

Lecture

Economic significance, biology and technology of oat cultivation

1. The economic importance of oats
2. Biological features of oats.
3. Technology of growing oats

Purpose: to learn the importance of oats for the national economy of Ukraine.

To study its biological features and cultivation technology.

Tasks for independent work: Features of cultivation of field cultures in the conditions of radionuclide pollution.

1. The economic importance of oats

Oat grain has a high content of protein (12-13%), carbohydrates (70%), fat (5-6%), which indicates the nutritional and feed value. Oat grain is indispensable concentrated feed for horses, cattle, poultry.

1 kg of grain corresponds to 1 feed unit and contains 85-92 g of digestible protein.

The composition of oat grain protein includes all essential amino acids (lysine, arginine, tryptophan). Oatmeal proteins are well digested. By protein quality oats ranks first among cereals. In terms of fat content, oat grains outperform other crops. A significant part of the grain is starch (40-45%), it contains many vitamins. Vitamin B1 (thiamine) in oats is more than in wheat and barley, and the content of vitamin B2 (riboflavin) in oats does not differ from other cereals. Due to the good absorption of protein, fat, carbohydrates and vitamins, oat foods are of great importance in baby and diet food. Oats also have medicinal value.

Oats are widely used for food - cereals, cookies, coffee. Oatmeal for baking bread is unsuitable due to lack of quality gluten. It can be added to wheat and rye flour when baking some types of bread.

Oat straw contains up to 7% protein and over 40% carbohydrates and is a valuable animal feed. Nutritionally inferior to meadow hay of medium quality. 100 kg of straw contains 31 feed units.

Oats - a valuable component for growing mixtures of annual grasses (with vetch, peas, etc.) for green fodder, haylage, hay.

Oats are among the ancient crops, found as a weed in crops of wheat and oats. As these crops moved north and into the mountains, oats as an unpretentious crop supplanted them and was grown as a fodder and food plant.

The first mention of growing oats in ancient Greece dates back to the IV century BC. is. From Europe, oats spread to other parts of the world.

In world grain production, oats by sown area (19.4 million hectares, or 2.8% of grain) ranks 6th after wheat, rice, corn, millet, oats (data for 1993-1995). It occupies the largest share in the structure of sown areas of grain crops in Russia -14.8% (more than 8 million hectares), in Belarus - 14.1%. Less in Canada - 8%, Poland - 7.3%, Germany - 6.3%. In Ukraine it is mainly grown in the Forest-Steppe and Polissya on the area of 0.5-0.6 million hectares or 5% of the world's sown area. In 1999, the sown area was 530 thousand hectares, the gross grain harvest was 759 thousand tons, and the yield was only 14 centners per hectare.

In terms of gross production, the leadership also belongs to Russia - 31.5% of the world's oat grain harvest (more than 9 million tons). In Canada, collect 10.1%, the United States - 8.8%, Germany - 5%.

The highest yield of this crop in 1998 was in Germany - 48.4 kg / ha, France - 46.5 kg / ha, England - 58.6 kg / ha. The lowest in Kazakhstan - 4.2 kg / ha and Russia - 8.7 kg / ha. The average yield in Ukraine (18.9 kg / ha in 2002) is inferior to spring barley and wheat. In favorable years in some farms the yield reaches 40-60 kg / ha and above.

The world is declining interest in oats as a fodder crop. This is due to a decrease in the number of horses for which oats are the main food; relatively low yields and lower energy nutrition of oats. If 1 kg of oats is equivalent to 1 feed unit, then 1 kg of corn grain - 1.34 k.o., oats 1.2 k.o., peas - 1.14 k.o., soybeans - 1.30 k. o., fodder beans - 1.15 k.o. As a result, the area under oats for the period from 1979 to 1998 decreased in the world from 25.6 to 14.6 million hectares, ie 1.75 times.

2. Biological features of oats

Oats are unpretentious to heat. Among spring crops, it is the most cold-resistant. The seeds begin to germinate at 1-2 ° C. Seedlings easily withstand spring frosts to minus 3-4 ° C, well - to minus 7-8 ° C, and sometimes minus 10 ° C. At temperature decrease to minus 10 ° C at oats leaves can perish, but the knot of tillering is not damaged. and with the onset of heat plant vegetation continues. During the emergence of seedlings and tillering favorable temperature for oats is 15-18 ° C, and later - 18-22 ° C. High temperature tolerates worse than barley and wheat. At 38–40 oC, the stomata become paralyzed very quickly - after 4-5 hours.

Oats are very demanding of moisture. During germination, the seeds absorb 60-65% of water by weight, ie more than other breads of group 1, because it is a film culture (film content 25-30%). High relative humidity and frequent rains are the key to high yields. Oat yields increase almost in parallel with the amount of summer precipitation.

On the lack of water in the phase stalking it reacts more strongly than other cereals. On insufficiently moistened soils seedlings appear unfriendly. Oats have the highest transpiration coefficient 450-500.

Oats are sown at an early stage - as soon as the soil reaches physical maturity. Rains have a positive effect on the formation and filling of grain. Oats tolerate cloudy weather and fog well. Reacts very negatively to high temperatures during flowering and grain filling.

Oats are unpretentious to the soil, because its root system is good developed and actively penetrates into the soil to a depth of 1.2 m, assimilating hard-to-reach forms of phosphorus and potassium. It grows well on slightly acidic (pH 5.0-6.0) sod-podzolic soils, although at the same time responds positively to liming. It is also suitable for light sandy and loamy soils and drained peatlands in regions where at least 500 mm of precipitation falls per year. On

Wetland soils oats are often the only cereal that should be grown. Grows poorly only on saline soils. With 1 quintal of grain removes from the soil 3 kg of nitrogen, 1 kg of phosphorus, 5 kg of potassium.

Oats have a mesocotyledonous type of tillering and rooting. The plant is a long day, self-pollinating, at elevated temperatures self-pollination is possible. Bushes worse than barley (total bushiness 3- 4, productive - 1.5-2). The duration of the growing season is 100-120 days.

3. Technology of growing oats

Oats are considered the least demanding crop to soil fertility and precursors. In crop rotation, oats should be sown first after legumes, then it forms a high-protein grain and gives a yield increase of 3-4 c / ha or more. Excellent precursors of oats are fertilized row crops crops (corn, potatoes). Oats are not recommended to sow after sugar beets, which dry out the soil and have common pests (in incl. nematodes). In Polissya, his crops are productive after potatoes, buckwheat and flax. Due to phytosanitary problems, oats cannot be grown after oats. A good grain precursor is rye, and wheat and winter barley are available possible precursors of oats.

The main and pre-sowing tillage is carried out in the same way as under the spring barley. Given the moisture-loving culture used techniques that promote the accumulation of moisture - snow retention and high-quality pre-sowing soil preparation. Spring tillage for oats is traditional for spring crops and may include harrowing, leveling and cultivation. It must ensure even, high-quality seed wrapping during sowing. It is important for oats to ensure good subsidence of the soil with a normally functioning capillary system, because oats due to the filminess of their grains (25-30%) require more moisture for germination and further growth and development than wheat, rye or barley. Because oats are sown very early and sown areas are relatively small, in most cases do not carry out the closure of moisture. When the physical maturity of the soil, the field is prepared for sowing with the help of KPS-4 or

combined units. Pre-sowing cultivation is carried out with minimal time gap with sowing.

Preparation of seeds, varieties

For sowing use only treated seeds, well aligned, with a mass of 1000 grains of at least 30-35 g and a growth force above 80%. When sowing seeds of a larger fraction, the yield of oats increases significantly. Before sowing seeds are treated on machines PS-10, PSII-5, Mobitox, etc. preparations of vincite (2 kg / t), real (0.2 kg / t), fundazole (2.0-3.0 kg / t) Oat seeds, as well as other cereals, are encrusted with the use of CMC film formers (0, 2 kg / t in 10 l of water) or PVA (0,5 kg / t in 10 l of water) with addition of all necessary pesticides.

Oats are the least demanding of mineral fertilizers among cereals cultures. Its grain productivity potential is also lower. It absorbs nutrients from the soil better than other cereals and tolerates the acid reaction of the soil solution. It makes good use of the aftereffects of fertilizers.

Oats absorb nutrients evenly throughout the growing season. Phosphorus and potassium fertilizers are applied under the cold, nitrogen is applied in the spring.

On podzolic, sod-podzolic, podzolic soils under oats, first of all, it is necessary to bring the raised norms of nitrogen fertilizers; on chernozems - phosphorus; on peat - potassium and copper.

The rate of mineral fertilizers for oats is 30-60 kg per hectare. When placing oats after stubble predecessors and on poor soils, the rate of mineral fertilizers is increased by 25-30%. On peat soils under oats apply increased rates of potassium fertilizers (K60-90) and make copper fertilizers - copper sulfate (25 kg / ha) or pyrite cinders (3-4 kg / ha).

When planning the yield of oats above 40 kg / ha, the need for trace elements and other types of soils increases. Thus, on limestone soils boron is applied, on acid soils (pH less than 5.2) - molybdenum. Soils with a high phosphorus content need zinc.

Nitrogen fertilizers are applied in portions. Some of them are introduced into pre-sowing cultivation, and the rest - at the beginning of the tube.

The use of mineral fertilizers along with increasing the yield increases the content of crude protein and reduces the amount of fiber in oat grains.

Recommended varieties: for the Forest-Steppe: Arkan, Salomon, Synelnykivsky 68 ; ; SP: Chernihivsky 27 (grain), SLP: Chernihivsky 28 (fodder) and others.

Sowing

Oat seed should consist of as much as possible grains of the first flowers of a spikelet

Method of sowing - narrow-row (7.5 cm), row (12 cm, 15 cm).

Depth of sowing depends on the biological characteristics of the culture. Oats suffer less from deeper sowing compared to barley. In addition, more water is needed for the germination of membranous seeds. Therefore, among cereals, the depth of sowing oats is one of the largest.

At resource-saving technologies it should be sown on 3-4 cm on lungs soils depth of sowing can reach 4-6 cm in the southern regions dry weather - up to 7 cm

Seeding rate

Oats are characterized by high bushiness and respond well to increasing feeding area. But the growth rate of lateral shoots, ie tillering energy is lower compared to other cereals. On in liquefied crops, the formation of excessive adjustment is observed, as a result of which grain ripening is delayed, harvesting is delayed and its quality deteriorates.

A practical method of preventing this phenomenon is the thickening of crops, which limits the tillering process. Therefore, sowing rates of oats are recommended high. In

4.5-5.5 million / ha are sown in the forest-steppe zone, 5.0-5.5 million / ha in Polissya, and in in the pre-Carpathian and Carpathian zones increase to 5.5-6.0 million / ha of similar seeds, in the Steppe - 4-4.5 million / ha. Weight rate depending on the size of the seeds is from 150 to 220 kg / ha.

When sowing early spring on drained peat soils, the seeding rate is reduced by 25-30%. If perennial grasses are sown under oats, the norm sowing oats is reduced by 10-15%.

Crop care

In the dry spring, crops must be rolled with ring-spur rollers. Soil crust (after rain) is destroyed by light toothed or needle harrows.

At high weed infestation in oat crops use the following herbicides: agritox; basegran M; basagran hit; 2.4D; 2M-4X; dialin; dicopur; cowboy; lontrel, banvel, luvaram.

Oats are more affected by diseases at late sowing dates. Seed treatment protects against a number of diseases in the early stages of growth. To ensure high yields, it is recommended to spray crops during the growing season.

Pest control

Oats are grown on small sown areas and its technology is less intensified compared to winter wheat and spring barley. This limits the reproduction and spread of specific oat pests.

The most dangerous pests of this culture are the Swedish fly, stem fleas, bread leeches, cereal aphids, oat thrips. To combat them use Bi-58 new, dimethrin, pilarmax, polytrin.

To prevent lodging of crops in the tillering phase, it is recommended to make chlorine-mequatchloride, antifouling, terpal C.

Cleaning works

The difficulty of harvesting oats is due to uneven ripening grain in the panicle. Waiting for full ripeness in the whole panicle leads to the rash of grain from the top of it. Premature harvesting is also undesirable, because you can get defective seeds. In addition, the vegetative mass of oats dries later than the grain, and at high humidity it is difficult to thresh. Therefore, it is recommended to collect oats only separately way. Harvesting begins when the grain in the top panicle will reach full, and in average wax ripeness. With separate harvesting, the yield increases slightly due to the increase in grain weight lower part of the panicle, which are delayed with development.

Only in weed-free areas, on low-growing or liquefied crops, oats can be harvested by direct combining.

For mowing in rolls use hinged harvesters ZhVN-6A, ZhNS-6-12, ZhVR-10 and self-propelled USK-17 "Step", ZhVN-6A-01 and ZhVR-10-03 on base of energy means KPS-5M. In the formation of double and paired rolls should not be allowed in them counter-arrangement of panicles.

Selection and threshing of rolls is carried out by combine harvesters SK-5M "Niva", SK-6A "Kolos", "Yenisei-1200" and "Don", Lan, Slavutych. Combines should be equipped with cloth-transport sorters like PTP-ZA.

Post-harvest processing of grain is carried out on grain cleaning units ZAV-20, ZAV-25, ZAV-40, ZAV-50 and ZAV-100. Machines must provide maximum separation of weeds and grain impurities. For grain drying it is recommended to use grain-cleaning drying complexes KZS-20Sh, KZS-40Sh, KZS-25Sh, KZS-25B and KZS-50.

Questions for self-examination

1. Describe the economic importance of oats for Ukraine?
2. Describe the biological characteristics of oats.
3. What precursors are best for oats?
4. What system of tillage is used in the cultivation of oats?
5. What fertilizer system is used for oats?
6. How to sow oats?
7. What care do oat crops need?
8. How to harvest oats?

literature

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