THE INFLUENCE OF THE TIMING AND NORMS OF SOWING WINTER RYE SEEDS ON THE VOLUME WEIGHT AND WATER PERMEABILITY OF THE SOIL

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Annotation The article describes the timing and norms of violence of autumn rye seeds to the agrophysical properties of the soil, which are important properties that determine its softness or density, taking into account the volume weight and water permeability of the soil. Soil volume weight is analyzed, at the beginning and end of the growing season.

Key words: agrophysical properties of soil, volume weight, mass, soil density, envelope method, validity period, mass, sample, density.

Experimental procedure and method The experiment involved five different sowing dates (September 20, October 1, October 10, October 20, November 1) and three different seed rates (3 million, 4 million, 5 million). When feeding winter rye, ammonium nitrate (N–34%) was used as nitrogen fertilizer, superphosphate (R2O5–12–14%) as phosphorus fertilizer, and potassium chloride (K2O–50%) as potassium fertilizer. In the experiment, 70% of the annual rate of phosphorus fertilizers and 100% of potassium fertilizers were applied to winter rye in the fall, under the plow, the remaining 30% of phosphorus fertilizers were applied in the 1st feeding with nitrogen fertilizers during the tillering period, and the 2nd feeding was carried out with nitrogen fertilizers during the tillering period.

The bulk density of the soil was determined in the 0–50 cm. layer, at the beginning and end of the application period by the method of N.A. Kachinsky.

The water permeability of the soil was determined at the beginning and end of the application period by the method of N.A. Kachinsky;

Research results and their analysis One of the agrophysical indicators of soil is the bulk density of the soil, which is an important property that determines its softness or density. The bulk density of the soil is the ratio of the mass in grams of one cubic centimeter of dry soil (with air) in its natural state to the weight of water taken at 4 0C in the same volume and is expressed in g/cm3. For good growth and development of agricultural crops, the bulk density of the soil is considered optimal, depending on the type, at an average of 1.30–1.35 g/cm3. In particular, winter rye seeds were sown at a rate of 3 million per hectare in the period from September 20 to When sowing with germinating seeds, the soil bulk density was on average 1.38 g/cm3 in the 0–30 cm layer, and 1.47 g/cm3 in the 30–50 cm layer under the plow, and the soil compaction compared to the beginning of the operation was on average 0.08 g/cm3 in the 0–30 cm layer and 0.07 g/cm3 in the 30–50 cm layer, respectively, during this period, 4 million and 5 million tons per hectare were used. In the variants planted with germinating seeds, this indicator was on average 1.36 g/cm3 in the 0–30 cm layer of soil, and 1.46–1.45 g/cm3 in the 30–50 cm layer under the plow, which was an increase of 0.06 g/cm3 in the 0–30 cm layer of soil and 0.06–0.05 g/cm3 in the 30–50 cm layer compared to the beginning of the operation. In particular, winter rye seeds were sown in the amount of 3 million per hectare during the period from September 20 to September 20. When sowing with germinating seeds, the soil bulk density was on average 1.38 g/cm3 in the 0–30 cm layer, and 1.47 g/cm3 in the 30–50 cm layer under the plow, and the soil compaction compared to the beginning of the operation was on average 0.08 g/cm3 in the 0–30 cm layer and 0.07 g/cm3 in the 30–50 cm layer, respectively, during this period, 4 million and 5 million tons per hectare were used. In the variants planted with germinating seeds, this indicator was on average 1.36 g/cm3 in the 0–30 cm layer of soil, and 1.46–1.45 g/cm3 in the 30–50 cm layer under the plow, which was an increase of 0.06 g/cm3 in the 0–30 cm layer of soil and 0.06–0.05 g/cm3 in the 30–50 cm layer compared to the beginning of the operation.

In the medium term, i.e., on October 10 and 20, when variants 7 and 10 were analyzed, the bulk density in the 0–30 cm layer of soil was on average 1.37–

1.36 g/cm3, and the soil density increased by an average of 0.07–0.06 g/cm3 compared to the beginning of the period of application. These indicators are similar to those of variants planted with 4 million and 5 million seeds per hectare, showing that the bulk density of the soil in the 0–30 cm layer was 1.36–1.35 g/cm3 for 4 million seeds and 1.34 for 5 million seeds, and an average increase of 0.06–0.05 g/cm3 for 4 million seeds and 5 million seeds compared to the beginning of the period of application. and in the 30–50 cm layer of soil, the bulk density of the soil at the end of the period of application was on average 1.44–1.47 g/cm3 when 4 million germinating seeds were sown, and 1.44–1.45 g/cm3 when 5 million germinating seeds were sown, and compared to the beginning of the period of application, it was determined that the bulk density increased by 0.04–0.07 g/cm3 for 4 million seeds and by 0.04–0.05 g/cm3 for 5 million seeds.

When analyzing the variants sown in the late period, that is, in the period of November 1, the following data were obtained, and 3 million per hectare In variant 13, where 130 When determining the bulk density of the soil in 14–15 variants planted at the rate of 4–5 million germinating seeds per hectare, by the end of the application period, it was found that the average bulk density in the 0–30 cm layer of the soil was 1.35–1.34 g/cm3, with a density of 0.05–0.04 g/cm3 compared to the beginning of the application, and in the 30–50 cm layer of the soil, the average bulk density was 1.44 g/cm3, with a density of 0.04 g/cm3 compared to the beginning of the application.

In our studies conducted in 2017–2018 and 2018–2019, it was observed that the above patterns were maintained, and positive data was obtained from our variants planted at the rate of 4–5 million germinating seeds per hectare in all planting periods.

Another agrophysical property of the soil is its water permeability. The water permeability of the soil depends on the bulk density of the soil and is assessed by the water absorption properties of the soil for 6 hours.

Each year, before conducting the experiment, the water permeability of the soil was determined by the envelope method at five points in the field at the beginning of the experimental period, and at the end of the experimental period in the cross-section of the variants.

In the 1st variant, planted at the rate of 3 million germinating seeds per hectare on September 20, a total of 850 m3/ha of water was absorbed into the soil over six hours, which was 30 m3/ha less than at the beginning of the implementation period. In the 2nd and 3rd variants, planted at the rate of 4 million and 5 million germinating seeds per hectare on September 20, a total of 855–860 m3/ha of water was absorbed into the soil by the end of the implementation period, which was 25–20 m3/ha less than at the beginning of the implementation period.

In the 1st and 3rd variants, planted at the rate of 3, 4, 5 million germinating seeds per hectare on October 20, a total of 855–860 m3/ha of water was absorbed into the soil by the end of the implementation period, which was 25–20 m3/ha less than at the beginning of the implementation period.

When the soil water permeability of the variants planted at the rate of 100,000 seeds was determined at the end of the implementation period, it was found that the average water absorption into the soil was 855–860–860 m3/ha, which was 25–20–20 m3/ha less than at the beginning of the implementation period.

In mid-October, that is, in the period from October 10 to 3, 4, 5 million per hectare. In the variants planted at the rate of 1000-1000 seeds, the soil water permeability by the end of the implementation period was on average 860-870-870 m3/ha, which was 20-10-10 m3/ha less water than at the beginning of the implementation period. In the variants planted at the rate of 2000-1000 seeds, the soil water permeability by the end of the implementation period was 860-865-870 m3/ha, which was 20-15-10 m3/ha less water than at the beginning of the implementation period. In the late period, i.e. on November 1, three varieties of 3, 4, 5 million. When analyzing the water permeability of the variants planted at the rate of 13–14–15 seeds, it was observed that by the end of the implementation period, the average water absorption into the soil was 860–865–865 m3/ha, which was 20–15–15 m3 less than at the beginning of the implementation period.

As can be seen from the presented data, the seed consumption rates per hectare also had a significant impact on the bulk density and water permeability of the soil.

In our studies conducted in 2017–2018 and 2018–2019, it was found that the above patterns were reflected, and it was observed that the increase in the number of seedlings had a positive effect on the agrophysical properties of the soil.

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