



Growth and Development of Kernza[®] in the Conditions of the Right-Bank Forest-Steppe of Ukraine (2018)

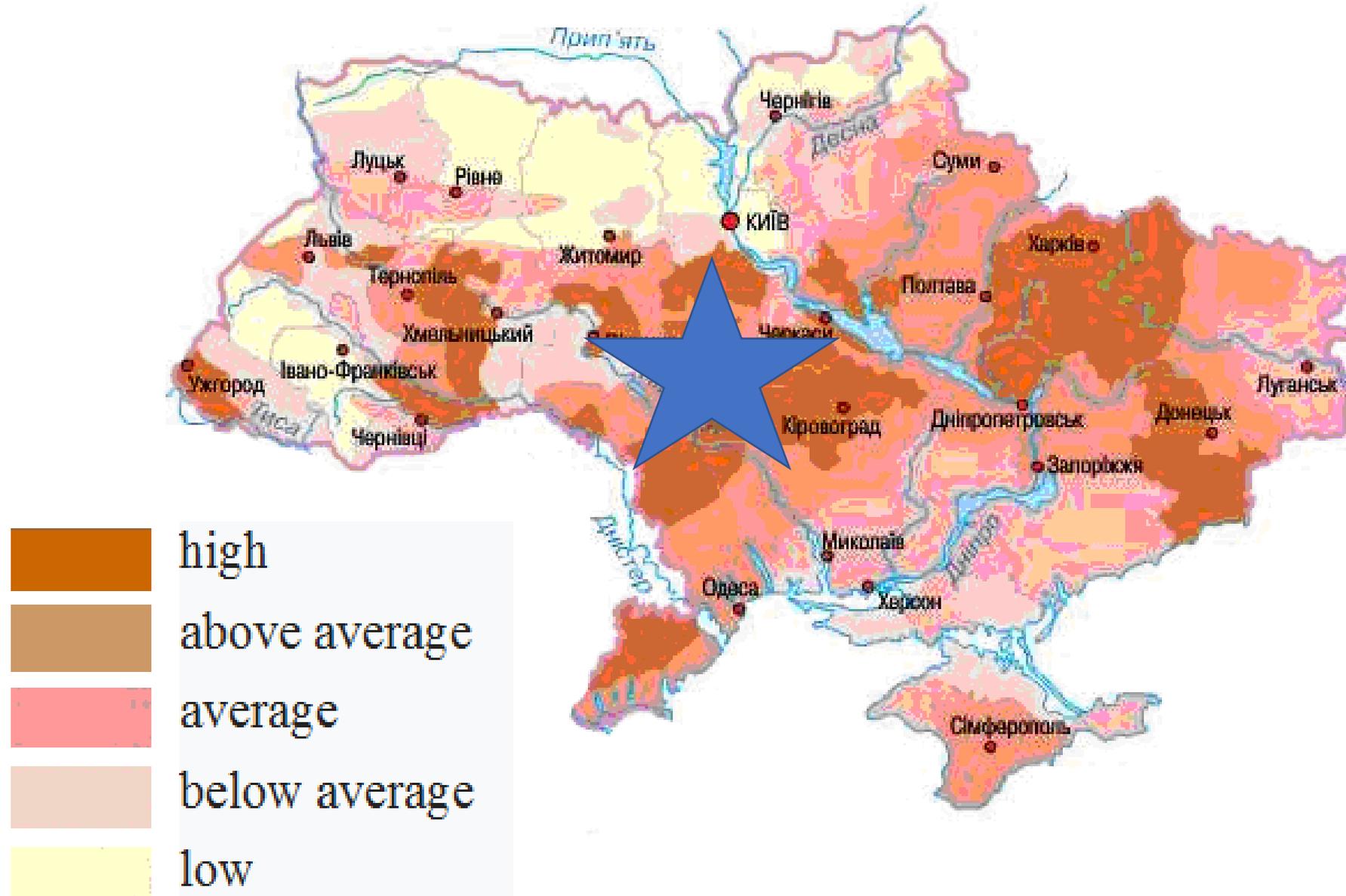
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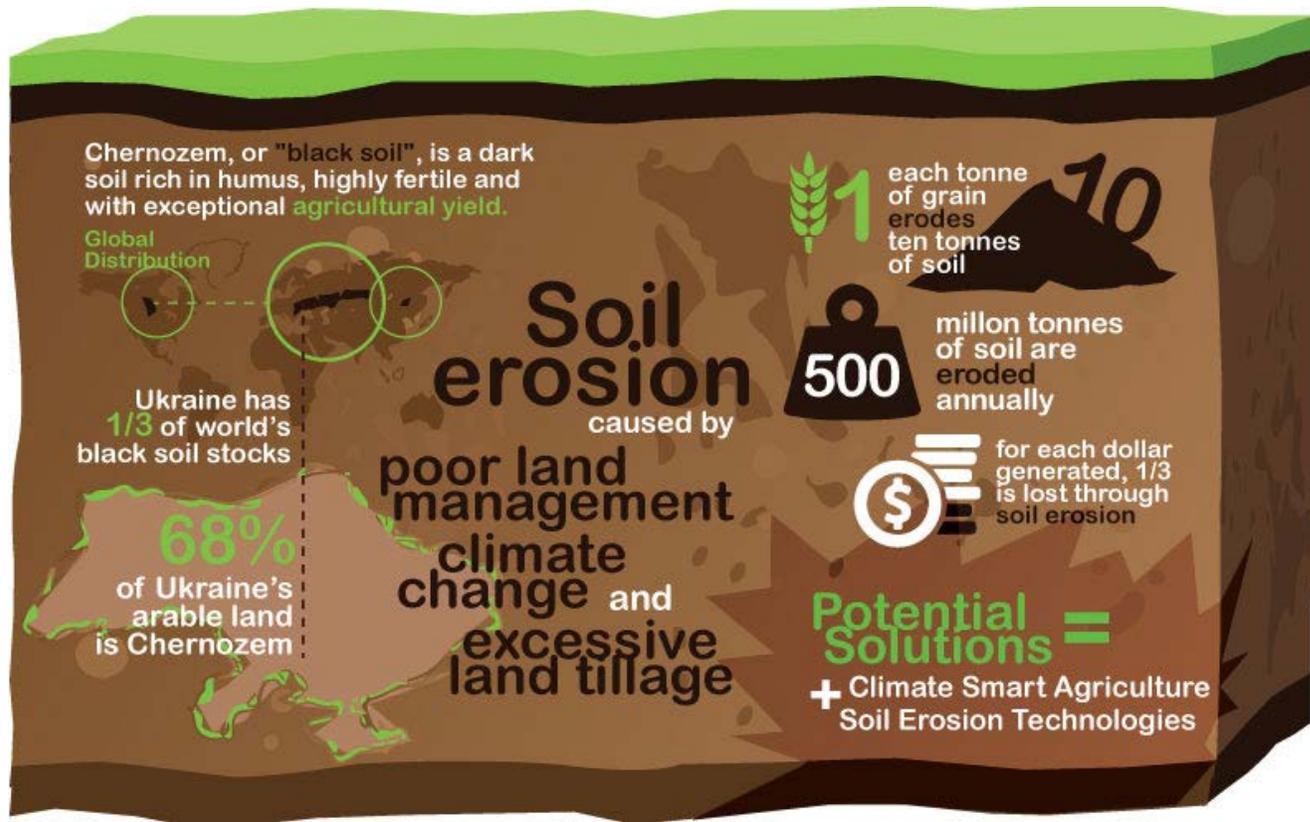
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SOIL FERTILITY

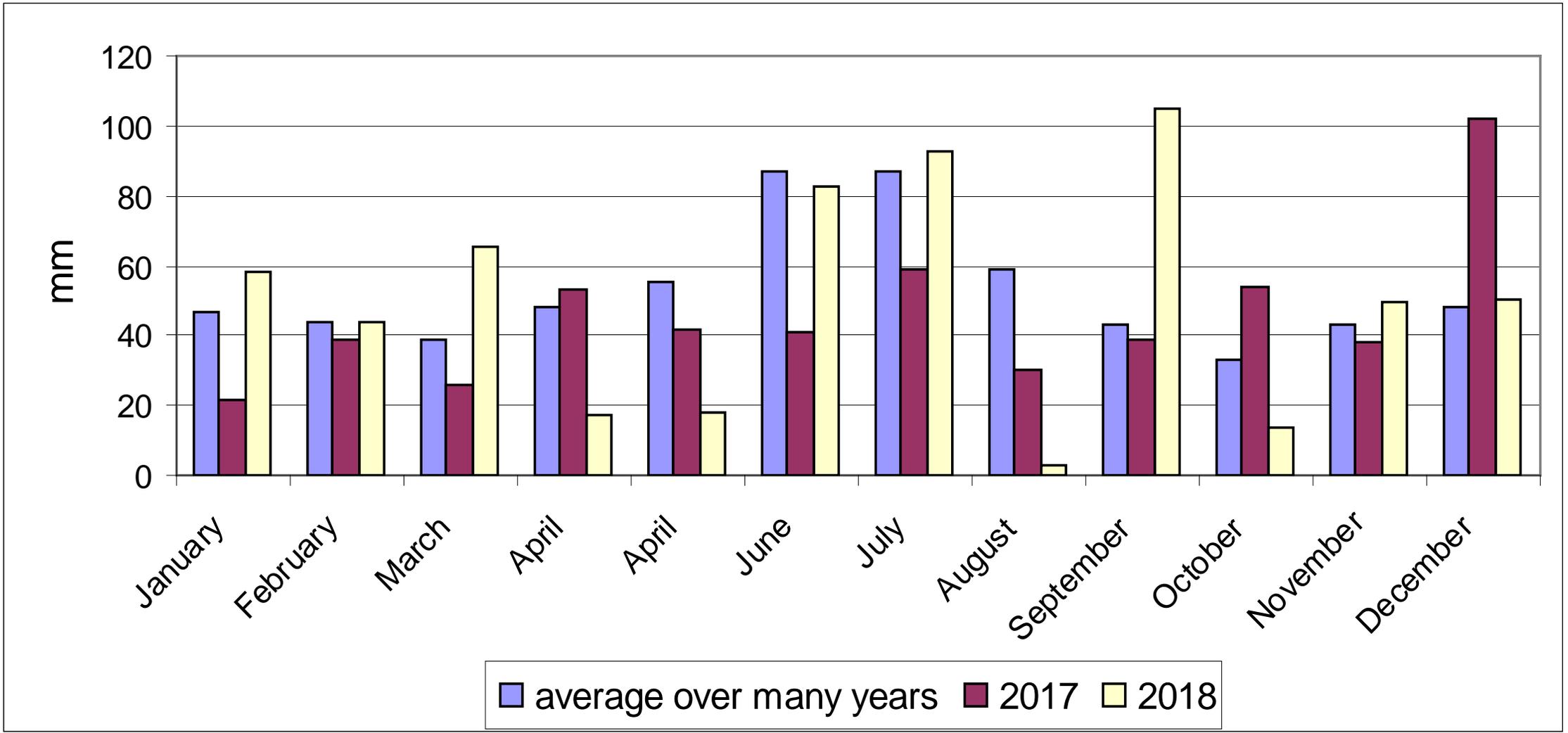


Characterization of soil

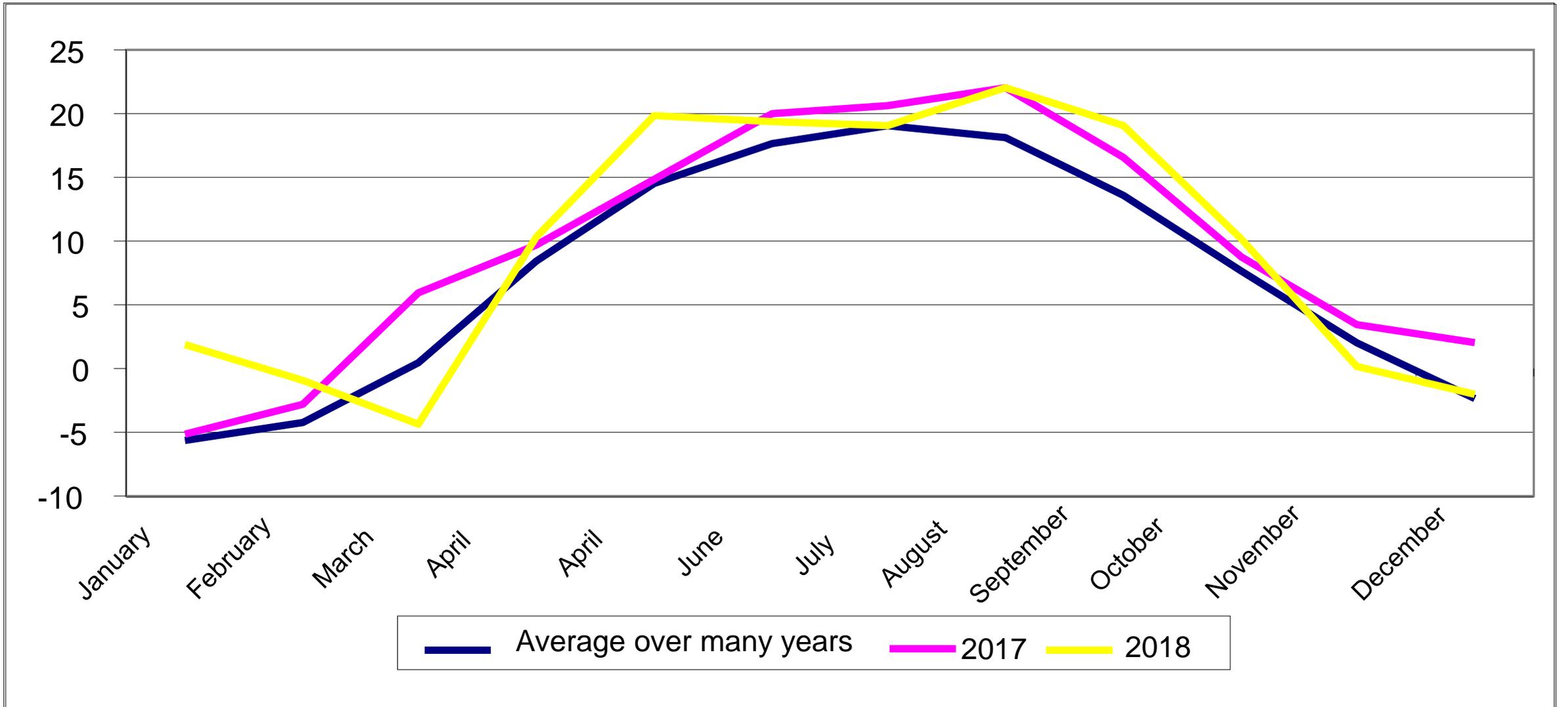
Soil of the experimental field is the typical chernozem



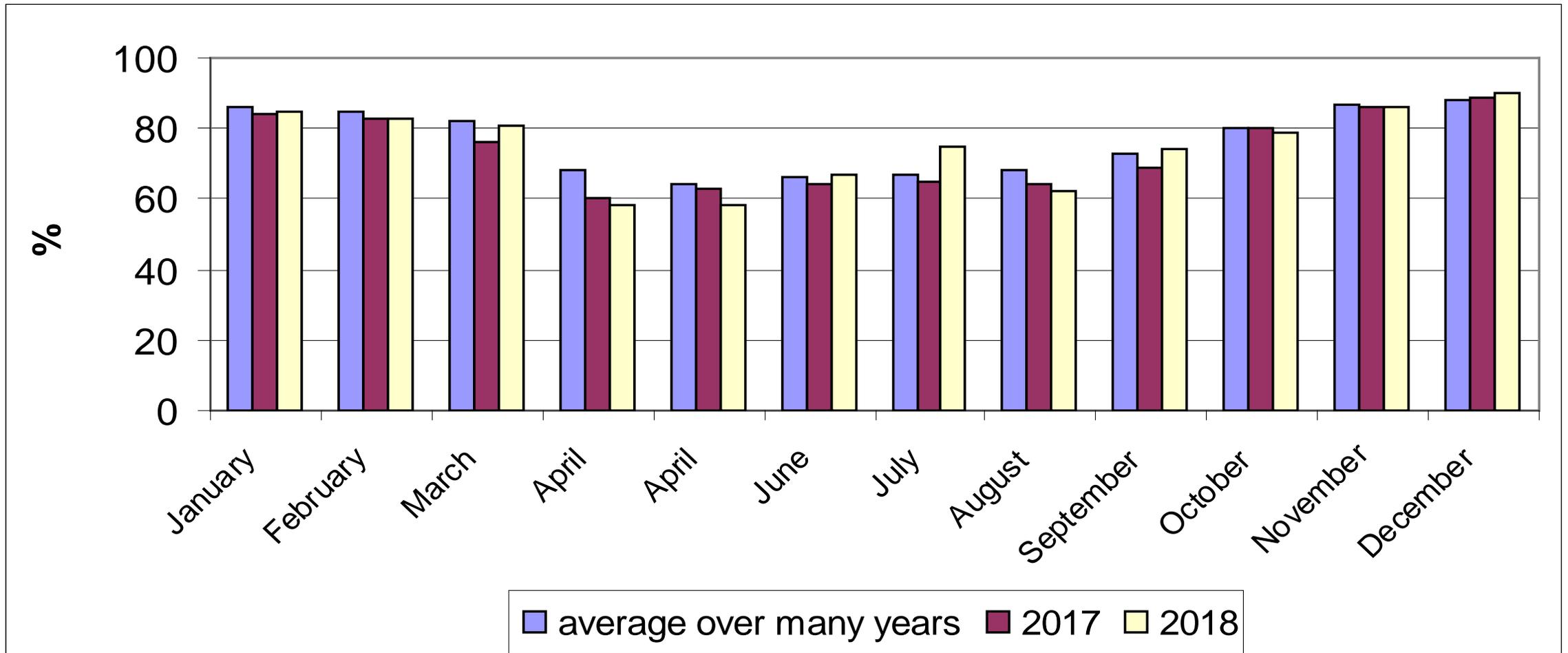
- Humus, dark gray soil
- Plow layer is loose
- Subsurface layer of lumpy structure, slightly consolidated, with moles and wormholes
- Transition is gradual



Precipitation (2017 – 2018)



Temperature (2017 – 2018)



Humidity (2017 – 2018)

Project Description

The seeds of Kernza[®] were cycle 4 KS

The hand sowing was carried out on October 19, 2017- extremely late sowing period for winter crops in region

The seeds were sown after the deep plowing with pre-sowing cultivation

Project Description

Mineral fertilizers and pesticides have not been applied

Sowing-seedling period: 21 days
Seedlings were not similar and weak

At the beginning of winter the plants were in the tillering stage, were weak and only 2-4 leaves
The root system concentrated in a 0-5 cm layer of soil

Questions of Interest:

- 1) How does Kernza® react to adverse environmental conditions?
- 2) Kernza® plants resistance to the diseases in comparison with Winter Wheat.
- 3) The growth and development stages of Kernza® during the first year in comparison with the similar Winter Wheat stages.



The state of Kernza® Plantings on
November 12, 2017



State of Winter Wheat Plantings and
Kernza® on November 12, 2017



The State of Kernza®
Plantings on April 12, 2018

- Overwintering conditions in 2017-2018 were unfavorable for winter crops
 - Low air temperatures and prolonged snow load in February and March
 - Restoration of spring vegetation was late region, first 10 days of April
- Plants were weakened at the beginning of the spring vegetation
 - Overwintering percentage was high – 95%
- Intense tillering was typical at the beginning of the vegetation restoration- with a slow increase in the vegetative mass
- Growth of the root system occurred much faster than aboveground system



The state of Winter Wheat plantings on May 18, 2018

- Starting from the after second decade of April 2018 there was a rapid increase in the average daily temperature
- Winter crops, in particular Winter Wheat, quickly developed from the spring tillering stage to the leaf-tube formation and the earing stage



Kernza® Plants on May 25,
2018

- But the same development stages of Kernza® were prolonged
- At the end of May (May 25, 2018), the plants were in the leaf-tube formation



Winter Wheat plantings on May
18, 2018



Kernza® Plants on May 25,
2018



Kernza® Plants on July 9,
2018

- Heading was observed in early July
- At that time the Winter Wheat was in the milk-ripe stage



The state of Kernza®
Plantings on August 9, 2018

- July in 2018 was hot, daytime temperature of + 37C
 - There was also soil and air drought
- The weather conditions were favorable for Septoria spot and root rot of Winter Wheat
 - Lesions of Winter Wheat plants reached 75%
 - The Kernza® plants were resistant
- The flowering stage in 2018 was in the first 10 days of August



Grain Kernza® is obtained
in Ukraine

- The Kernza® plants intensively developed under the hot weather conditions
- The grain formation was observed in September, and the harvesting began in the second decade of October
- Yield Indices:
 - Grain yield 0.63 t/ha;
 - Above-ground dry weight yield 0.47 t/ha
 - Thousand-kernel weight 10,2 g

Conclusions:

- 1) Kernza® showed high plasticity to the adverse environmental conditions.
- 2) Kernza® plants are resistant to the diseases widespread in the growing area, affecting the Winter Wheat and intermediate wheatgrass.
- 3) The growth and development stages of Kernza® during the first year of cultivation significantly prevailed in time in comparison with the similar Winter Wheat stages.