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**Глобальная база данных по биоразнообразию.
Современные тенденции развития в Беларуси,
Латвии и Литве**

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CURRENT STATE AND FORMING COLLECTION STOCK OF THE CENTRAL BOTANICAL GARDEN OF THE NATIONAL ACADEMY OF SCIENCES OF BELARUS

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Abstract. The publication presents the analysis of the accession number registered in the Main Introduction Book of the Central Botanical Garden of the National Academy of Sciences of Belarus depending on the category of their obtaining during the period from February 15, 1947 to December 31, 2020. A total of 240,309 accessions, drawn from 75 countries from all parts of the world, have been registered by 222 staff members during the period studied. The most of accessions (93.4%) were received within the framework of the International Botanic Garden Exchange. The fractions of accession collected in the wild, obtained in collaboration with other institutions, from private collectors and commercial purchases were 1.3%, 2.1%, 2.3% and 0.9% respectively. 221,979 accessions from 586 institutions in 75 countries were registered within the framework of international botanical exchange. The largest amount of botanical exchange was detected during the period from 1965 to 1980, the maximum number of institutions (207) and the maximum number of countries (50) were ascertained in 1975, 1969 and 1975 years respectively. There were registered 3,079 accessions collected in the wild from 17 countries of Europe, Asia and North America. The majority of all accessions registered (96.1%) belong to the *Angiosperms* and the *Gymnosperms*, *Pteridophytes* and *Bryophytes* consist 3.1%, 0.7% and 0.01% of all accessions respectively. The maximum number of accessions registered belong to the Family *Rosaceae* and the Genus *Rosa*, The Genus *Rosa* was represented by 309 species (135 accepted, 89 unresolved, 85 synonyms) and 29 infraspecific taxa (11 accepted, 2 unresolved, 16 synonyms).

Current state of the collection stock of the Central Botanical Garden.

A botanical garden is a controlled and staffed institution, which has a strictly protected natural green area, for the formation and maintenance of a living plant collection and their expositions of actual or potential value for purposes of conservation biological diversity, scientific research, education, public display and recreational activities.

The botanical gardens were mostly medicinal gardens up to the 16th and 17th centuries. Investigation and reclamation of new lands and territories led to changes in botanical gardens for encompassing displays of the new, beautiful, strange and sometimes economically important plant trophies being received from

distant lands. That in turn resulted in extension of their scientific and educational function by developing and demonstrating plant classification systems in the 18th century. Botanical gardens began to exchange plants through the publication of their *Indices Seminae* that have laid the basis of the following international system of plant and information exchange between botanical gardens

The international botanical exchange is considered to have been founded in 1682 by the professor of botany at Leiden University Paul Hermann and the curator of the botanical (apothecary) garden in Chelsea (Physic Garden at Chelsea) John Watts, who prepared the first exchange lists (*Index Seminum*) and carried out the first exchange of seed (Minter, 2000). Subsequently, many botanical gardens began to publish their *Indices Seminae* and an international system of botanical exchange was created, which successfully working up till now.

The first international botanical exchanges in Belarus were carried out in 1775-1780 by French physician and botanist Jean Emmanuel Gilibert (1741–1814), who founded the first official botanical garden in Belarus at the veterinary and medical school in Grodno in 1775. Stanislav Boniface Yundzill (1761–1847) continued Gilibert's investigations at the University of Vilnius and maintained constant contacts with the best botanical gardens in the world, that resulted in the garden's collections contained at about 6565 species and varieties of plants in 1824. In the 18th-19th centuries at about ten Belarus botanical gardens participated in the international botanical exchange and published their *Indices Seminae* (Fedoruk, 1989).

Evgenia Vladimirovna Ivanova, who had been working in the Central Botanic Garden since its foundation, analyzing the exchange of seeds in 1963, wrote: "The Central Botanic Garden of AS BSSR was founded in 1931 in north-eastern part of Minsk. The area allocated for the garden was a clearing from the pine forest. The garden staff had to work hard at territory planning and creation of corresponding soil substratum for future sowing and planting. Seed and planting material was collected through expeditions to old gardens, parks and forest "dachas" all over the country.

But this could not meet the garden's needs, so it was necessary to start obtaining seeds and plant material from botanical institutions of the USSR and foreign countries. ... The obtained seeds and plant material were received by the Department of Flowering Plants, under which the Seed Laboratory was established in 1932, registered in the appropriate book and each accession received its own ID-number" (Ivanova, Klimovitskaya, 1963).

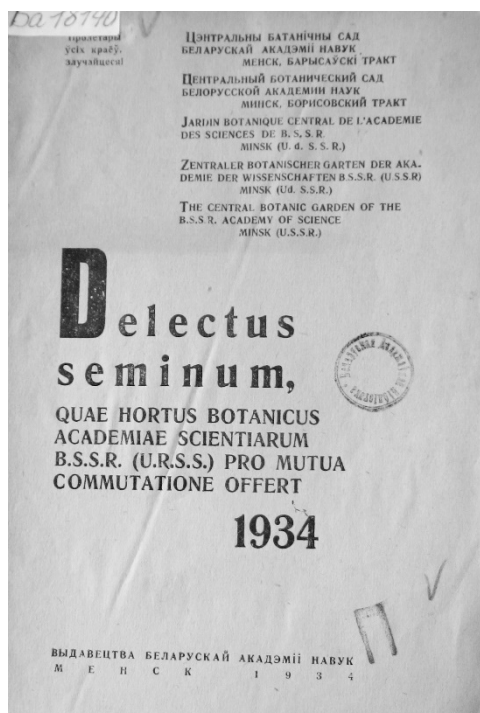


Figure 1. The title of the first *Delectus Seminum* of the Central Botanical Garden published in 1934

... The obtained seeds and plant material were received by the Department of Flowering Plants, under which the Seed Laboratory was established in 1932, registered in the appropriate book and each accession received its own ID-number" (Ivanova, Klimovitskaya, 1963). Later this book was called "The Main Introduction Book" (MIB), and the registration of material was conducted by the Seed Laboratory, which was transformed into the Laboratory of Plant

Resources Mobilization in 1968 (1999-2010 - Division) and then into the Laboratory of Plant Resources Biodiversity in 2010, which continues registration of new accessions. The first *Delectus Seminum* of the Central Botanical Garden was published in 1934 (Fig. 1), in which 533 species and varieties of plants belonging to 48 families were presented, including 77 species of trees and shrubs, 435 species and varieties of herbaceous plants, mainly from wild flora.

The active work of the CBG staff since 1931 resulted in formation multidisciplinary scientific institution, which combines the functions of the largest depositary of the world flora gene pool and a leading scientific center of plant introduction and acclimatization, biological diversity conservation, environmental protection, plant physiology and biochemistry, as well as an educational and recreational facility (Smolsky, 1960; Smolsky, 1972; Sidorovich et al, 1982; Botyanovskiy et al, 1992; Reshetnikov et al, 2002; Titok, Volodko, 2012).

The CBG collections of living plants and the herbarium of introduced plants of the world flora have been declared as the National Heritage of the Republic of

Belarus (Resolution of the Council of Ministers of the Republic of Belarus of November 25, 1999, No. 1842). The CBG is included in the national system of specially protected natural areas as a natural monument of republican significance since September 29, 1999. It has been declared a monument of landscape architecture of the second half of the 20th century since April 10, 2003. The Republican Scientific and Practical Center for Ornamental Gardening has been established on the basis of the Central Botanical Garden by the decision of the Presidium of the National Academy of Sciences of Belarus in 2015.

The active work of the CBG collection curators in the field of plant introduction has ensured the creation of a valuable gene pool of decorative and economically useful plants, which is widely used in the national economy. As of the beginning of 2021, the collection stock of the Central Botanical Garden is represented by 15490 accessions (on December, 2020), wherein 11916 and 3574 are of field and greenhouse plant stocks, respectively (Tab. 1). Some collection accessions are unique and are available in no more than two or three botanical gardens in the world.

Table 1. Total collection stock of the Central Botanical Garden of the National Academy of Sciences of Belarus.

Collection	Families	Genera	Species	Accessions
Rare and Endangered Species of the Belarusian Natural Flora	69	231	349	590
Herbaceous ornamental plants, including:	120	432	1050	5557
Dahlias	1	1	1	219
Hyacinths	1	1	1	126
Gladioli	1	3	4	664
Irises	1	1	21	378
Daylilies	1	1	6	135
Lilies	1	1	21	452
Low-Spread Ornamental Perennials	59	163	347	635
Daffodils	1	1	4	417
Annual Ornamental Plants	54	172	301	797
Peonies	1	1	21	357
Tulips	1	1	24	551
Phloxes	1	1	4	75
Chrysanthemums	1	1	1	298
Ephemeroïd Ornamental Plants	8	24	126	229
Belarusian Aqua Flora Plants	23	33	39	39
Ground Cover Plants	20	51	87	110
Belarusian Wild Ornamental Plants	31	58	72	75

Table 1 continuation

Economically useful herbaceous plants, including:	64	253	583	1062
Medicinal Plants	56	200	424	626
Spicy and Aromatic Plants	21	81	135	206
Melliferous Plants	24	58	76	100
Forage Plants	5	10	37	78
Bioenergy Plants	3	4	9	48
Xylophytes, including:	77	214	1764	4707
Arboretum	63	175	1488	2552
Hardy Shrub Plants (Nursery)	48	100	238	650
Clematises	1	2	33	170
Roses	1	1	1	271
Rhododendrons	1	1	109	300
Lilac	1	1	3	298
Ornamental Garden Forms of Woody Plants	7	16	47	216
<i>Vaccinium</i> Berry Plants	2	2	8	137
Spontaneous somatic mutations and decorative woody plant forms of the CBG breeding	1	3	4	29
Magnolias	1	1	11	21
Ornamental garden forms of deciduous trees and shrubs	14	21	32	63
Total in field	201	904	3542	11916
Greenhouse plant collections, including:	155	858	2272	3574
Tropical Herbaceous Perennials	108	333	671	934
Tropical and Subtropical Woody Plants	79	199	311	374
Succulent Plants	27	221	841	984
Subtropical Fruit Plants	9	14	36	121
Ornamental Greenhouse Plants	5	5	28	146
Orchids	1	110	273	476
Tropical and Subtropical Plant Exposition	86	259	446	527
Exotic Tropical and Subtropical Plants	2	2	2	12
Total growing	266	1706	5792	15490
<i>In vitro</i> collections, including:	29	70	111	295
Aseptic Samples of Clone Reproduction Plants	6	7	7	40
Aseptic Samples of Economically Useful Plants	27	64	105	255
Herbariums				
<i>Herbarium plantarum</i>	248	1404	5752	27832
Herbarium of Lichen Forming Fungi	38	83	219	6490

Formation of the collection stock of the Central Botanical Garden.

Within the framework of the State Program "High-End Techniques and Technologies" the subprogram "Development of the Central Botanical Garden of the National Academy of Sciences of Belarus", 28 manuscript volumes of the MIB were converted into electronic form in 2016-2018. The first entry in MIB was

made on February 15, 1947 and has the introductory number 21149. Unfortunately, it has not yet been possible to find the MIB for the earlier period (from 1931 to 1946), but the presence of a continuing introductory number indicates that the MIB was not destroyed during the World War II and there is a possibility that the missing parts of the MIB will be found.

The conversion of information into electronic form has made it possible to analyze the receipt of the CBG accessions recorded in the MIB containing 240,309 records for the period from February 15, 1947 to December 31, 2020. All the variants of obtaining of the accessions registered in the MIB can be divided into the following categories:

- collected in the wild (in special expeditions or accidental findings, etc.);
- obtained within the framework of the International Botanical Garden Exchange;
- obtained within the framework of cooperation with other institutions (forest and variety testing stations, scientific and educational institutions, customs services, etc.);
- exchange with private collectors;
- commercial purchases.

The majority of accessions (93.4%) during the period studied has been obtained via international botanical exchange. The percentage of accessions collected in the wild was 1.3%, obtained through collaboration 2.1%, from private collectors 2.3% and commercial purchases 0.9% (Fig. 2).

The highest number of accessions obtained from 1955 to 1980 when 44.1% of all accessions were registered, the maximum number equaled to 8932 accessions was detected in 1960, of which 8803 accessions were obtained via international botanical exchange. Thereafter, the amount of material obtained decreases and now about 600 accessions are registered annually. Such a tendency is usual for any collection demonstrating large amount of the material obtained during the collecting period and its decreases subsequently due to keeping only the valuable collection accessions. It is probably that the number of new accessions registered

in the coming years in the CBG collection will be stabilized at the level of 200-300 accessions per year and will be equal to the number of exclusions from collections.

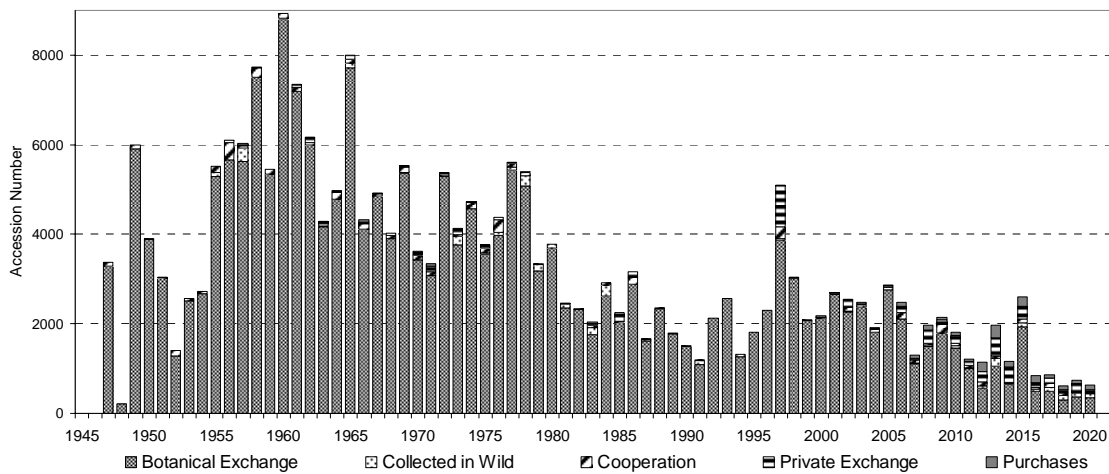


Figure 2. The number of accessions by categories of obtaining by the CBG for the period of 1947 – 2020 years.

During the period analyzed, 221,979 accessions were obtained by the CBG via international botanical exchange from 586 institutions (botanical gardens, arboretums, etc) in 75 countries (according to their current international status of independent states) and 2,574 accessions (1.1%) have not been identified, from which institution they have been obtained (the country and/or city was indicated, but not the institution itself). The greatest number of institutions with which the CBG had the international botanical exchange was detected during 1965-1980, the maximum number of institutions (207) was revealed in 1975, and the maximum number of countries (50) was revealed in 1969 and 1975 (Fig. 3). The CBG has active international botanical exchange with 247 institutions from 41 countries at present time. However, not all the botanical institutions publish their *Indexes Seminae* every year. On the average, the CBG receives annually *Indexes* from 150 institutions in 40 countries and obtains at about 300 accessions from 45 institutions in 20 countries.

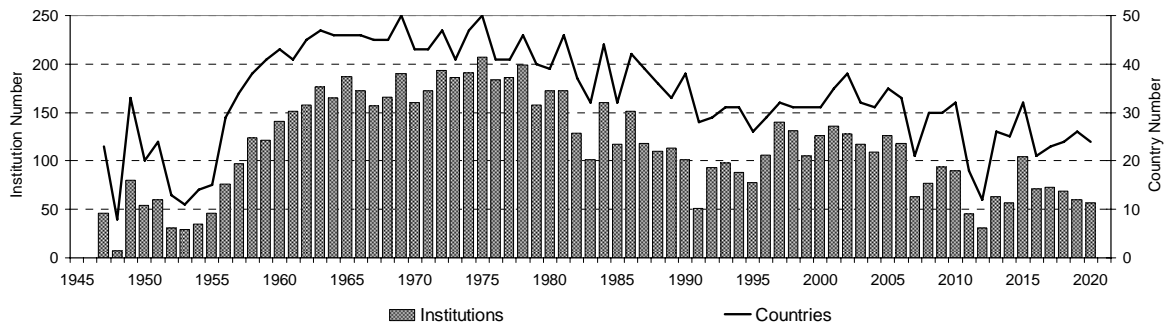


Figure 3. The numbers of institutions and countries from which the CBG received accessions within the framework of the International Botanic Garden Seed Exchange for the period of 1947 – 2020 years.

The CBG conducted international botanical exchange with 586 institutions during 1947-2020 and 247 of them continue active cooperation up till now that resulted in 86.7% of all accessions were received from these 247 botanical institutions. The thirty most active institutions from which 31.7% of all the registered accessions were received are: (1) Tsitsin Main Moscow Botanical Garden of Academy of Sciences, (2) Botanical Garden of Peter the Great of V.L. Komarov Botanical Institute of Russian Academy of Sciences, (3) Botanical Garden of the University of Latvia, (4) M.M. Hryshko National Botanical Garden, (5) National Botanical Garden of Hungary, (6) Belmonte Arboretum, (7) Botanical Garden of the NAS of Uzbekistan, (8) Vytautas Magnus University Botanical Garden in Kaunas, (9) Botanical Garden of Antwerpen, (10) Nikita Botanical Garden, (11) Berlin Botanic Garden and Botanical Museum, (12) Alexandru Borza Cluj-Napoca University Botanic Garden, (13) Botanical Garden of the Martin Luther University of Halle-Wittenberg, (14) Botanical Garden of Tartu University, (15) Botanical Garden of Natural History Museum of Denmark, (16) Botanical Garden of the All-Russian Research Institute of Medicinal and Aromatic Plants, (17) Lviv Botanical Garden of the I. Franko University, (18) Botanical Garden of Munich-Nymphenburg, (19) Main Botanical Garden of NAS of Kazakhstan, (20) Villa Taranto Botanical Gardens, (21) Botanical Garden of I.I. Mechnikov Odesa State University, (22) Tallinn Botanical Garden, (23) Botanical Garden of Coimbra University, (24) Kórnik Arboretum, (25) National Botanical Garden of Latvia, (26) Batumi Botanical Garden, (27) Botanical Garden of the Comenius University, (28) Botanical Garden of the Far Eastern Branch of the Russian Academy of Sciences,

(29) Botanical Garden of the Oles Honchar Dnipro National University, (30) Botanical Garden of the Oslo University (Fig. 4).

As expected, the first places were taken by N.V. Tsitsin Main Botanical Garden and the Botanical Garden of Peter the Great of V.L. Komarov Botanical Institute, from which 9120 and 4735 accessions were obtained, respectively.

Countries from all parts of the world took part in the international botanical exchange with the CBG: Europe (40 countries), Asia (14), Africa (8), South America (6), North America (3), Australia and Oceania (3). Among the countries, Russia as expected leads with 35,381 accessions from 84 institutions. Next in order are: Germany (26,642 accessions from 57 institutions), Ukraine (16,730 from 29), France (12,869 from 37), Poland (10,701 from 25), Italy (10,153 from 41) and Hungary (8,325 from 12). In terms of the number of accessions per institution, Latvia (1217.8), Hungary (693.8), Norway (674.7), Belgium (622.1), Slovakia (620.8), Ukraine (576.9) and the Netherlands (569.3) take the lead.

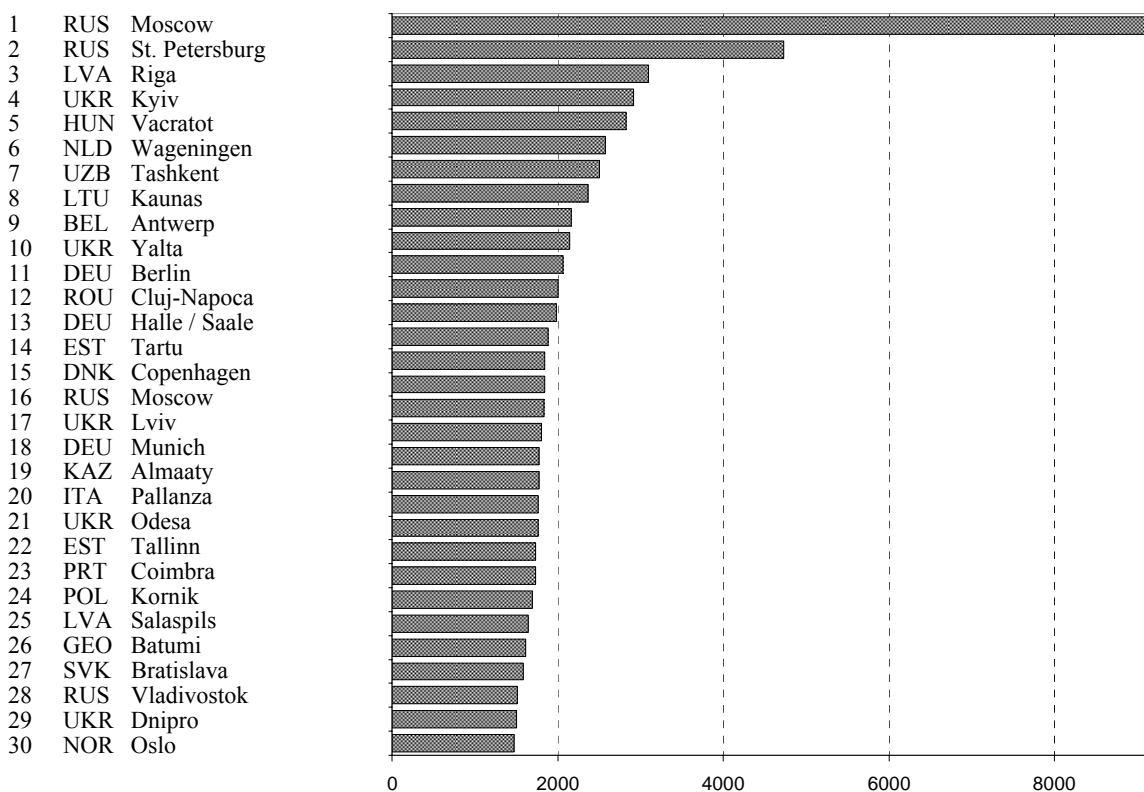


Figure 4. The number of accessions received within the framework of International Botanic Garden Seed Exchange with the CBG from the most active institutions for the period from 1947 to 2020 years (the names of the institutions are given in the text).

Note: Hereinafter abbreviations of country names are given according to ISO 3166-1

There were registered 3 079 accessions of plant species collected in the wild during 1947-2020 from 17 countries of: Europe (8 countries), Asia (8) and North America (1) (Fig. 5). The first post-WWII accessions of the plant species collected in the wild from Turkmenistan were registered in 1955. In general, 47.9% of all the accessions were collected in the Pamir-Alai region.

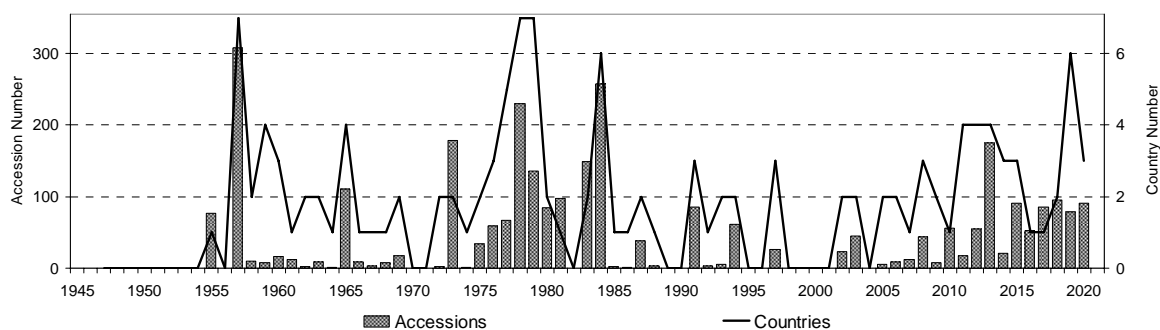


Figure 5. The numbers of accessions collected in the wild and countries in which they were collected over the period of 1947 – 2020 years.

The first accessions collected in the wild from Belarus were registered in 1957; however, intentional collecting has been carried out since 2005. A total of 1,006 accessions from Belarus have been registered, which presented 32.7% of all the species collected in the wild (Fig. 6). A large number of accessions was also collected during Far Eastern, North Caucasian and Transcarpathian expeditions.

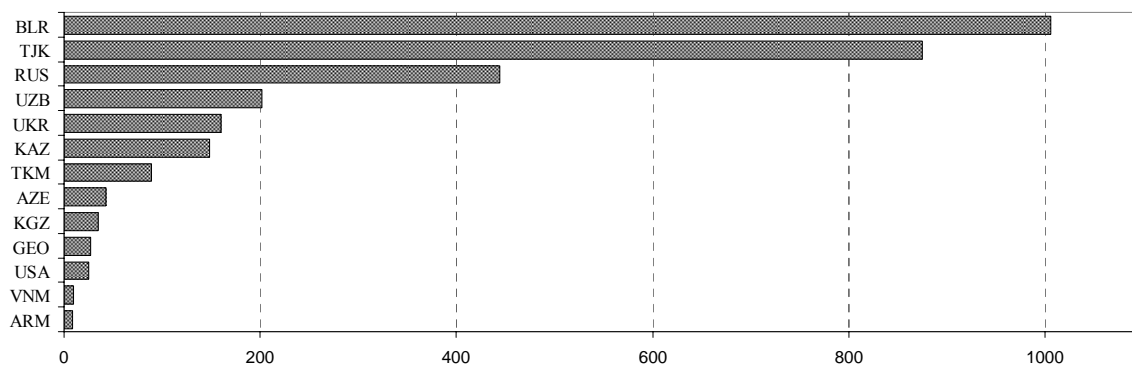


Fig. 6. The number of accessions collected in the wild in countries in which they were collected during the period of 1947 – 2020 years.

Besides collecting species in the wild and providing international botanical exchange, some accessions were provided by other institutions such as forest and variety testing stations, scientific and educational institutions, communal farms, floral and ornamental plant complexes, customs services, etc. This category of

obtaining accessions was conventionally called as a framework of cooperation. Between 1947 and 2020, 5,053 accessions were registered in this category, of which 4,649 (92%) were from 137 identified institutions and 404 from institutions that have not been identified. The number of accessions obtained within the framework of cooperation was fairly even across the years during the period studied, except for a significant decrease in the 1990s, which happened to the general economic situation in the states of the former Soviet Union (Fig 7.).

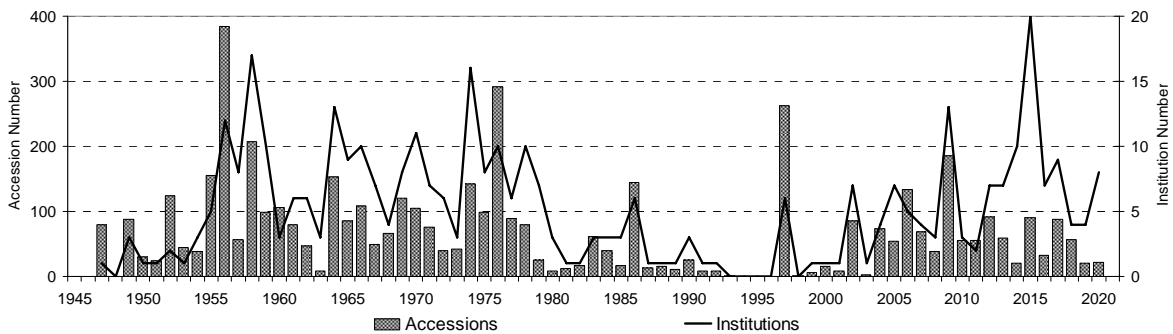


Figure 7. The numbers of accessions and institutions from which they were received within the framework of cooperation over the period of 1947 – 2020 years.

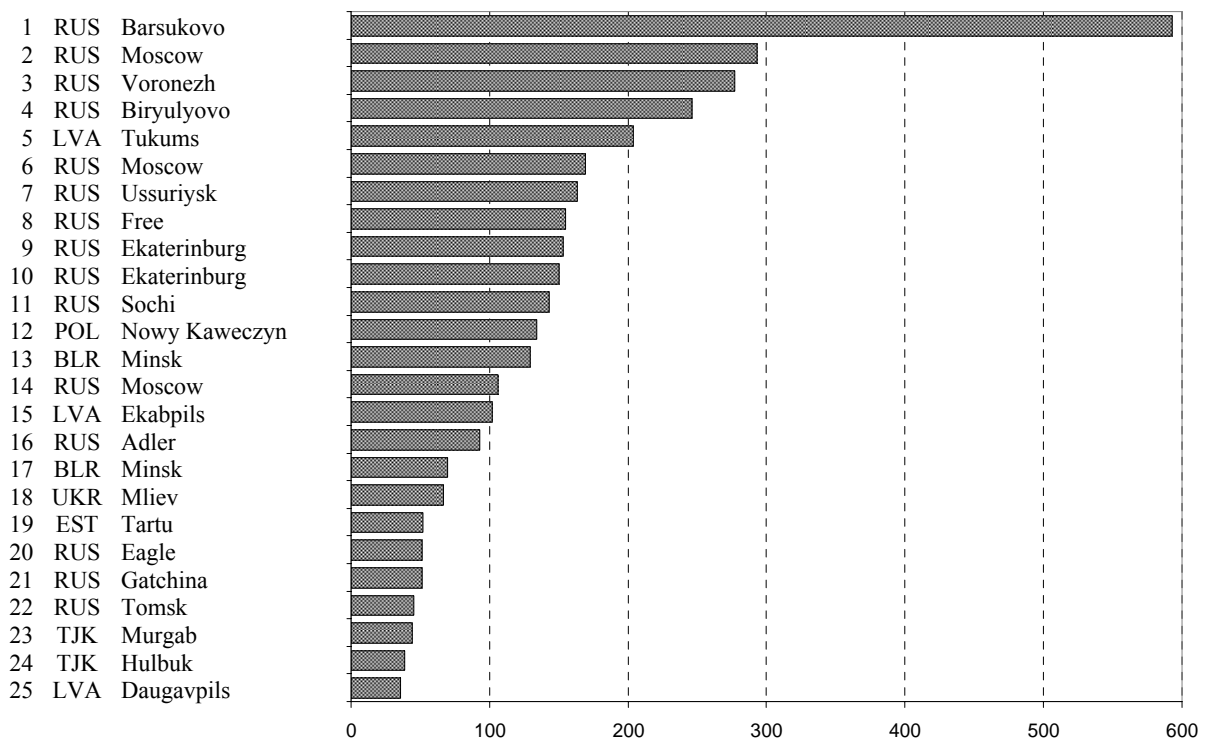


Figure 8. The number of accessions provided by institutions in the framework of cooperation with the CBG during the period of 1947 – 2020 years (the names of the institutions are given in the text).

The largest number of accessions as expected was from Belarus (1981 accessions from 26 institutions) and Russia (1013 from 50), followed in descending order by Lithuania (333 from 10), Poland (254 from 5), Ukraine (214 from 11), Latvia (207 from 9), Vietnam (204 from 1), Kyrgyzstan (151 from 2) and Estonia (104 from 5).

Figure 8 shows the distribution of the number of registered accessions from the 25 most cooperating institutions: (1) Meshcherskaya (Lipetsk) Forest-Steppe Experimental Breeding Station, (2) K.D. Pamfilov Academy of Municipal Economy, (3) B.A. Keller Botanical Experimental Station of K.D. Glinka Voronezh Agricultural Institute, (4) Research Zonal Institute of Horticulture of the Non-Black Soil Zone (All-Russian Breeding and Technological Institute of Horticulture and Nursery), (5) Tukums Flower Farm, (6) Gribovsk Vegetable Breeding Station (All-Russian Research Institute of Breeding and Seed Production of Vegetable Crops), (7) Mountain-Taiga Station of the Far East Branch of the Russian Academy of Sciences, (8) Amur Forest Experiment Station of the Far East Forest Research Institute, (9) Ural Experimental Station (Forest Institute of Urb RAS), (10) Ural Research Institute of the Academy of Municipal Economy, (11) Institute of Mountain Horticulture and Floriculture, (12) Nursery KZD Nowy Dwor, (13) Orchid Club, (14) Research Zonal Institute of Horticulture of Non-Black Soil Zone, (15) Farm of Flower and Ornamental Plants, (16) State Farm "Southern Cultures", (17) Belarus Society of Nature Protection, (18) Mliyevsk Gardening Experimental Station, (19) Tartu Station of Young Naturalists, (20) Oryol Fruit and Berry Station, (21) Gatchinsk Variety Testing of Floral and Decorative Plants, (22) Siberian State Medical University, (23) Pamir Biological Station, (24) Vakhsh Zonal Experimental Station, (25) Daugavpils Branch of Horticulture and Beekeeping.

During the period analyzed, 5,479 accessions were obtained from private collectors, 49.9% of them from 163 indicated persons (Fig. 9). The first accessions from private collections were provided by Smolsky N.V. and Zalivsky (unfortunately no first name was given) in 1956. One of the most actively

cooperating collectors with the CBG was N. I. Rutsky (Minsk), who began to provide his material in 1957. The greatest number of accessions as expected has been provided by the collectors from Belarus (1855 accessions from 111 persons). Then, in descending order follow Slovakia (282 from 1 person), Russia (271 from 28), Lithuania (139 from 6), Latvia (88 from 7), Ukraine (71 from 2) and Estonia (13 from 2).

The largest number of accessions (282) was received from one of the most prominent gladiolus breeders Igor Adamovič (Slovakia), who was awarded the International Hall of Fame in 2001 for his outstanding contribution to the development of world gladiolus production. After his death in 2006, his son Jan Adamovič donated a large part of his father's collection to the CBG in 2013, which was brought by A.V. Kruchonok, curator of the Gladiolus collection of that time.

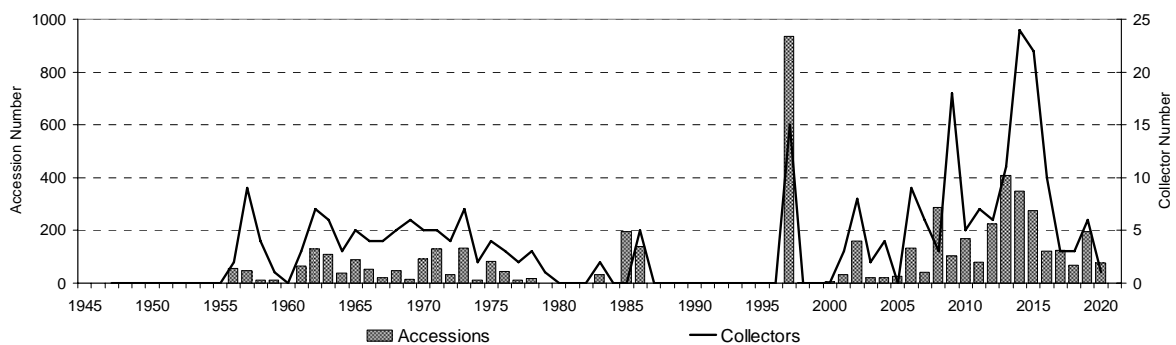


Figure 9. The numbers of accessions and private collectors from which accessions were received over the period of 1947 – 2020 years.

Many good words can be said to all the 163 identified, as well as all the unidentified private collectors who have shared their material with the CBG. However, the format of this publication does not allow us to do so. Therefore, here are the names of only 25 individuals who have contributed the largest number of accessions to the various collections of the CBG (Fig. 10).

The first accessions purchased at Exhibition of Achievements of National Economy of the USSR in Moscow were registered in 1958. Seeds and plant material were regularly purchased in the shops of the Minsk Variety Vegetable Seed Association since 1959. A total of 2145 accessions have been purchased from 8 countries were registered during the period analyzed including 1309 (61.0%)

accessions from 54 indicated and 836 ones from unindicated companies and farms. Significant increase in the number of purchased accessions was detected since 2006 (Fig. 11). Overall, during the period from 1947 to 2020, the largest number of accessions was acquired in Belarus - 897 (41.8%) accessions from 22 companies. Then in descending order follows Russia (251 accessions from of 13 companies), the Netherlands (79 from 6), Ukraine (44 from 3), Germany (19 from 4) and Poland (15 from 3).

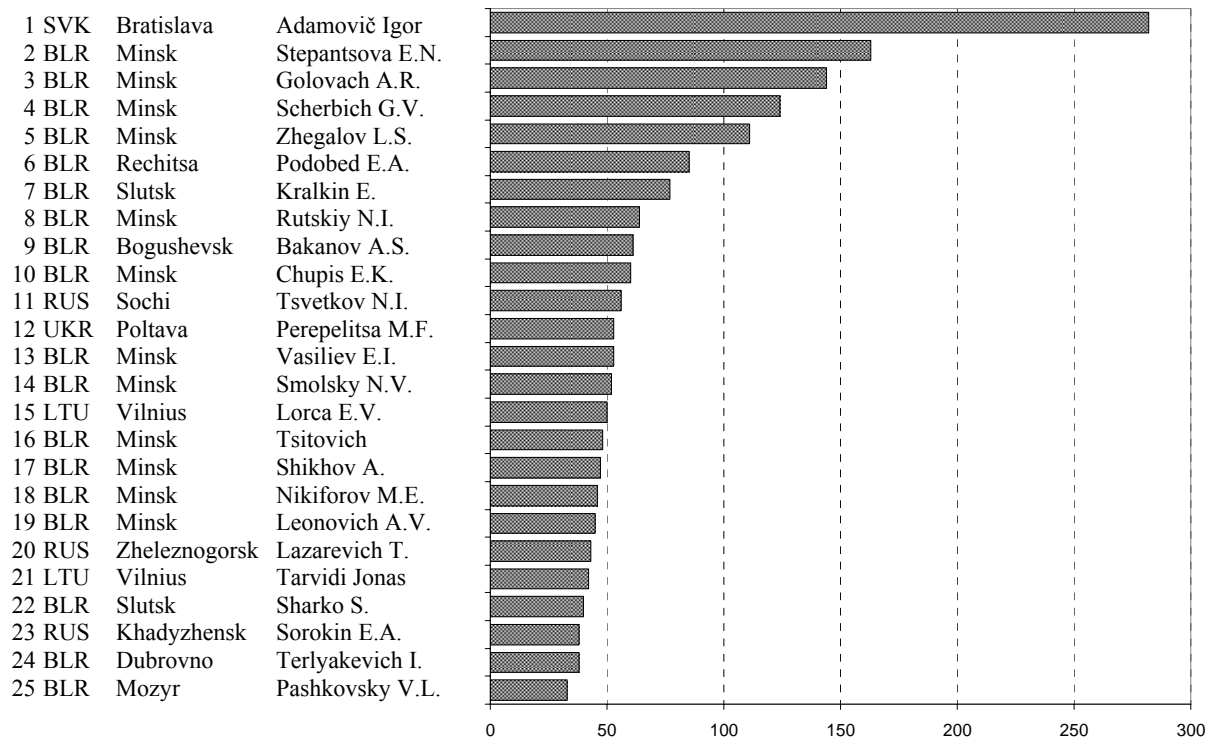


Figure 10. The number of accessions provided by private collectors to the CBG during the period of 1947 – 2020 years.

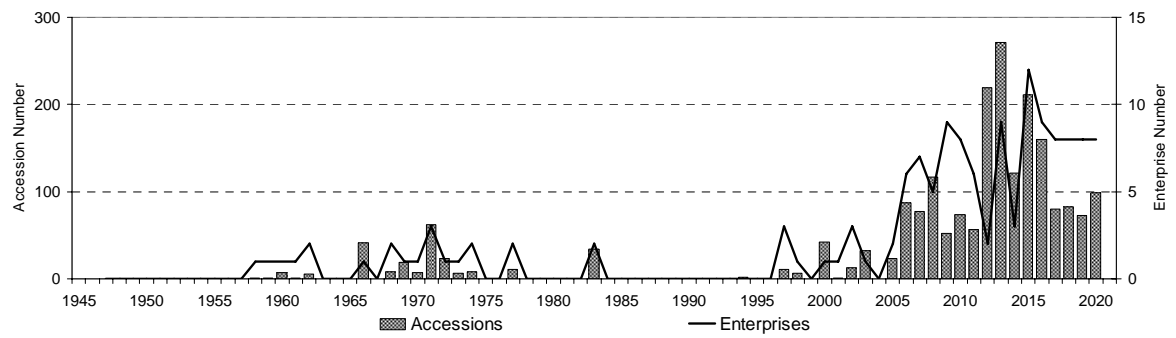


Figure 11. The numbers of accessions and commercial enterprises from which accessions were purchased between 1947 and 2020 years.

Having analyzed history of forming the CBG collections, it is necessary to indicate the researchers (collection curators) who created the plant collections, which now represent the National Heritage of the Republic of Belarus. During 1947-2020, 222 employees registered 237,926 (99%) accessions in the Main Introduction Book. For 2,383 accessions, either the curator registered the information was not pointed, or his signature or abbreviation of his name has not been identified. The departments instead of the names of the curators were indicated in some cases: Department of Dendrology (16 949 accessions), Department of Pomology (5 949), Department of Medicinal and Technical plants (675), Floriculture Department (314), Department of Greenhouse plants (266), Department of Plant Systematic (152), Department of Technical Crops (18), Department of Plant Mobilization (15) and Department of Genetics, which in 1957 registered one accession. A total of 24,339 accessions, or 10.1% of the total, have been registered by the departments.

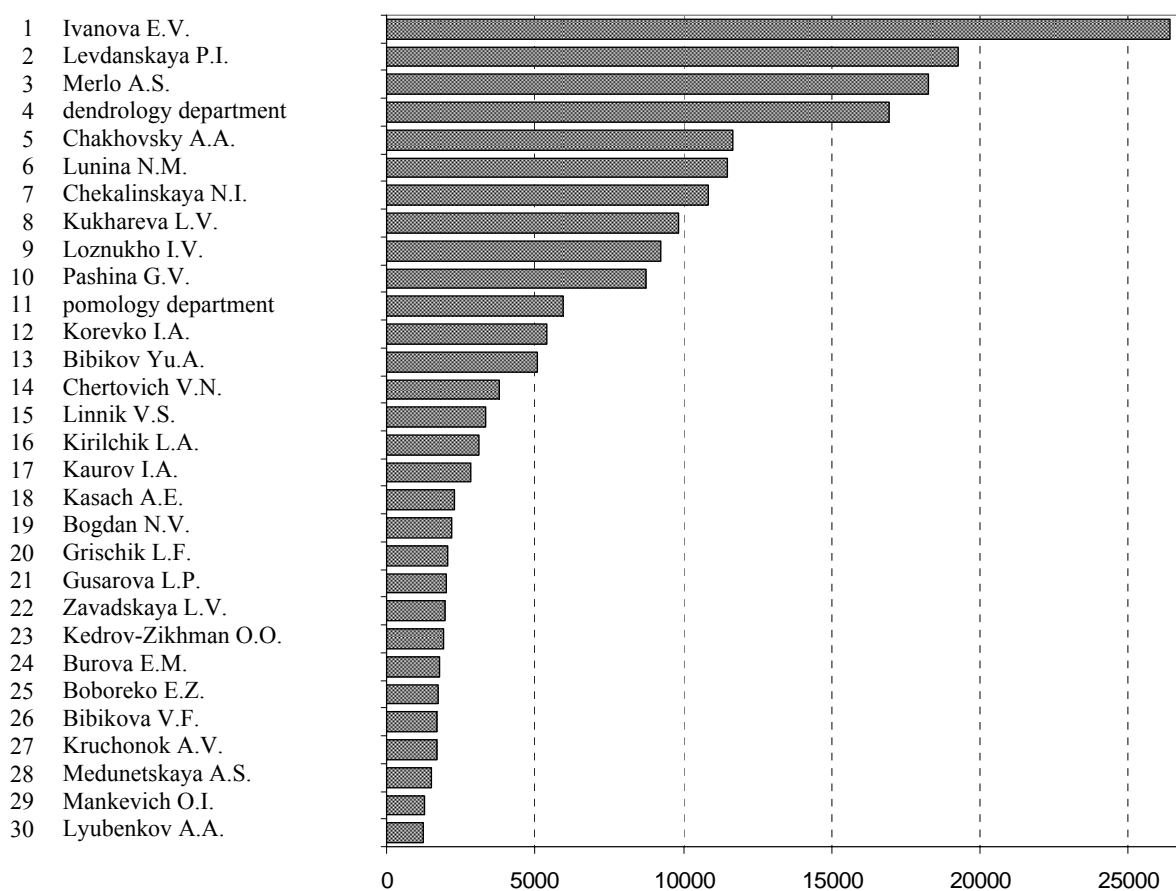


Figure 12. The number of accessions registered in the CBG collections by researchers during the period of 1947 – 2020 years.

The greatest number of accessions was registered by the founders of the CBG, who worked there for more than 40 years: Evgeniya Vladimirovna Ivanova (26 415 accessions), Praskovya Ignatievna Levanskaya (19 270), Anna Stanislavovna Merlo (18 242), Natalia Ivanovna Chekalinskaya (10 867) (Fig. 12). The next generation of the CBG researchers successfully continued their work: Aleksandr Aleksandrovich Chakhovsky registered 11 687 accessions since 1956, Natalia Mikhailovna Lunina (11 474 since 1973), Lydia Vasilievna Kukhareva (9,858 since 1969), Ivan Vasilievich Loznukho (9,252 since 1982), Galina Vasilievna Pashina (8,723 since 1964), Irina Aleksandrovna Korevko (5,387 since 1968), Yuri Aleksandrovich Bibikov (5,098 since 1958), Valentina Nikolaevna Chertovich (3,781 since 1972).

Accurately resolving the systematic positions of a taxa (accession) in manuscript book is always a challenge in mistakes of handwritings and errors of inputting data in electronic tables or forms. However, Genus were identified for 240 184 (99.9%) accessions that resulted in detection of 3 679 Genera in total. In most cases the residual accessions belong to intergeneric hybrid such as *Raphanobrassica*, *Tritipyron (Agroticum)*, *Gladanthera* and other, which cannot be identified by “The Plant List” and “World Flora Online” database although some of them could be found in International Plant Name Index.

Genera identification allows detection of taxonomy structure for accessions obtained by the Central Botanical Garden during the period of 1947 – 2020 years (Tab. 2). The majority of all accessions (96.1%) belong to the *Angiosperms* (flowering plants); the *Gymnosperms* (conifers, cycads and allies), the *Pteridophytes* (ferns and fern allies) and the *Bryophytes* (mosses and liverworts) consist 3.1%, 0.7% and 0.01% of all accessions respectively.

Table 2. Taxonomy structure of the accessions obtained by the Central Botanical Garden during the period of 1947 – 2020 years.

Major Plant Group (Phylum)	Number of		
	Accessions	Genera	Families
<i>Angiosperms</i>	230 905	3 502	263
<i>Gymnosperms</i>	7 476	53	12
<i>Pteridophytes</i>	1 783	113	19

<i>Bryophytes</i>	20	11	8
Total	240 184	3 679	302

Analysis performed identified 263 (63.2% of all in Phylum) Families of the *Angiosperms* and 12 (100%), 19 (39.6%) and 8 (4.5%) ones of the *Gymnosperms*, *Pteridophytes* and *Bryophytes* respectively. The Families having the largest number of the accessions and their systematic order are presented in Table 3. Identified were 3 502 (20.6% of all in Phylum) Genera of the *Angiosperms* and 53 (53.4%), 113 (17.9%) and 11 (0.6%) ones of the *Gymnosperms*, *Pteridophytes* and *Bryophytes* respectively. The Genera having the largest number of the accessions and their systematic order are presented in Table 4. The Genus *Rosa*, for which the maximum number of accessions were registered, was represented by 309 species (135 accepted, 89 unresolved, 85 synonyms) and 29 infraspecific taxa (11 accepted, 2 unresolved, 16 synonyms)

Table 3. Systematic order of the Families having the largest number of the accessions obtained by the Central Botanical Garden during the period of 1947 – 2020 years.

Family	Order	Clade	Phylum	Number of Accessions
<i>Rosaceae</i>	<i>Rosales</i>	<i>Rosids</i>	<i>Angiosperms</i>	21 269
<i>Asteraceae</i>	<i>Asterales</i>	<i>Asterids</i>	<i>Angiosperms</i>	21 038
<i>Fabaceae</i>	<i>Fabales</i>	<i>Rosids</i>	<i>Angiosperms</i>	14 187
<i>Lamiaceae</i>	<i>Lamiales</i>	<i>Asterids</i>	<i>Angiosperms</i>	9 953
<i>Ranunculaceae</i>	<i>Ranunculales</i>	<i>Eudicots</i>	<i>Angiosperms</i>	9 339
<i>Iridaceae</i>	<i>Asparagales</i>	<i>Monocots</i>	<i>Angiosperms</i>	8 778
<i>Poaceae</i>	<i>Poales</i>	<i>Monocots</i>	<i>Angiosperms</i>	8 010
<i>Cactaceae</i>	<i>Caryophyllales</i>	<i>Superasterids</i>	<i>Angiosperms</i>	7 612
<i>Liliaceae</i>	<i>Liliales</i>	<i>Monocots</i>	<i>Angiosperms</i>	6 276
<i>Apiaceae</i>	<i>Apiales</i>	<i>Asterids</i>	<i>Angiosperms</i>	4 766
<i>Caprifoliaceae</i>	<i>Dipsacales</i>	<i>Asterids</i>	<i>Angiosperms</i>	4 478
<i>Asparagaceae</i>	<i>Asparagales</i>	<i>Monocots</i>	<i>Angiosperms</i>	4 359
<i>Amaryllidaceae</i>	<i>Asparagales</i>	<i>Monocots</i>	<i>Angiosperms</i>	4 224
<i>Ericaceae</i>	<i>Ericales</i>	<i>Asterids</i>	<i>Angiosperms</i>	4 206
<i>Crassulaceae</i>	<i>Saxifragales</i>	<i>Superrosids</i>	<i>Angiosperms</i>	4 136
<i>Brassicaceae</i>	<i>Brassicales</i>	<i>Rosids</i>	<i>Angiosperms</i>	3 439
<i>Caryophyllaceae</i>	<i>Caryophyllales</i>	<i>Superasterids</i>	<i>Angiosperms</i>	3 288
<i>Primulaceae</i>	<i>Ericales</i>	<i>Asterids</i>	<i>Angiosperms</i>	3 243
<i>Malvaceae</i>	<i>Malvales</i>	<i>Rosids</i>	<i>Angiosperms</i>	3 233
<i>Plantaginaceae</i>	<i>Lamiales</i>	<i>Asterids</i>	<i>Angiosperms</i>	3 192

Table 4. Systematic order of the Genera having the largest number of the accessions obtained by the Central Botanical Garden during the period of 1947 – 2020 years.

Genus	Family	Phylum	Number of Accessions
<i>Rosa</i>	<i>Rosaceae</i>	<i>Angiosperms</i>	5 552

<i>Gladiolus</i>	<i>Iridaceae</i>	<i>Angiosperms</i>	5 173
<i>Tulipa</i>	<i>Liliaceae</i>	<i>Angiosperms</i>	3 228

Table 4 continuation

<i>Iris</i>	<i>Iridaceae</i>	<i>Angiosperms</i>	2 631
<i>Lonicera</i>	<i>Caprifoliaceae</i>	<i>Angiosperms</i>	2 539
<i>Allium</i>	<i>Amaryllidaceae</i>	<i>Angiosperms</i>	2 513
<i>Lilium</i>	<i>Liliaceae</i>	<i>Angiosperms</i>	2 464
<i>Primula</i>	<i>Primulaceae</i>	<i>Angiosperms</i>	2 462
<i>Paeonia</i>	<i>Paeoniaceae</i>	<i>Angiosperms</i>	2 437
<i>Rhododendron</i>	<i>Ericaceae</i>	<i>Angiosperms</i>	2 274
<i>Clematis</i>	<i>Ranunculaceae</i>	<i>Angiosperms</i>	2 226
<i>Acer</i>	<i>Sapindaceae</i>	<i>Angiosperms</i>	1 953
<i>Salvia</i>	<i>Lamiaceae</i>	<i>Angiosperms</i>	1 914
<i>Aster</i>	<i>Asteraceae</i>	<i>Angiosperms</i>	1 815
<i>Cotoneaster</i>	<i>Rosaceae</i>	<i>Angiosperms</i>	1 768
<i>Sorbus</i>	<i>Rosaceae</i>	<i>Angiosperms</i>	1 754
<i>Campanula</i>	<i>Campanulaceae</i>	<i>Angiosperms</i>	1 751
<i>Crataegus</i>	<i>Rosaceae</i>	<i>Angiosperms</i>	1 750
<i>Betula</i>	<i>Betulaceae</i>	<i>Angiosperms</i>	1 713
<i>Dianthus</i>	<i>Caryophyllaceae</i>	<i>Angiosperms</i>	1 662
<i>Dahlia</i>	<i>Asteraceae</i>	<i>Angiosperms</i>	1 621
<i>Festuca</i>	<i>Poaceae</i>	<i>Angiosperms</i>	1 592
<i>Spiraea</i>	<i>Rosaceae</i>	<i>Angiosperms</i>	1 592
<i>Begonia</i>	<i>Begoniaceae</i>	<i>Angiosperms</i>	1 542
<i>Chrysanthemum</i>	<i>Asteraceae</i>	<i>Angiosperms</i>	1 487
<i>Sedum</i>	<i>Crassulaceae</i>	<i>Angiosperms</i>	1 480
<i>Syringa</i>	<i>Oleaceae</i>	<i>Angiosperms</i>	1 466
<i>Callistephus</i>	<i>Asteraceae</i>	<i>Angiosperms</i>	1 377
<i>Viburnum</i>	<i>Viburnaceae</i>	<i>Angiosperms</i>	1 343
<i>Euonymus</i>	<i>Celastraceae</i>	<i>Angiosperms</i>	1 320
<i>Berberis</i>	<i>Berberidaceae</i>	<i>Angiosperms</i>	1 299
<i>Trifolium</i>	<i>Fabaceae</i>	<i>Angiosperms</i>	1 219
<i>Potentilla</i>	<i>Rosaceae</i>	<i>Angiosperms</i>	1 174
<i>Pinus</i>	<i>Pinaceae</i>	<i>Gymnosperms</i>	1 167
<i>Mammillaria</i>	<i>Cactaceae</i>	<i>Angiosperms</i>	1 113
<i>Juniperus</i>	<i>Cupressaceae</i>	<i>Gymnosperms</i>	1 088

Conclusion.

Thus, during the period from February 15, 1947 to December 31, 2020, 240 309 accessions obtained by the Central Botanical Garden of the National Academy of Sciences of Belarus from 75 countries all over the world have been registered in the Main Introduction Book by 222 researchers. The most of accessions (93.4%) were received within the framework of the International Botanic Garden Exchange. The fractions of accession collected in the wild, obtained in collaboration with other institutions, from private collectors and

commercial purchases were 1.3%, 2.1%, 2.3% and 0.9% respectively. The majority of all accessions registered (96.1%) belong to the *Angiosperms* and the *Gymnosperms*, *Pteridophytes* and *Bryophytes* consist 3.1%, 0.7% and 0.01% of all accessions respectively. The maximum number of accessions registered belong to the Family *Rosaceae* and the Genus *Rosa*, The Genus *Rosa* was represented by 309 species (135 accepted, 89 unresolved, 85 synonyms) and 29 infraspecific taxa (11 accepted, 2 unresolved, 16 synonyms).

References

1. Botyanovskiy I. E., Garanovich I. M., Getko N. V., Kutas E. N., Ruban N. N., Rupasova Zh. A., Sergeichik S. A., Yaroshevich M. I. Central Botanical Garden of the Academy of Sciences of Belarus. Research results 1980-1992. Minsk, 1992. 50 p (in Russian).
2. Fedoruk A. T. Garden-Park Art in Belarus. Minsk, Uradzhaj, 1989, 247 P. (in Russian).
3. Ivanova E. V., Klimovitskaya G. A. Exchange seed operations of the Central Botanical Garden of the Academy of Sciences of the BSSR. Botany (Research). Minsk, Science and Technology, 1963, vol. 5, pp. 233-236 (in Russian).
4. Minter S. The apothecaries' garden: a history of Chelsea Physic Garden. Sutton Publishing: Stroud., 2000, 210 p.
5. Reshetnikov V. N., Garanovich I. M., Volodko I. K. The Central Botanical Garden of the National Academy of Sciences of Belarus is 70 years old. Bulletin of the Main Botanical Garden. Moscow, Nauka, 2002, vol. 184, pp. 146-149 (in Russian).
6. Sidorovich E. A., Kudinov M. A., Shkutko N. V. Results of the introduction of plants in the Byelorussian SSR (to the 50th anniversary of the Central Botanical Garden of the Academy of Sciences of the BSSR). Minsk, Nauka i Tekhnika, 1982. 200 p (in Russian).

7. Smolsky N. V. 40 years of the Central Botanical Garden of the Academy of Sciences of the Byelorussian SSR. Brief results of construction and scientific activity. Introduction and plant breeding. Minsk, 1972, pp. 3-36 (in Russian).

8. Smolsky N. V. On the construction and scientific activities of the Central Botanical Garden of the Academy of Sciences of the BSSR. Collection of scientific works of the Central Botanical Garden of the Academy of Sciences of the BSSR. Minsk, 1960, no. 1, pp. 3-18 (in Russian).

9. Titok V. V., Volodko I. K. Plant introduction and its role in solving economic and social problems of the Republic of Belarus. Materials of the International Conference dedicated to the 80th anniversary of the Central Botanical Garden of the National Academy of Sciences of Belarus "Introduction, conservation and use of biological diversity of the world flora" (June 19-22, 2012, Minsk, Belarus). Minsk, Confido, 2012, vol. 1, pp. 294-297 (in Russian).