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CURRENT STATE AND PROSPECTS FOR OIL FLAX PRODUCTION

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The oilseed flax plays an important role in many sectors of the national economy and is characterized by unmatched medicinal properties. The main advantages of this crop in agriculture include high drought resistance, ability to withstand spring frosts, resistance to lodging and seed shedding, and high economic efficiency of production. From 2000 to 2022, global oilseed flax cultivation areas increased by 1.8 times. In terms of world regions, the largest cultivation areas for oilseed flax are in Asia, accounting for 44.2% of the world average. The leading countries in terms of cultivation areas are Canada, Russia, Kazakhstan, China, and the USA. The combined share of the leading countries in global cultivation areas is increasing and reached 88.3% in 2021-2022. In Ukraine, the situation with oilseed flax cultivation areas is unstable and varies significantly from year to year (from 14.0 to 68.7 thousand hectares). Global oilseed flax production volumes doubled from 2000 to 2022. The leading countries accounted for 67.6% to 87.7% of total production. Canada is the absolute leader, accounting for 26% of global production, significantly ahead of other countries. For Ukraine, this indicator is only 1.3% due to small cultivation areas. The highest amount of oilseed flax seed in our country was harvested in 2016 – 92.2 thousand tons. There is a clear trend of increasing yields of this oil crop in Ukraine. If in 2000-2003 it was 0.25-0.29 t/ha, it reached 1.53 t/ha before the war period. The yield of oilseed flax seed in Ukraine exceeds the average yield levels of regions such as Asia and Europe, and in 2021-2022, other regions of the world as well. A comparative analysis with leading

countries showed that the yield of oilseed flax in Ukraine is significantly higher than in Russia and Kazakhstan, but China, the USA, and Canada are far ahead of our country in this indicator. France achieves even higher yields than leading countries due to a shortage of flax seed in the European Union and ecological changes in agricultural production related to global climate change. Due to its beneficial properties and high product value, oilseed flax is a promising crop for Ukraine, and improving its cultivation technology will contribute to the development of the Ukrainian economy, increase export potential, and strengthen Ukraine's position internationally.

Key words: *oil flax, seeds, production volumes, crop area, yield.*

Задирко Р.В., Гамаюнова В.В. Сучасний стан та перспективи виробництва льону олійного

Льон олійний відіграє важливе значення в багатьох галузях народного господарства та характеризується неперевершеними лікувальними властивостями. Основними перевагами цієї культури в рослинництві є висока посухостійкість, здатність витримувати весняні заморозки, стійкість до вилягання посівів та осипання насіння та висока економічна ефективність виробництва. За період 2000–2022 рр. світові площі посівів льону олійного збільшились в 1,8 рази. В розрізі регіонів світу найбільші посівні площі під льон олійний відведено в Азії – 44,2% від середньосвітових показників. Країнами-лідерами за площами посівів є Канада, РФ, Казахстан, Китай та США. Сумарна частка країн-лідерів у світових площах посівів має тенденцію до зростання і в 2021–2022 рр. досягла значення 88,3%. В Україні ситуація з площами посівів льону олійного внаслідок низки причин є нестабільною і дуже сильно (14,0–68,7 тис. га) різниться за роками вирощування. Обсяги світового виробництва льону олійного за період 2000–2022 рр. зросли вдвічі. При цьому країни-лідери забезпечували від 67,6 до 87,7% загального виробництва. Абсолютним лідером, значно випереджаючи інші країни світу, є Канада – 26% світового виробництва. Для України даний показник у зв'язку з незначними площами вирощування становить лише 1,3%. Максимальну кількість насіння льону олійного в нашій країні за досліджуваний період було зібрано у 2016 р. – 92,2 тис. тонн. Одночасно, в Україні спостерігається чітка тенденція до зростання врожайності цієї олійної культури. Якщо у 2000–2003 рр. вона становила 0,25–0,29 т/га, то у довоєнний період досягла рівня 1,53 т/га. Врожайність насіння льону олійного в Україні перевищує середній рівень урожайності таких регіонів світу, як Азія та Європа, а в 2021–2022 рр. – й інших регіонів світу. Порівняльний аналіз з країнами-лідерами показав, що врожайність льону олійного в Україні є значно вищою, ніж в РФ і Казахстані, проте Китай, США та Канада значно випереджають нашу країну за даним показником. Ще вищий рівень урожайності, ніж у країнах-лідерах, одержують у Франції, чому сприяє дефіцит насіння льону в Європейському Союзі та екологічні зміни в аграрному виробництві, пов'язані з глобальними змінами клімату. Завдяки своїм корисним властивостям та високій вартості продукції льон олійний є перспективною культурою для України, а вдосконалення технології його вирощування буде сприяти розвитку української економіки, підвищить експортний потенціал та посилить позиції України у міжнародному просторі.

Ключові слова: *льон олійний, насіння, обсяги виробництва, площі посівів, урожайність.*

Problem statement. Production and processing of oilseeds are essential components of agricultural production since oilseeds are sources of vegetable oils used in food, cosmetics, pharmaceuticals, and other industries. The modern oilseed market is one of the most promising directions for developing the economic potential of any country. In Ukraine, soybeans, sunflower, and rapeseed are the main oilseed crops [1–3]. Less widespread niche oilseed crops include flax, mustard, safflower [4, 5].

Ukrainian oilseed production primarily considers export orientation. Exporting oilseeds allows Ukrainian producers to gain significant profits and expand their opportunities in the international agricultural product market. It also contributes to the development of the Ukrainian economy, increases the country's export potential, and stimulates the development of the agricultural sector. High purchase prices for oilseed flax seeds determine its significant export potential, define the high profitability of its cultivation, almost at the level of sunflower production, and increasingly attract the attention of Ukrainian producers [4].

Cultivating oilseed flax can be a profitable type of agricultural activity for Ukrainian producers, especially under favorable soil-climatic conditions that Ukraine possesses. Therefore, researching the beneficial properties, current trends, and possible prospects of cultivating oilseed flax is a relevant issue today.

Analysis of recent research and publications. The seeds of oil flax contain up to 50% oil, which quickly dries and forms a smooth shiny thin film. Flaxseed oil is the best raw material for the production of natural linseed oil and high-quality paints, widely used in the aviation, automotive, electrical, foundry, and shipbuilding industries [6].

Seeds and oil of flax also play an important role in the food industry. The seeds contain oil, dietary fiber, and protein, while the oil contains unsaturated fatty acids, including oleic, linoleic, linolenic, and isolinolenic acids, which help reduce cholesterol levels in human blood [7, 8].

Flax seeds contain many beneficial substances such as omega-3 fatty acids, antioxidants, and vitamins, making it an excellent therapeutic agent. When soaked in water for 2–3 hours, flax seeds swell and form a mucilaginous mass that possesses anti-inflammatory and soothing effects and is used in inflammations and ulcers of the gastrointestinal tract [9].

The anti-diabetic properties of oil flax seeds have been experimentally proven. The biologically active components of the seeds help lower glucose levels and can be used in the treatment of type 2 diabetes [10].

Flaxseed oil is recommended for metabolic disorders, treating atherosclerosis, and preventing heart diseases. It is also used to produce medicinal products for treating skin burns [13].

Oil flax and its processed products, due to their high protein content and a significant spectrum of fatty acids and vitamins, have a high feed potential, contributing to their wide use in animal feed production [14].

An important advantage of cultivating oil flax is its drought resistance, attributed to the formation of a strong root system that continues to grow deep into the ground almost until the end of the vegetation period. This allows oil flax plants to absorb moisture from deep soil layers even after flowering, making them more resistant to dry periods compared to other crops. At the same time, this culture loves moisture, so it responds positively to sufficient moisture conditions, significantly increasing the yield level [15].

Another advantage of oil flax is its resistance to cool conditions. Crop seeds can germinate at a soil temperature of 3–5^{o}C, and at a slightly higher temperature, you can expect germination in 5–7 days. Seedlings of linseed are resistant to spring frosts and can withstand temperature drops to -3…-4^{o}C [16].

Another advantage of modern oil flax varieties is their relatively short vegetation period, allowing harvest at the end of July. This makes oil flax one of the best precursors for winter grain crops. Furthermore, there are no issues with seed moisture for this crop, as delayed harvesting does not lead to seed shedding, and tall varieties do not lodge [17].

The economic benefits of cultivating oil flax are significant, as researchers from various countries have noted the high economic impact of producing this oil crop [18–20].

With its beneficial properties and high production value, oil flax is a promising oil crop for Ukraine. Increasing the acreage of its cultivation and production volumes will contribute to the development of the Ukrainian economy, enhance export potential, and strengthen Ukraine's position in the international arena, confirming the relevance of our research.

Problem statement. The scientific research involved analyzing the current state of oil flax production in Ukraine, various regions of the world, and leading producing countries, as well as identifying prospects for the development of the flax industry.

Comparative-analytical, graphical, and abstract-logical methods were used to address the set task. The international database FAOSTAT served as the information source for conducting statistical and analytical studies.

Presentation of the main material of the research. The areas of oil flax cultivation, compared to other oilseed crops, are significantly lower, largely due to the lower yield levels of this crop. In many countries around the world, including Ukraine, oil flax is considered a niche crop. However, considering that linseed oil is a valuable raw material in many sectors of the economy, the acreage of flax cultivation tends to increase. For instance, while in 2000, 2.580 million hectares were sown with this crop worldwide, by 2022, it reached 4.533 million hectares [21], which is 1.8 times more (Table 1).

Table 1

Dynamics of oil flax sown area by region of the world

Year	Regions of the world										World crop area, million hectares
	Asia		America		Africa		Europe		Oceania		
	million hectares	% of world crop area	million hectares	% of world crop area	million hectares	% of world crop area	million hectares	% of world crop area	million hectares	% of world crop area	
2000	1.135	44.0	0.878	34.0	0.095	3.7	0.462	17.9	0.011	0.4	2.580
2001	1.024	41.4	0.934	37.8	0.151	6.1	0.352	14.2	0.011	0.4	2.471
2002	1.031	43.7	0.949	40.2	0.112	4.8	0.258	11.0	0.010	0.4	2.360
2003	0.944	39.6	0.993	41.6	0.159	6.7	0.280	11.7	0.008	0.3	2.384
2004	1.018	45.5	0.773	34.6	0.164	7.3	0.272	12.2	0.009	0.4	2.236
2005	0.984	35.9	1.185	43.2	0.269	9.8	0.296	10.8	0.011	0.4	2.745
2006	0.966	35.5	1.175	43.2	0.235	8.6	0.331	12.2	0.011	0.4	2.719
2007	0.808	40.9	0.726	36.7	0.194	9.8	0.241	12.2	0.009	0.5	1.978
2008	0.849	40.5	0.797	38.0	0.164	7.8	0.278	13.2	0.009	0.4	2.098
2009	0.836	39.7	0.790	37.5	0.150	7.1	0.320	15.2	0.009	0.4	2.105
2010	0.920	45.3	0.571	28.1	0.080	4.0	0.450	22.2	0.009	0.5	2.031
2011	1.019	45.7	0.399	17.9	0.123	5.5	0.681	30.5	0.009	0.4	2.231
2012	1.033	42.5	0.529	21.8	0.135	5.5	0.725	29.8	0.009	0.4	2.430
2013	1.028	45.9	0.518	23.2	0.100	4.4	0.583	26.1	0.009	0.4	2.238
2014	1.195	45.3	0.783	29.7	0.088	3.3	0.564	21.4	0.008	0.3	2.638
2015	1.234	41.3	0.851	28.5	0.091	3.0	0.803	26.9	0.008	0.3	2.987
2016	1.247	45.1	0.523	18.9	0.088	3.2	0.901	32.6	0.008	0.3	2.767
2017	1.524	52.1	0.558	19.1	0.088	3.0	0.746	25.5	0.009	0.3	2.924
2018	1.744	55.4	0.451	14.3	0.091	2.9	0.855	27.1	0.009	0.3	3.149
2019	1.740	54.2	0.476	14.8	0.077	2.4	0.907	28.3	0.009	0.3	3.208
2020	1.824	51.7	0.518	14.7	0.087	2.5	1.089	30.9	0.009	0.2	3.527
2021	1.856	45.1	0.526	12.8	0.085	2.1	1.642	39.9	0.009	0.2	4.117
2022	1.823	40.2	0.440	9.7	0.091	2.0	2.171	47.9	0.009	0.2	4.533

Source: FAOSTAT, 2023

Average data over a 23-year period (2000–2022) show that 44.2% of oil flax cultivation areas are concentrated in Asia, 27.9% in America, 22.6% in Europe, 5.0% in Africa, and 0.3% in Oceania. Over the last decade, an increase in cultivation areas has occurred in Asia and Europe. The situation in Africa and Oceania remains relatively stable, while significant reductions in oil flax cultivation areas are observed in the Americas.

Statistical data on individual countries worldwide revealed that the main cultivation areas are concentrated in just five leading oil flax-producing countries: Canada (18.6% on average for the period 2000–2022), Russia (17.6%), Kazakhstan (16.7%), China (12.8%), and the USA (6.1%). These countries show a clear trend of increasing cultivation areas for this oil crop. For example, while during the period 2000–2005, the share of leading countries in the global oil flax cultivation area was 58.9%, by 2016–2020, it reached 81.3%, and in 2021–2022, it was 88.3% (Figure 1).

In Ukraine, the areas of oil flax cultivation vary significantly from year to year, as shown in Figure 2. The minimum areas during the study period were in 2004, 2008, 2019, and 2020 – 14.0–19.2 thousand hectares, while the maximum areas were in 2015 and 2016 – 66.7–68.7 thousand hectares. This unstable situation is associated with various factors, including:

– underdeveloped domestic flax market, as in recent years, about 70% of flax is used for internal consumption by Ukrainian processors;

– significant fluctuations in pricing policies both domestically and internationally. For example, in recent years, the purchase price of flax on the domestic market ranged from 10 to 27 thousand UAH;

– volumes of supply on the agricultural market, which fluctuate greatly throughout the year and depend largely on pricing policies and also influence them;

– production volumes of organic flax since its purchase price is three times higher, etc. [16].

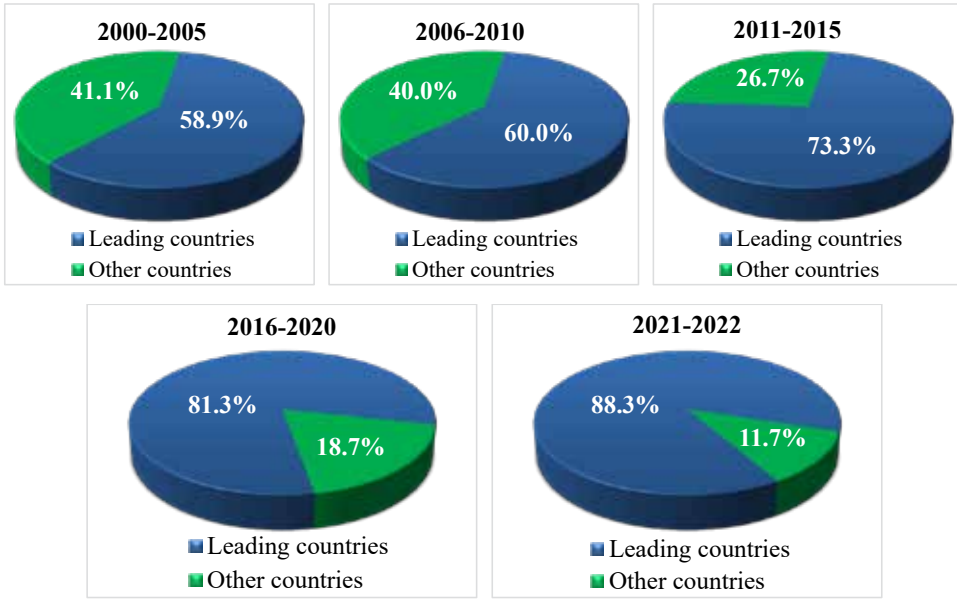


Fig. 1. Share of leading countries in the world area under flax crops oil

Source: FAOSTAT, 2023

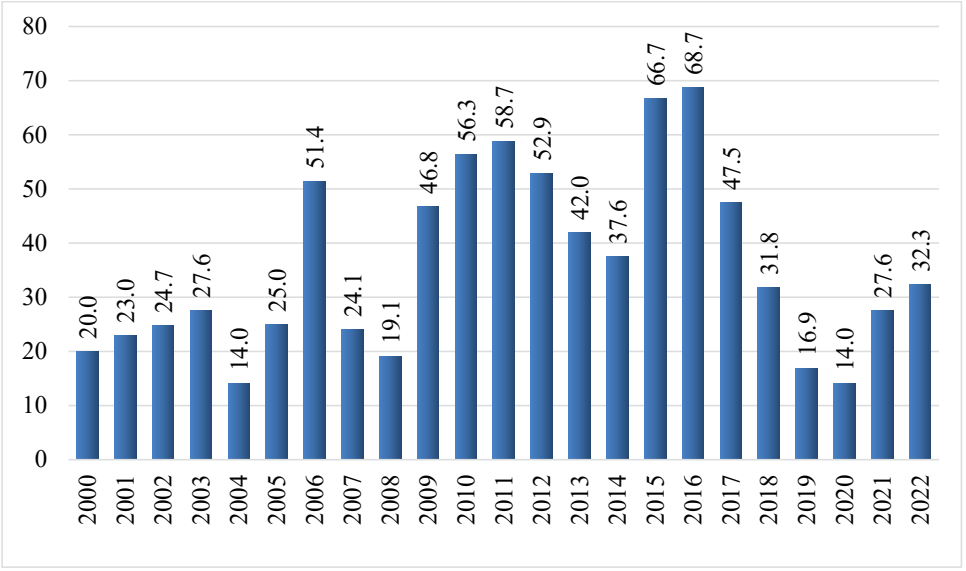


Fig. 2. Dynamics of areas under oil flax crops in Ukraine, thousand hectares
Source: FAOSTAT, 2023

The volumes of global oil flaxseed production over the study period, especially starting from 2018, show a tendency to increase. For instance, in 2000, the world produced 1.987 million tons of seeds, while in 2022, it reached 3.974 million tons, doubling the production volume (Table 2).

Table 2

Dynamics of oil flax seed production by regions of the world

Year	Regions of the world										World production, million tons
	Asia		America		Africa		Europe		Oceania		
	million tons	% of world production	million tons	% of world production	million tons	% of world production	million tons	% of world production	million tons	% of world production	
1	2	3	4	5	6	7	8	9	10	11	12
2000	0.609	30.6	1.022	51.4	0.068	3.4	0.279	14.0	0.010	0.5	1.987
2001	0.479	26.2	1.037	56.7	0.100	5.5	0.204	11.2	0.010	0.6	1.830
2002	0.641	34.3	1.007	53.8	0.072	3.8	0.141	7.5	0.010	0.5	1.871
2003	0.650	32.3	1.045	52.0	0.105	5.2	0.201	10.0	0.009	0.4	2.009
2004	0.679	36.8	0.827	44.8	0.114	6.2	0.217	11.8	0.010	0.5	1.847
2005	0.670	24.8	1.549	57.4	0.185	6.9	0.284	10.5	0.012	0.4	2.699
2006	0.678	27.0	1.347	53.6	0.159	6.3	0.319	12.7	0.010	0.4	2.514
2007	0.462	27.9	0.845	50.9	0.141	8.5	0.202	12.2	0.009	0.5	1.658

Table 2 (Continued)

1	2	3	4	5	6	7	8	9	10	11	12
2008	0.542	27.3	1.038	52.2	0.188	9.4	0.211	10.6	0.010	0.5	1.989
2009	0.554	25.7	1.156	53.6	0.164	7.6	0.274	12.7	0.010	0.5	2.158
2010	0.618	34.2	0.706	39.0	0.075	4.1	0.400	22.1	0.010	0.6	1.808
2011	0.796	36.7	0.582	26.9	0.122	5.6	0.656	30.3	0.010	0.5	2.166
2012	0.715	35.2	0.674	33.2	0.131	6.5	0.499	24.6	0.009	0.5	2.027
2013	0.861	37.9	0.855	37.6	0.094	4.1	0.456	20.1	0.008	0.4	2.273
2014	0.973	36.5	1.075	40.4	0.091	3.4	0.516	19.4	0.008	0.3	2.664
2015	1.067	33.9	1.239	39.3	0.107	3.4	0.729	23.1	0.008	0.3	3.150
2016	1.071	36.8	0.814	28.0	0.100	3.4	0.919	31.5	0.008	0.3	2.913
2017	1.269	44.1	0.680	23.7	0.101	3.5	0.817	28.4	0.008	0.3	2.875
2018	1.532	50.9	0.639	21.2	0.121	4.0	0.706	23.5	0.009	0.3	3.008
2019	1.521	49.6	0.650	21.2	0.102	3.3	0.784	25.6	0.008	0.3	3.065
2020	1.561	46.2	0.754	22.3	0.103	3.0	0.954	28.2	0.008	0.2	3.379
2021	1.277	38.3	0.431	12.9	0.091	2.7	1.527	45.8	0.008	0.3	3.335
2022	1.310	33.0	0.625	15.7	0.097	2.4	1.933	48.6	0.009	0.2	3.974

Source: FAOSTAT, 2023

Countries in America and Asia accounted for 36% of the total oil flaxseed production worldwide from 2000 to 2022, European countries – 23.1%, African countries – 4.6%, and Oceanian countries – 0.4% (Figure 3). The leading producing countries accounted for 67.6 to 87.7% of the total oil flaxseed production (Table 3).

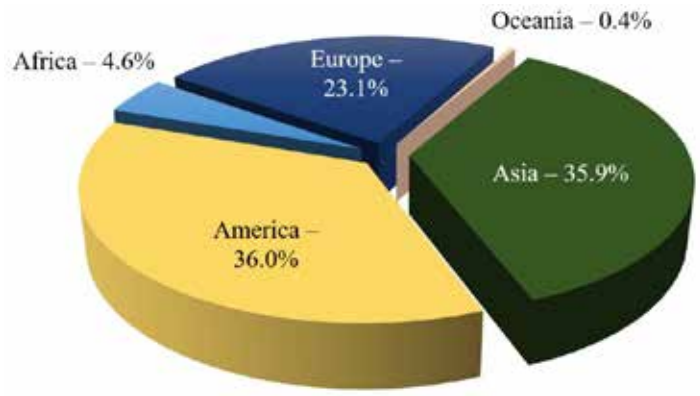


Fig. 3. Share of regions in global production of oil flax seeds in total for 2000–2022
Source: FAOSTAT, 2023

The experience of Kazakhstan in oil flaxseed production is quite interesting. Until 2011, there was no large-scale cultivation of this oil crop here. However, starting from 2011, flax cultivation became one of the most important components of agribusiness in

Kazakhstan, as compliance with agronomic requirements allowed for high economic returns. Due to its biological characteristics and high profitability in Kazakhstan's soil-climatic conditions, oil flaxseed began to take leading positions [22].

Table 3

Dynamics of oil flax seed production by the largest producing countries, thousand tons

Year	Leading countries in the production of oil flax seeds					Total production volumes of the leading countries, thousand tons
	Canada	China	Kazakhstan	RF	USA	
2000	693.400	343.748	0.590	32.691	272.550	1342.979
2001	715.000	252.645	0.800	29.496	290.970	1288.911
2002	679.400	409.000	0.630	25.525	301.330	1415.885
2003	754.400	450.000	0.790	29.748	267.120	1502.058
2004	516.900	460.000	0.777	34.223	263.360	1275.26
2005	990.600	475.000	1.080	36.676	500.280	2003.636
2006	988.800	480.000	5.390	78.982	279.900	1833.072
2007	633.500	268.301	5.220	79.573	149.770	1136.364
2008	861.100	349.655	10.300	92.930	145.190	1459.175
2009	930.100	318.135	47.650	102.620	188.550	1587.055
2010	418.500	352.812	94.610	178.213	230.030	1274.165
2011	398.900	358.641	273.077	437.236	141.783	1609.637
2012	491.500	390.505	157.878	341.565	147.280	1528.728
2013	730.700	398.809	295.021	299.768	85.250	1809.548
2014	883.300	387.000	419.957	365.088	161.750	2217.095
2015	943.100	399.620	491.389	523.534	256.420	2614.063
2016	541.400	368.541	561.771	673.338	235.580	2380.63
2017	555.100	363.000	683.338	611.283	97.590	2310.311
2018	492.400	366.000	933.533	557.888	113.440	2463.261
2019	486.100	340.000	1007.244	658.644	142.880	2634.868
2020	578.100	330.000	1058.247	787.923	144.940	2899.21
2021	336.638	340.000	775.568	1300.173	69.040	2821.419
2022	473.175	290.000	845.642	1766.559	109.330	3484.706

Source: FAOSTAT, 2023

In total, from 2000 to 2022, Kazakhstan's share of oil flaxseed production volume is 13% (Figure 4). Canada is the absolute leader, accounting for 26% of global oil flaxseed production. Ukraine's share is 1.3%, as flaxseed cultivation in our country is more oriented towards niche crops.

Oil flaxseed production volumes in Ukraine fluctuate significantly from year to year – from 5.0 thousand tons in 2000 to 92.2 thousand tons in 2016 (Figure 5). This is primarily due to fluctuations in sown areas and, to some extent, imperfect or violated cultivation technologies leading to insufficient yields. Flax requires strict adherence to

timing and quality of all agronomic practices, with different requirements in various agro-climatic conditions. High yields are achievable only through a well-developed and implemented cultivation strategy in specific soil-climatic conditions [16].

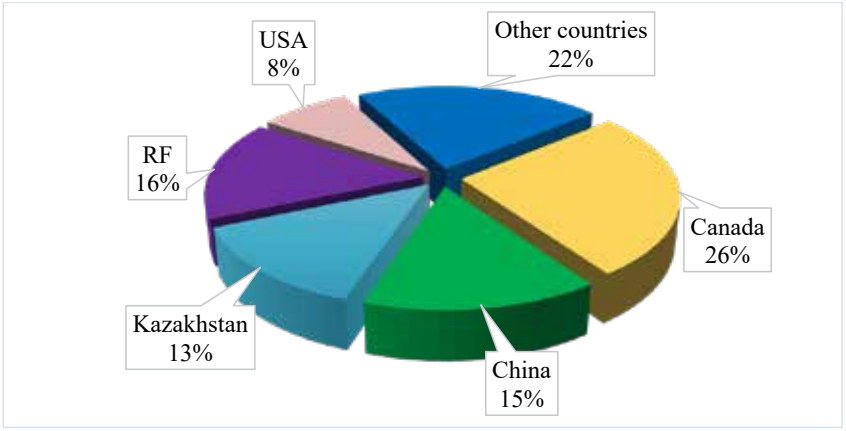


Fig. 4. The share of leading countries in global production of oil flax seeds in total for 2000–2022

Source: FAOSTAT, 2023

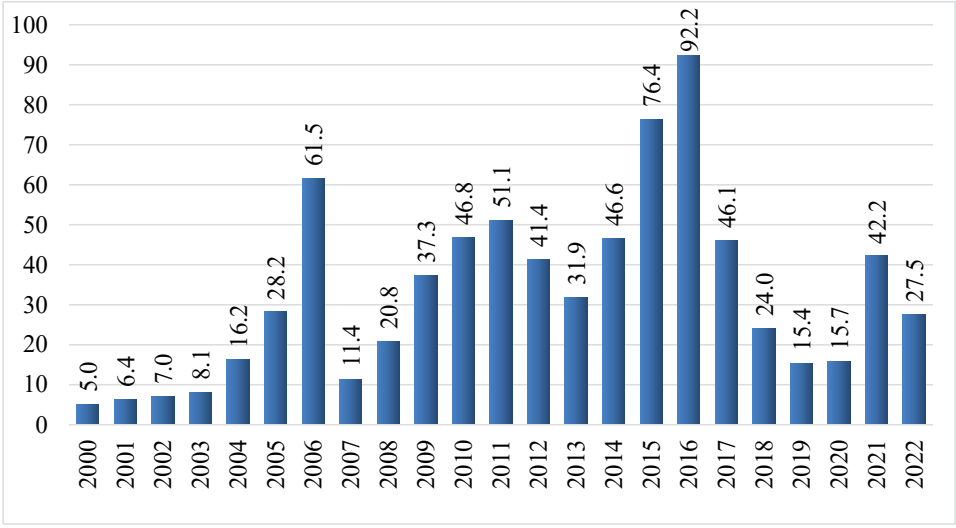


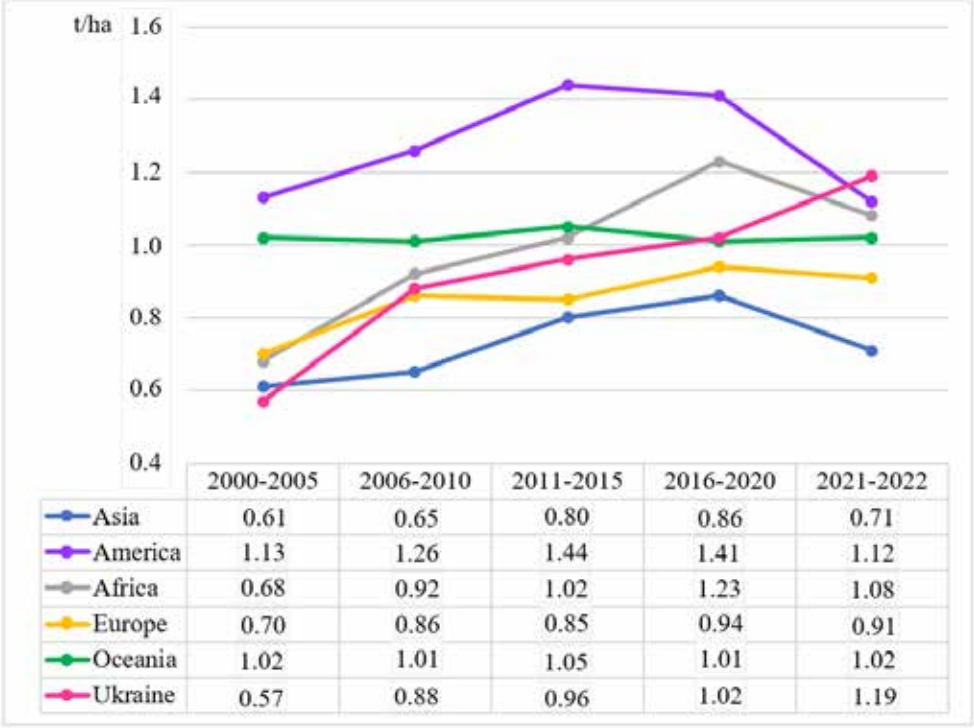
Fig. 5. Dynamics of flax seed production in Ukraine, thousand tons

Source: FAOSTAT, 2023

Over the study period (2000–2022), oil flaxseed yield in Ukraine showed a gradual increase. The lowest was in 2000–2003 – 0.25–0.29 t/ha, reaching its peak pre-war period in 2021 – 1.53 t/ha.

The variety composition plays an extremely important role in yield formation. Important characteristics of oil flax varieties include resistance to pests and diseases, adaptability to specific soil-climatic conditions, seed oil content, and yield potential. Choosing the optimal variety for specific conditions allows achieving maximum yield and seed quality. The potential yield of modern oil flax varieties listed in the State Register in Ukraine is 2.0–2.5 t/ha [23]. This level is significantly higher than what is actually obtained under production conditions. Despite this, oil flaxseed yield in Ukraine exceeds the average yield level of regions such as Asia and Europe, and in 2021–2022 also other regions of the world, as demonstrated in Figure 6.

A comparative analysis with leading countries in oil flaxseed production showed that the yield of this crop in Ukraine is significantly higher than in Russia and Kazakhstan (Figure 7). However, China, the USA, and Canada significantly outperform our country in this indicator. Even higher levels of oil flaxseed yield than in leading countries in the production of this crop are achieved in France, although it has somewhat decreased compared to the period of 2000–2010. The driving force behind the cultivation of oil flaxseed in France is the shortage of flaxseed in the European Union and ecological changes in agricultural production, driven by global climate changes. The French Oilseed Organization (Onidol) and the French Technical Institute for Oilseeds (Cetiom) have been conducting research since 2008 to study every element of oil flaxseed cultivation technology for a better understanding of all stages of the production chain [24].



	2000-2005	2006-2010	2011-2015	2016-2020	2021-2022
Asia	0.61	0.65	0.80	0.86	0.71
America	1.13	1.26	1.44	1.41	1.12
Africa	0.68	0.92	1.02	1.23	1.08
Europe	0.70	0.86	0.85	0.94	0.91
Oceania	1.02	1.01	1.05	1.01	1.02
Ukraine	0.57	0.88	0.96	1.02	1.19

Fig. 6. Comparative diagram of the yield of oil flax seeds in Ukraine and regions of the world, t/ha

Source: FAOSTAT, 2023

French breeders actively work on creating high-yielding and pest/disease-resistant varieties of oil flaxseed, while French farmers utilize modern cultivation technologies and have rich experience in growing oil flaxseed, allowing them to effectively use accumulated knowledge and skills to achieve high results [25, 26].

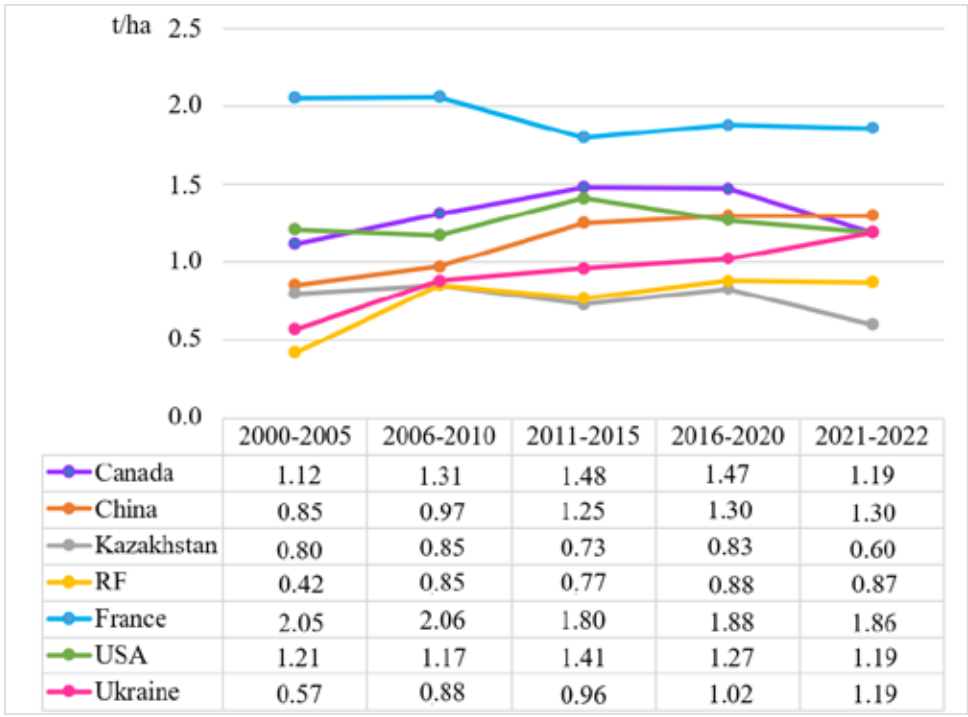
The relevance of improving oil flaxseed cultivation technology in Ukraine under modern conditions is becoming increasingly evident. Effective utilization of the potential of modern varieties should include:

– Establishing an optimal nutrient background for plants, as oil flaxseed is demanding in soil fertility;

– Giving special attention to weed control measures, as oil flaxseed crops do not have a large assimilation apparatus and therefore compete weakly with weedy vegetation;

– Developing modern plant protection systems against a complex of diseases, especially those dangerous for flax, such as anthracnose, rust, fusarium, and stem diseases;

– Creating a reliable plant protection system against pests, including flax flea beetles, thrips, and flax moth.



	2000-2005	2006-2010	2011-2015	2016-2020	2021-2022
Canada	1.12	1.31	1.48	1.47	1.19
China	0.85	0.97	1.25	1.30	1.30
Kazakhstan	0.80	0.85	0.73	0.83	0.60
RF	0.42	0.85	0.77	0.88	0.87
France	2.05	2.06	1.80	1.88	1.86
USA	1.21	1.17	1.41	1.27	1.19
Ukraine	0.57	0.88	0.96	1.02	1.19

Fig. 7. Comparative chart of flaxseed yield in Ukraine and leading countries in production, t/ha

Source: FAOSTAT, 2023

A serious problem in Ukraine that needs to be addressed is the presence of a significant amount of counterfeit seeds on the domestic market, so Ukrainian farmers must avoid counterfeits, which are often difficult to distinguish from the original [16].

Oil flaxseed requires strict adherence to all elements of cultivation agronomy, the improvement of which is a relevant and promising task for Ukraine's agricultural sector.

Addressing the most urgent issues in the flax industry will strengthen Ukraine's position in the international agricultural product market.

Conclusions and recommendations. Due to its high drought and frost resistance, lodging resistance, unmatched medicinal properties, and high economic efficiency of production, oil flaxseed plays an important role in the development of the world economy. The areas under cultivation and production volumes are trending upwards. The largest producers of oil flaxseed are Canada, Russia, Kazakhstan, China, and the USA. In Ukraine, oil flaxseed occupies small areas of cultivation and belongs to niche oilseed crops, but there is a clear trend towards increasing its yield. The yield of oil flaxseed in Ukraine is significantly higher than in Russia and Kazakhstan but lags behind China, the USA, and Canada. Leading countries in oil flaxseed production by yield, in turn, lag behind France. Improving oil flaxseed cultivation technology considering the international experience of leading countries makes this crop promising and economically attractive for Ukraine.

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