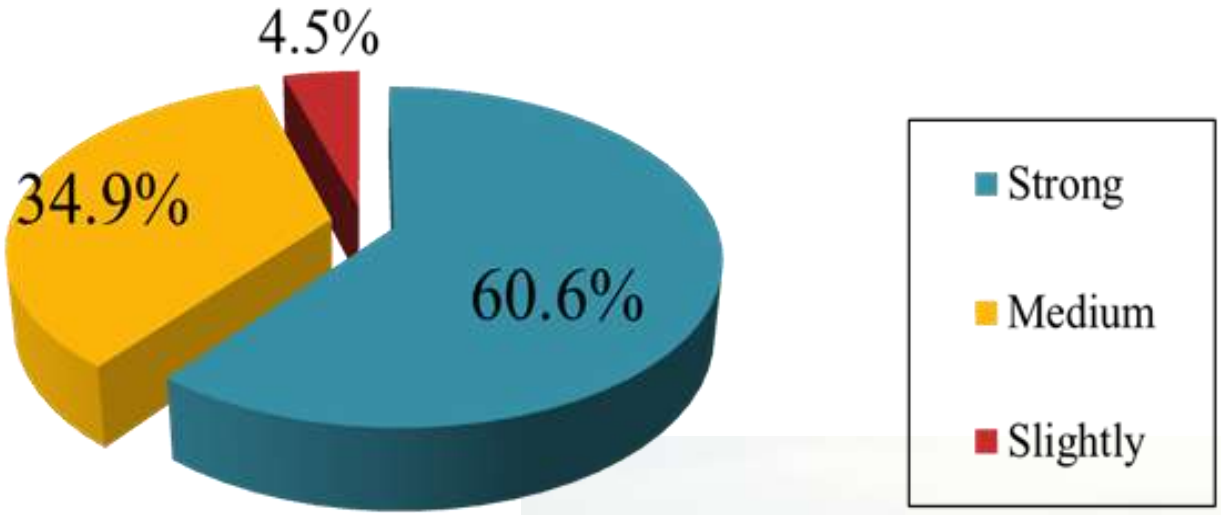




SOIL PROVISION LEVEL OF AVAILABLE NITROGEN (NO_3-N)



Cropland Erosion level, %



Эх сурвалж: Патрик Иллигер, 2016

OBJECTIVE OF THE FIELD EXPERIMENT, 2016

To find out the appropriate nitrogen fertilizer rate at sowing for rapeseed mutant lines. The goals were:

- To determine the effect of N fertilizer on soil nutrient content;
- To find out the effect of N fertilizer rate on rapeseed lines yield;
- To ascertain the effect of N application on the quality of the tested lines

Materials

1. Rapeseed lines (Doma and Westar)
2. Chemical fertilizer (Ammonium Nitrate -34%)
3. 5 % ^{15}N atom excess fertilizer (NH_4NO_3)

Methods

Experimental Design:

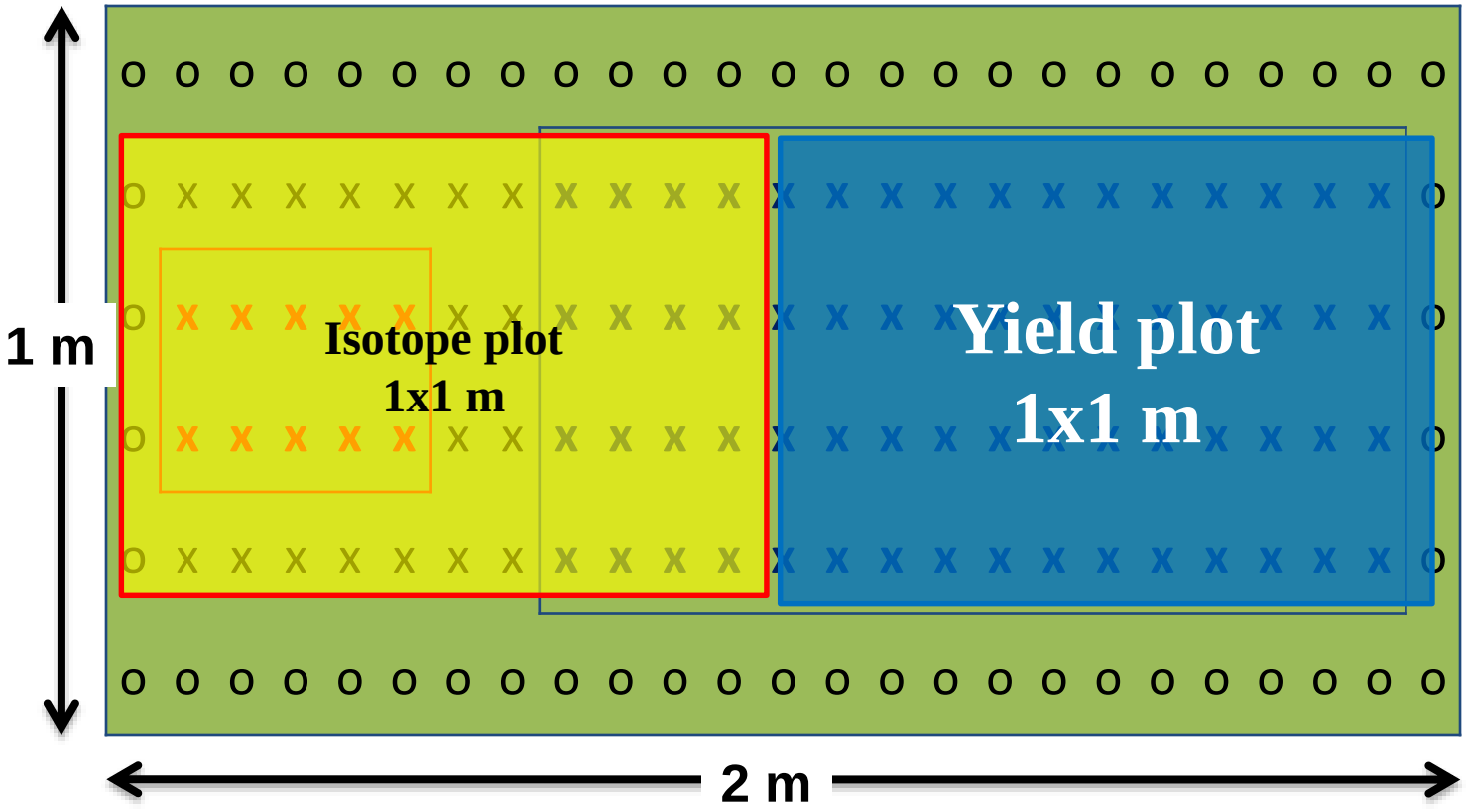
4 Treatments and 3 replications

T1: Control (without fertilizer)
T2: 20 kg N/ha
T3: 40 kg N/ha
T4: 60 kg N/ha

The fertilizer was applied at the time of sowing

Methods (cont.)

plantation



5% ^{15}N atom excess fertilizer

Soil Chemical and Physical Properties

Soil properties	units	Method
Soil Humus	(%)	wet combustion (Turin, 1964)
pH (soil:water)	1:5	pH meter
NO_3-N	mg/kg	By using phenol, ending SPM
P_2O_5	mg/100g	1% Ca(HCO3) (2Machigin, 1969)
K_2O	mg/100g	By using Flamephotometer
Soil moisture	mm	Gravimetric method

THE WEATHER CONDITION, 2016

Parameters	Months	Indicate of overall average years	Indicate in 2016
Average temperature, ^{0}C	V	9.7	11.5
	VI	16.7	18.3
	VII	18.7	21.7
	VIII	16.2	17.9
	IX	9.4	12.7
	V-IX	13.9	16.4
Precipitation, mm	V	20	13.8
	VI	50	98.6
	VII	77	50.5
	VIII	57	58.2
	IX	31	32.8
	V-IX	236	253.9

Plant growing season of this year was slightly warmer (2.5^{0}C) and abundant in precipitation (17.9 mm), than overall average years.

RESULTS, 2016

AGROCHEMICAL CHARACTERISTICS OF THE SOIL AT THE EXPERIMENTAL SITE (2016)

Soil Type	Depht, cm	Humus, %	Available Nutrients			pH
			NO3-N, mg/kg	P205, mg/100g	K20, mg/100g	
Chestnut Soil (Light clay)	0-20	2.18	5.70	1.7	12.0	7.49
	20-40	1.71	3.80	1.3	6.4	7.64

The soil of experiment site has low organic matter content (humus -1.94% in 40 cm depth of soil) and low provision level of nitrogen and phosphorus for cereal crops and medium of potassium.

RESULTS, 2016

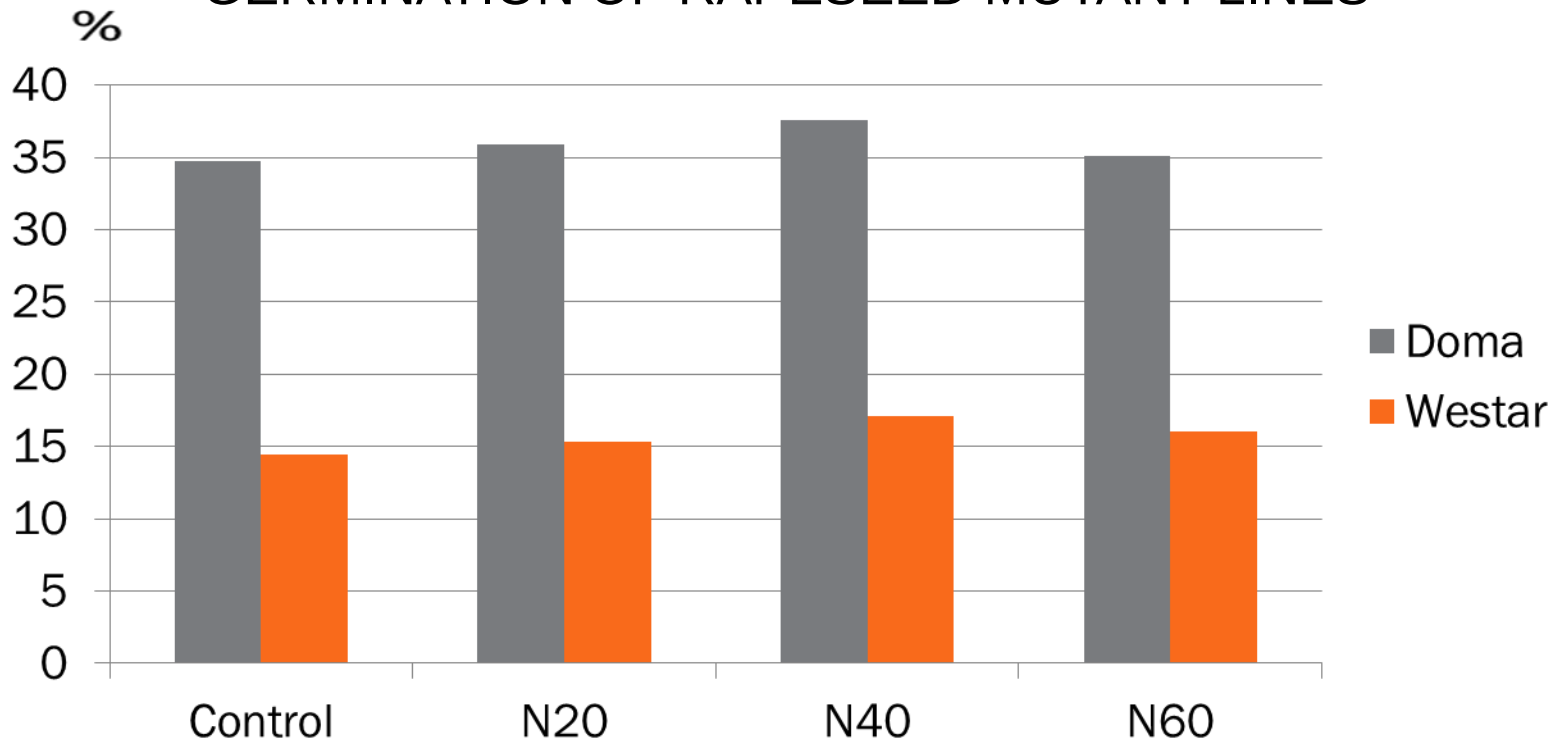
SOIL MOISTURE CONTENT OF FIELD SITE, 2016

(BEFORE PLANTING)

Soil Type	Depht, cm	Soil bulk density, g/cm3	Soil moisture	
			%	mm
Chestnut Soil (Light clay)	0-10	1.22	9.9	12.1
	10-20	1.23	12.1	14.9
	20-30	1.25	12.4	15.5
	30-40	1.28	11.3	14.4
	40-50	1.28	10.9	13.9
Sum	0-50	1.25	56.6	70.8

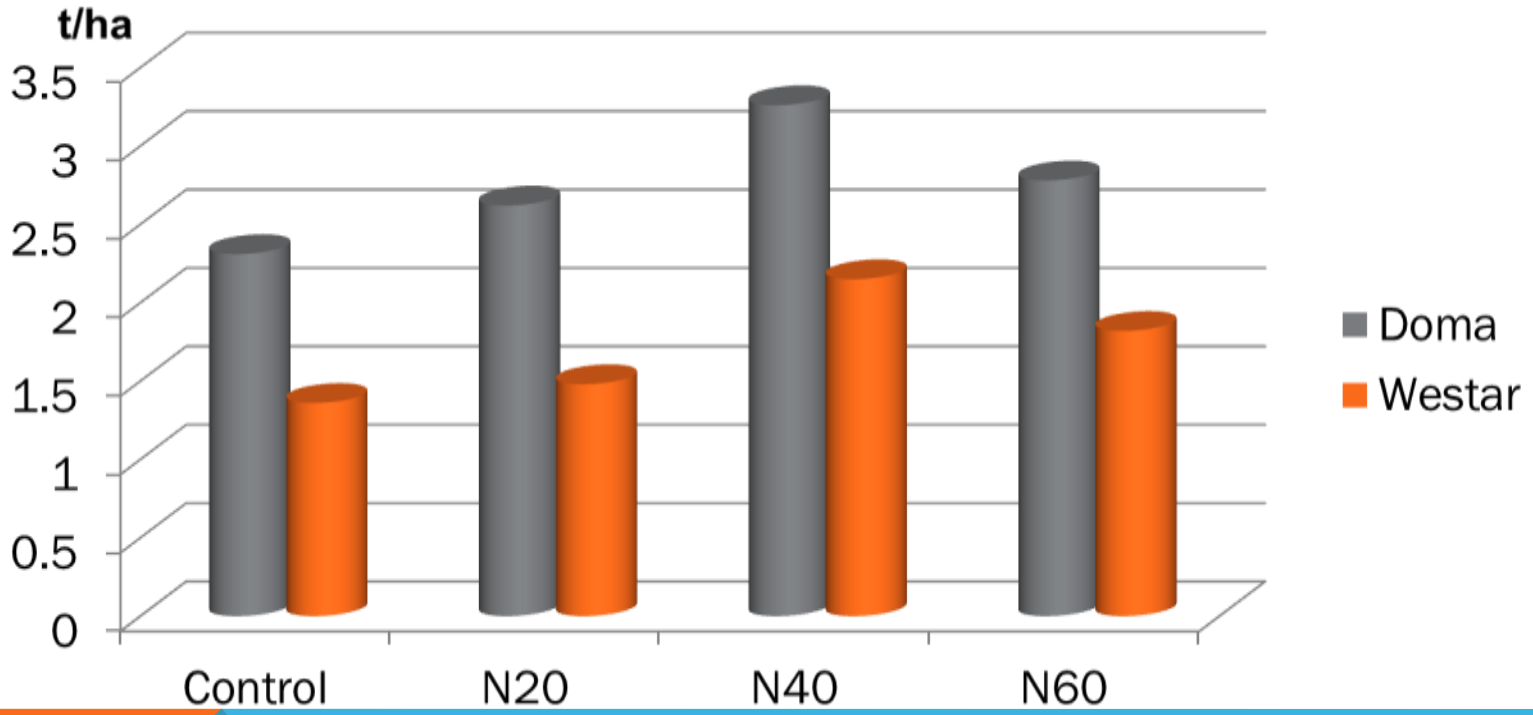
RESULTS, 2016

EFFECT OF NITROGEN FERTILIZATION RATE ON GERMINATION OF RAPESEED MUTANT LINES



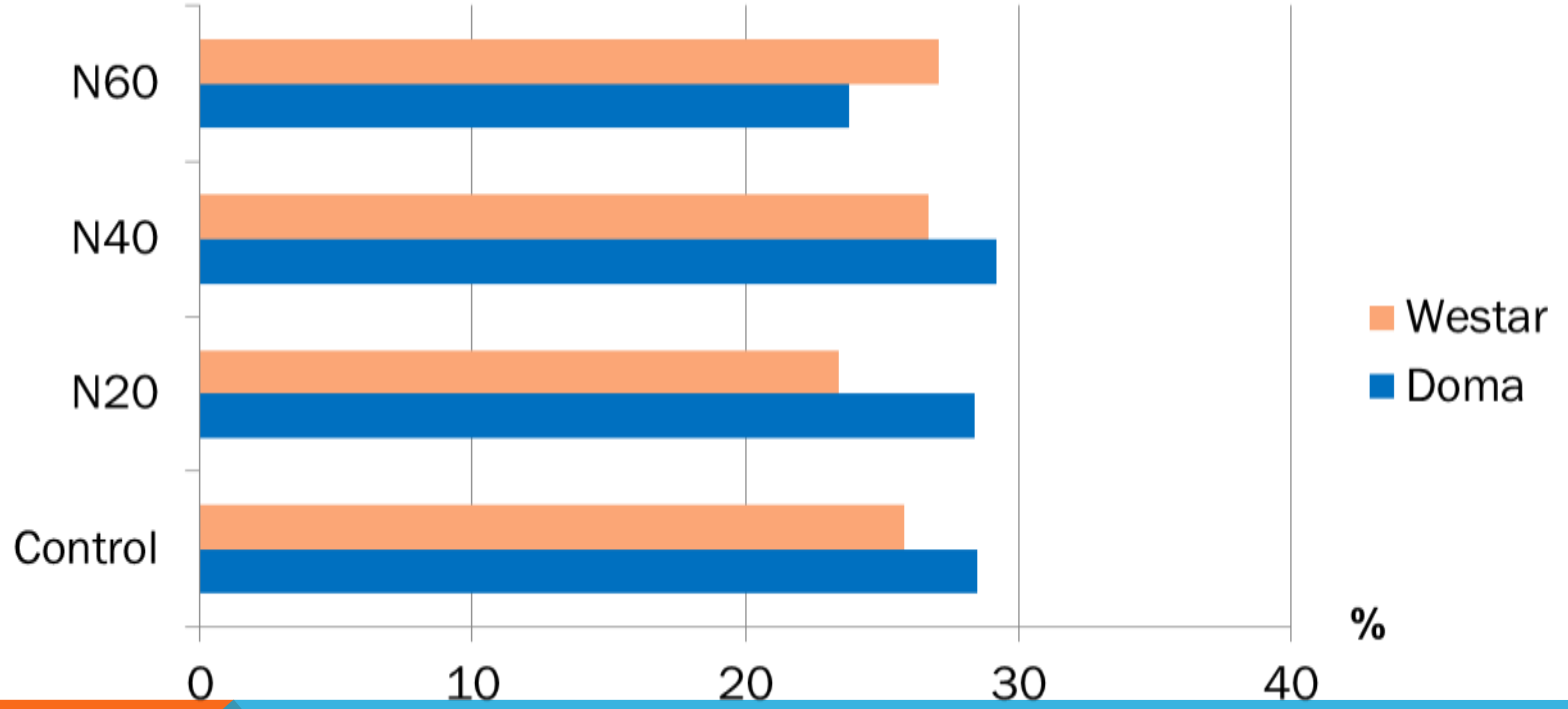
RESULTS, 2016

EFFECT OF NITROGEN FERTILIZER RATES ON GRAIN YIELD OF RAPESEED MUTANT LINES



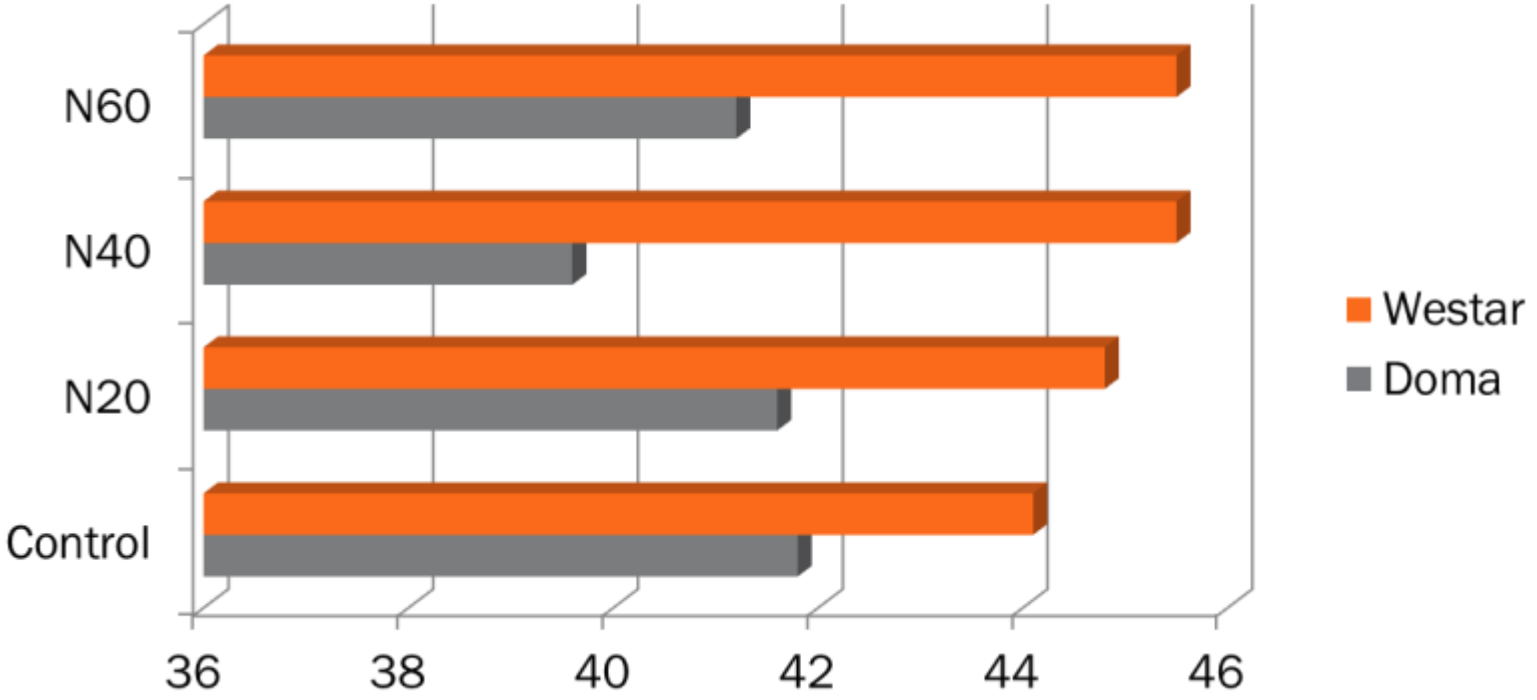
RESULTS, 2016

EFFECT OF NITROGEN ON GRAIN PROTIEN CONTENT, %



RESULTS, 2016

EFFECT OF N FERTILIZER RATES ON GRAIN OIL CONTENT, %



CONCLUSION

Nitrogen application with 40 N kg/ha, during the seeding time resulted in the highest rapeseed yield and increased grain quality for both mutant lines under agro ecological conditions of Mongolia.

FIELD EXPERIMENT IN 2017

OBJECTIVE:

Field experiment is proposed that to estimate the effects of different mineral fertilizers on soil fertility and yield of rapeseed mutant lines.

TREATMENTS (2017)

1. Control (without fertilizer),
2. N_{40}
3. $N_{40}P_{16}$
4. $N_{40}P_{16}K_{10}$

For the experiment the unlabeled ammonium nitrate (N-34%), superphosphate (P2O5-46%), and potassium chloride (K_2O-60%) fertilizer were used as a source of nitrogen, phosphorus and potassium, respectively.

WORK PLAN IN 2017

The parameters which should will be observed during the study:

1. Before planting soil samples were taken from 0-20 and 20-40 depths, they were analyzed for soil nutrients.
2. Soil sampling from each 10 cm depth up to 50 cm to determine a soil moisture content by gravimetric method. Soil bulk density will be determined.
3. Humus content in soil will determined by Turing, nitrate nitrogen by using spectrophotometer, available potassium and phosphorus were extracted by 1% carbohydrate ammonium and by using spectrophotometer and flame photometer, the pH (1:5 soil : water) extract was determined using a pH meter.

WORK PLAN IN 2017

4. Emergency count. In the 20 days after planting the central 2 rows from each plot will selected to count emergency, their emergency will counted and means will be taken.
5. Grain protein contents will be determined by Kjeldali method. And grain oil content - by Socks let method.
6. At physiological maturity the plant samples will be taken from $1m^2$ of all yield plots and tied into bundles. Biological yields will recorde by weighing the bundles of each plot. The bundles will be separated into seed and straw. The grain weight will be recorded in kg and then subsequently converted into t/ha.
7. Data recorded will be analyzed using ANOVA technique

THANK YOU

УР ТАРИАНЫ ТАРИМЛУУДЫН ТЭЖЭЭЛИЙН БОДИСЫН ШИНГЭЭЛТ* кг/га (богарт)

Таримал	Таримлын бүрдэл	N	P	K	S
Буудай 1600 кг/га	Үр	39	16	10	2
	Сүрэл	16	3	32	4
	Нийт	55	19	42	6
Арвай 1600 кг/га	Үр	32	12	11	2
	Сүрэл	17	4	36	4
	Нийт	49	16	47	6
Хошуу будаа 1600 кг/га	Үр	29	12	8	4
	Сүрэл	20	7	35	5
	Нийт	49	19	43	9
Canola 800 кг/га	Үр	30	14	7	5
	Сүрэл	18	6	30	4
	Нийт	48	20	37	9

- Source: Agricultural Advisor Viggo Johansen, 2015