Botanical Garden of the University of Tartu (Dorpat) and the Botanical Network in the First Half of the 19th Century

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Abstract: *The paper deals with the establishment of the Botanical Garden of the University of Tartu (Estonia) in 1803 and its further developments in the first half of the 19th century. A decisive role in the establishment of the Botanical Garden was played by Gottfried Albrecht Germann, the first professor of natural history (botany) at the university, and by a learned gardener Johann Anton Weinmann. Owing to the scientific contacts between these two men, species richness in the Botanical Garden increased rapidly. In 1810, after the collections had been moved to their present location of the garden in the autumn of 1808, the garden contained 4,586 species. By 1927, the garden's species richness had grown to 10,449 taxa and by 1845 – to about 14,000 taxa on account of the live plants and seeds collected by the subsequent teachers of botany and leaders of the Botanical Garden – Carl Friedrich von Ledebour, Alexander Georg von Bunge, Ernst Rudolph Trautvetter and Carl Johann Maximowicz on their expeditions, as well as with the help of contributions from many other botanists, pharmacists, collectors, etc. According to the analysed manuscript registration lists of plants and seeds from the years 1823–1832, 1839–1841 and 1846–1852, the garden received 48,096 accessions from nearly 350 persons and nearly 30 nurseries, with 32 persons having sent more than 400 accessions. Among the contributors were many then well-known botanists of Europe.*

Keywords: *19th century, botanical garden, botanists, contributors of plants and seeds, species richness, Tartu (Dorpat)*

Introduction

By the end of the 18th century, a solid botanical network had emerged in Europe, involving many researchers and amateur naturalists, academic plant taxonomic research and publishing at universities, numerous extensive expeditions, botanical gardens, private collections, nurseries and developments in ornamental gardening. Great numbers of plants had been collected in botanical and private gardens, herbaria had been established, many local and foreign floras had been examined and an extensive botanical bibliography published (Pritzel, 1851, pp. 1–330, 379–391; Meyer, 1857, pp. 254–288; Hill, 1915, pp. 190–223).

Botanical science in Russia in the 18th and 19th century was advanced largely by natural scientists educated in Germany, France, England, Denmark and Sweden, who had settled in Russia in the 18th century for their research and for arranging research expeditions. At the same time, researchers also emerged from among the Baltic Germans. All these researchers published also their numerous scientific works in Germany and Russia (Trautvetter, 1837, pp. 4–50, 57–75; Kolchinsky, 2004, pp. 106–116; Sokoloff *et al.*, 2002, pp. 129–191). Thirty-six better-known botanical gardens with various purposes and names are mentioned in Russia from the 17th century onward (Trautvetter, 1837, pp. 51–54). Private gardens were actively established also in the provinces of Estonia and Livonia, and also the park culture here was highly developed (Hupel, 1791, pp. 534–553; Germann, 1805, pp. 17–32; Hein, 2007, pp. 15–87).

The first private botanical gardens in Russia were established in the 18th century in the manor of Demidov near the village of Krasnoe Solikamsk in the Urals (1731), in the Neskuchny Manor of Prokopy Demidov in Moscow (1756), and in the manor of Alexei Razumovsky at Gorenki (in the late 18th century). In 1771, Ivan Lepekhin registered 422 species in the garden of Solikamsk, several of them being exotic species. The plant catalogue of the Neskuchny Garden contained 2,000 species in 1781 and 4,363 species in 1806. The Gorenki Garden was led in its early years by botanists Friedrich Christian Stephan (1798–1803), Ivan Redowsky (1803–1805), and Friedrich Ernst Ludwig von Fischer from Germany (since 1806), each of them giving a contribution to increasing the species richness of the garden. Owing to Fischer, seeds and plants were sent or brought there by many Russian explorers. In 1803, the garden contained 2,846 species, while the collection had increased to 8,036 species by 1812 (Trautvetter, 1837, pp. 52–53; Sokoloff *et al.*, 2002, pp. 161–169, 182–183; Elina, 2006, pp. 582–583).

By the time the Botanical Garden of the University of Tartu began to be established, botanical gardens had existed in Europe for 250 years and a large variety of plants had been introduced there from various regions of the world. In addition, good contacts had been established between the botanical gardens, botanists and explorers in Western Europe and Russia. Many researchers who had been educated in the universities of Europe had given a great contribution to studying the flora of Russia, and many plants were preserved in bigger collections and herbaria (Trautvetter, 1837, pp. 1–145; Sokoloff *et al.*, 2002, pp. 129–191). All this contributed to the rapid formation of species richness in the Botanical Garden of the University of Tartu. New plants were obtained from many locations and the garden evolved into one of the biggest and most significant botanical gardens in Russia in the 19th century, first of all due to the diversity of plants from East Asia.

This paper deals with the formation and changes of species richness in the Botanical Garden of the University of Tartu in 1804–1851, also providing an insight into the garden's leading staff as well as the provenance and contributors of live plants and seeds in the above period.

Methods and material

The paper builds on published literature and on manuscripts preserved in the Estonian Historical Archives in Tartu (EAA 1) – general plant lists of, and data on contributors of plants to, the Botanical Garden of the University of Tartu. The general lists cover the years 1804, 1816–1818, 1822, 1823–1840, 1842, 1843, 1846, 1848 and 1851. Two general lists are stored in the Botanical Garden of the University of Tartu. One of them is untitled and thus it remains unclear which data it concerns, while the other one is the general list for 1845 (*Enumeratio*..., 1845). Both have been analysed before (Sander, 2010, pp. 90–93). The plant names occurring in the manuscripts are written in ink on the left-hand pages together with the names of the species' authors and often also with the names of senders of the plants. In places, plant names in the manuscripts have been crossed out, recorded by numbers or just by the names of authors, and a few entries have also been added in between. The right-hand pages contain additional data, which are often written in pencil and appear to have been added later. The lists do not reveal their compilers – only in some single cases are they signed and stamped by the then directors of the garden.

Also the registration lists of seeds or live plants sent to the botanical garden have been preserved from the first half of the 19th century. These contain the following

data: the name of the sender, place of dispatch, number of accessions received on the respective date, and the date of arrival or registration. The names of senders are missing in places. In most cases it is also mentioned whether the parcel contains seeds or live plants, although the latter were sent only in very rare cases. Also the names of plants are listed. The lists cover the following periods: 23 Jan 1823–7 Nov 1832, 10 Apr 1839–22 May 1841 and 12 May 1846–1854 (EAA 2).

Leaders of the Botanical Garden of the University of Tartu

In the first half of the 19th century, the Botanical Garden of the University of Tartu had three directors: Gottfried Albrecht Germann (1803–1809), Carl Friedrich von Ledebour (1811–1836) and Alexander Georg von Bunge (1836–1867) (Siilivask, 1982, pp. 185–188). Next to the directors, a great contribution to the development of the Botanical Garden was made by the assistant directors and learned gardeners (Meikar, 2002, pp. 61–73) (Table 1). The latter immediately started to lead the work in the garden and had a great impact on the actual situation in the garden.

Table 1. Directors and learned gardeners of the Botanical Garden of the University of Tartu in the first half of the 19th century (Meikar, 2002, p. 65)*

Directors	Assistant directors	Head gardeners
Gottfried Albrecht Germann (1803–1809) Carl Christian Friedrich von Ledebour (1811–1836) Alexander Georg von Bunge (1836–1867)	Ernst Rudolph Trautvetter (1833–1835) Carl Albert Rathlef (1835) Carl Herrmann Bluhm (1835–1836) Anton Bärnhoff (1836) Friedrich Julius Seetzen (1836–1846) Friedrich Wilhelm Kupffer (1848–1850) Carl Johann Maximowicz (1850–1852)	Johann Friedrich Kieser (1803–1804) Johann Peter Buek (1804) Johann Anton Weinmann (1805–1813) Albert Siegmund Natusch (1813–1814) Carl Neumark (1814–1816) Ludwig Riedel (1818–1820) Louis Autem (1821) Heinrich Wilhelm Gebhardt (1825–1832) Friedrich Wilhelm Günter (1833–1834) Wilhelm Eduard Stelling (1834–1876)

** The table does not include short-term substitutes in these positions.*

The Botanical Garden was founded and organised by Professor Germann (1773–1809), the first professor of natural history (botany) at the University of Tartu, whose research at the university focused mostly on botany and ornithology. In his teaching work, he lectured on Natural History, Botany, Zoology, Mineralogy, Entomology and Ornithology. Germann also established a cabinet of natural history for the accommodation of various collections and for teaching work, and assembled an entomological and rock collection and a herbarium (Siilivask, 1982, pp. 185–186; Sander *et al.*, 2009, pp. 46–50).

Germann was assisted in establishing the Botanical Garden by learned gardeners Kieser, Buek and Weinmann (Meikar, 2002, pp. 64–67). In 1805, Johann Anton Weinmann (1782–1858), a practitioner with extensive horticultural experience from Germany, assumed the head gardener's position at the Botanical Garden and held the position until 1813. Prior to coming to Tartu, he worked in the Botanical Garden of Würzburg and as an assistant to Razumowski's[1] palace gardener Rosenthal[2] in Vienna. Weinmann continued the work of his predecessors in the old location of the Botanical Garden and established the garden in its present location in Tartu (Lai 38/40). Planting of the plants transferred from the old garden, as well as new ones, started under his guidance in the autumn of 1808 and the new garden was mostly completed by 1810 (Weinmann, 1810, pp. XI–XIII; Le Lièvre, 1997a, pp. 36–38; Sander & Meikar, 2009, pp. 72–85). In 1813, Weinmann moved to St Petersburg, where he initially worked in the garden of the Gatchina Palace and two years later became the supervisor of the gardens of Pavlovsk Palace. He was a flora researcher and taxonomist, with his research involving, next to vascular plants, also bryophytes, lichens, algae and, in particular, fungi. He was elected a correspondent member of the St Petersburg Academy of Sciences in 1831 (Siilivask, 1982, p. 186; Lipshits, 1947, pp. 77–78).

After Germann's death, the position of professor of botany remained vacant, while the duties of the director of the Botanical Garden were assumed by Weinmann (Tänavots, 1994, p. 30). Initially, there were several candidates for the position of professor of botany, including Karl (Carl) Asmund Rudolphi (1771–1832), Ledebour's teacher at the University of Greifswald, who, however, withdrew his candidacy. Yet no elections were held for some reason. The second

[1] Count Andrei Razumowski (1752–1836), a Russian diplomat, worked in 1777–1779 in the Russian Embassy in Vienna, since 1794 the Russian ambassador in Vienna. Later lived in Italy, returned to Vienna in 1801.

[2] Johann Konrad Rosenthal was a then famous gardener in Austria, in particular in Vienna.

time, Ledebour and Tauscher[3] were the only candidates. Ledebour was preferred and took up the position. Ledebour (1785–1851) entered the University of Greifswald in 1802 and graduated as a Master of Science in 1805, earning also his Doctor of Medicine degree in the same year. On his way to Tartu, Ledebour stopped in Berlin, where he became acquainted with C. L. Wildenow[4] and P. S. Pallas[5]. Ledebour worked at the University of Tartu for 25 years (1811–1836) (Levitskii, 1902, pp. 344–348; Tankler & Pullonen, 1994, p. 17).

Ledebour lectured on Botany, but also Pharmacological Botany, Terminology of Botany, History of Botany, etc., and, to a small extent, also Zoology and Mineralogy. He also taught practical courses for advanced students and guided botanical tours (Tankler & Pullonen, 1994, p. 12).

Ledebour also made great efforts to extend the Botanical Garden. At his demand, the greenhouses and teaching and residential buildings were renovated, construction of the wall surrounding the garden was completed, and the territory of the garden was extended on account of the neighbouring plots. An additional parcel of land was bought in 1822, and the area behind the pond was filled and made usable (in parallel with cleaning of the pond) in 1824. The outdoor planting area tripled as a result of various earthworks. The budget of the garden was increased from 1,200 to 4,000 roubles at his request, and additional 2,000 roubles were allocated to the garden in 1829 (Tankler & Pullonen, 1994, p. 18; Tänavots, 1994, p. 30; Poots, 1994, p. 37). Ledebour also replenished the equipment of the Chair of Botany, bought state-of-the-art microscopes and expanded the teaching herbarium and scientific herbarium. The plant collections of the Botanical Garden also increased considerably during his time (Siilivask, 1982, p. 186) and the seed collection began to be created, amounting to 8,617 specimens in 1837 (Mushinskii, 1911, p. 149).

Ledebour also organised significant expeditions. The first one, to the Crimea, was carried out from May to October 1818 together with Carl Anton Meyer (Trautvetter, 1837, p. 38; Tankler & Pullonen, 1994, p. 19). The second expedition, a two-year journey to Altai, was undertaken in 1826–1827 together

[3] August Michael Tauscher (1771–1841) was a philosopher, botanist and entomologist. He lived in Russia in 1806–1812, organising scientific expeditions in 1806 and later. Since 1814 he lived in Saxony and since 1826 in Dresden.

[4] Carl Ludwig Wildenow (1765–1812) was a German botanist, pharmacist and plant taxonomist. He worked as a professor of natural philosophy and botany at the Berlin Collegium and University of Berlin and was the director of the Botanical Garden of Berlin from 1801 until his death.

[5] Peter Simon Pallas (1741–1811) was a German zoologist and botanist who worked in Russia in 1767–1810.

with Alexander von Bunge and Meyer. Each of the three took a separate extensive route (Trautvetter, 1837, pp. 18–21; Poots, 1994, pp. 39–40; Le Lièvre, 1997a, pp. 52–54).

Together with Meyer, Bunge and other botanists, Ledebour examined the plant material collected by botanists Adelbert Chamisso and Morten Wormskjold and zoologist Johann Friedrich Eschscholtz during their participation in the round-the-world journeys of Otto von Kotzebue (1815–1818 and 1823–1826), as well as the material collected by Carl (Karl) Eduard Eichwald during his expedition to Southern Russia in 1825–1826 (which started and ended in Kazan). Ledebour also examined the plant material collected by Finnish zoologist Alexander von Nordmann and Th. Döllinger in Southern Russia in 1836 (Trautvetter, 1837, pp. 6, 30–31; 33). On the basis of the plant material collected by him and others on the expeditions, he wrote several works, including a four-volume Flora Altaica (together with Bunge and Meyer, published in 1829–1833), a two-volume travelogue on Altai (published in 1829 and 1830), and a four-volume Flora Russica, published in 1842–1853 (Trautvetter, 1837, pp. 19, 61; Siilivask, 1982, pp. 186–187; Kask, 1994, pp. 22–29; Poots, 1994, p. 41; Le Lièvre, 1997a, pp. 41–52).

Bunge, who was elected as professor of botany, head of the Chair of Botany and director of the Botanical Garden of the University of Tartu after the retirement of Ledebour in 1836, studied medicine at the University of Tartu in 1821–1825 and obtained his doctorate of Medicine in 1825. In 1826, Bunge commenced work as a physician in Barnaul, Tomsk Governorate, and participated in the Altai expedition of Ledebour and Meyer. He worked in the expedition area (Barnaul, Zmeinogorsk, eastern Altai) until 1830. In 1830–1832, he participated in an expedition to Mongolia and from there to Bejing through the Gobi Desert as part of a diplomatic mission. In 1832, Bunge carried out a second expedition to Altai. In 1833, he was elected as an extraordinary professor of botany of the University of Kazan and nominated a correspondent member of the St Petersburg Academy of Sciences. In 1834 and 1835, Bunge carried out expeditions in Southern Russia. In 1857–1859, he participated in an expedition of the Russian Geographical Society to Persia (Iran).

Bunge wrote monographs on many complicated plant genera: *Acantholimon* (Plumbaginaceae), *Anabasis* (Chenopodiaceae), *Astragalus* (Fabaceae), *Cousinia* (Asteraceae), *Echinops* (Asteraceae), *Gentiana* (Gentianaceae), *Heliotropium* (Boraginaceae), and others. He has written papers on the flora of Russian steppes, Central Asia, Mongolia, China and Iran. As an excellent taxonomist, Bunge also examined the plant collections of Alexander Gustav

von Schrenk; Alexander Theodor von Middendorff; Gustav Radde, explorer of the Crimea, Caucasus and East Siberia; Alexander Lehmann, explorer of Central Asia; Alexander Czekanowski, explorer of East Siberia; and others. Bunge organised expeditions (some of them together with Meyer) to the then Estonian, Livonian and Curonian governorates in 1823–1851 and published a concise overview of the flora of the region in 1853. Bunge also replenished the collections of the Botanical Garden. The greenhouses of the garden were modernised in 1855–1857 at his demand and an additional, fifth greenhouse was built in 1858 (Trautvetter, 1837, pp. 21, 41, 45; Bunge, 1847, pp. 1–139; 1853, pp. 1–292; Siilivask, 1982, p. 188; Kaavere, 1978, pp. 517–520; Le Lièvre, 1997a, pp. 52–54; Läänelaid, 2006, pp. 255–272).

Due to his high workload and long-term expeditions, Ledebour was requesting since 1820 that an additional position be opened for an assistant to deal mainly with the Botanical Garden. The position of assistant director of the garden was allocated in 1833 and assumed in the same year by Ledebour's student Ernst Rudolf Trautvetter (1809–1889). Trautvetter graduated from the University of Tartu with a gold medal in 1829 and returned to his city of birth Jelgava (Mitau) until assuming the position in Tartu. In addition to performing the duties of the assistant director, Trautvetter worked since 1834 as a private docent, lecturing also on the local flora (*Flora Livonica*). After leaving Tartu in 1835, he worked in 1835–1838 as a junior assistant director in the St Petersburg Botanical Garden under director Friedrich Ernst Ludwig von Fischer and moved to the University of Kiev in 1838, becoming a professor of botany there and establishing the university's Botanical Garden in 1841. He was also a dean at Kiev University in 1841–1847 and rector in 1847–1859. In 1837, Trautvetter was elected as a correspondent member of the St Petersburg Academy of Sciences. Retiring in 1864, he returned to work in St Petersburg, became the acting director of the Botanical Garden and was elected as the director in 1866 and 1870. Trautvetter published his first scientific paper in 1830 and the last one in 1888. He stood out for his phytogeographic and floristic works (Trautfetter", 1873, p. 178; Regel, 1889, pp. 661–672; Hasselblatt & Otto, 1889, p. 144; Siilivask, 1982, p. 187).

For the entire first half of the 19th century, the assistant director's position was held by alumni of the University of Tartu with different specialisation. Rathlef (1810–1895), who held the position for a brief period, studied theology and philosophy at the University of Tartu in 1828–1832, continued his studies in Berlin for one year and worked as a private tutor in Tartu in 1833–1835. Later, in 1854–1858, he worked in Tartu as an extraordinary professor of history and in 1858–1866 as a full professor of history. Bluhm (1812–1904) studied medicine in Tartu in 1831–1836 and also received a degree of Doctor of Medicine there,

working as an assistant director of the Botanical Garden during either his studies or study breaks. Since 1837, he worked as a practicing physician in Jelgava. Bärnhoff (1812–1855) studied medicine in Tartu in 1831–1835, worked as an assistant director of the garden for a brief period after his graduation and as a physician in Alūksne (Marienburg, Latvia) since 1838. Seetzen (1810–1885) studied medicine in Tartu in 1830–1836, worked as an assistant director of the Botanical Garden in 1836–1846 and thereafter worked in St Petersburg. Kupffer studied mathematics in Tartu in 1833–1837 and worked as a private tutor in Curonia after leaving the assistant director's job in Tartu (Hasselblatt & Otto, pp. 177, 198, 209, 213, 226; Siilivask, 1982, p. 159). Thus, despite the fact that Ledebour had been requesting for years for an assistant director's position to be allocated, no competent worker who would also be an outstanding researcher emerged for this position after Trautvetter during the first half of the 19th century.

Another assistant director of outstanding merit, next to Trautvetter, was Carl Johann Maximowicz (1827–1892), who graduated from the University of Tartu in 1850 as a student of Bunge. His two-year period in Tartu is regarded as preparation for his subsequent grand works. After leaving Tartu, he moved to work as herbarium curator in the St Petersburg Botanical Garden (1852–1855, 1858–1859, 1864–1869), where he became the head botanist in 1869 and was elected as the temporary director of the museum and biology laboratory of the Botanical Garden in 1870. In 1855–1858 and 1859–1864, Maximowicz worked as a botanist-explorer. In 1853–1854, he participated in a round-the-world expedition on the ship *Diana* together with Leopold von Schrenk and, in 1854–1857, explored the vegetation of the Amur region. His later expeditions took him to Mongolia, Tibet, China, Korea and Japan (Trautfetter", 1873, pp. 181–182; Siilivask, 1982, p. 188; Le Lièvre, 1997b, pp. 131–143; Barnes, 2001, p. 3).

Learned gardeners are known to have changed frequently during Ledebour's time. On some occasions there were none working at the garden and Ledebour himself had to do the work. The only noteworthy learned gardener at this time was Gebhardt from Riga, who worked in this position for a longer period than the others (Willkomm, 1873, p. 23). Unfortunately, he died in 1832 at the age of 29. Gebhardt may have been dealing with the plants and herbaria brought along by Ledebour from his journeys (Le Lièvre, 1997a, p. 40). Gebhardt was succeeded in the position of learned gardener by Wilhelm Eduard Stelling, who started in 1828 as a gardener's apprentice and later worked as assistant to the learned gardener. The administration was satisfied in all respects with his work and he was repeatedly acknowledged for the excellent order attained in the garden (Meikar, 2002, p. 67).

Species richness in the Botanical Garden in 1810–1851

According to literature data based on Weinmann's list from 1810, there were 4,360 plant species growing in the garden in 1810, with 509 of them being native plants (Siilivask, 1982, p. 186). The list contained 4,586 species from 968 genera. The mode of cultivation was not specified for two of them. Of the remaining 4,584 taxa, 742 were growing in a heated greenhouse, 1,508 were growing in a cold greenhouse, and 2,358 – in the open ground. This makes a total of 4,608 taxa, of which 24 occurred in two sites, mostly both in a cold greenhouse and in the open ground (Weinmann, 1810, pp. 1–170; Sander & Meikar, 2009, p. 82). After 1810, the number of plant species in the garden increased, although the increase was not continuous but variable between years. In 1827, the garden had 10,449 species (Ewers, 1827, p. 439), and no other numerical data are known to have been recorded for that year. Of the 10,449 species, 4,477 were growing in greenhouses and 7,627 were growing in the open ground. As we can see, there were more plants growing in the garden in total than recorded on the species list. Thus, 1,655 species were growing both in greenhouses and in the open ground. The biggest plant genera were *Allium* (with 90 species), followed by *Astragalus* and *Rosa* (both with 76 species), *Potentilla* (65), *Campanula* and *Euphorbia* (both 56), *Medicago* (54) and *Iris* (52). The collection also included over 800 Siberian species brought by Ledebour from his 1826 expedition, some of which were completely new to science and some had not been brought into cultivation earlier. The Botanical Garden also had a herbarium of Altaian flora with 1,600 species.

All registered plant names were counted separately from the volumes of 1845 and 1851. In 1845, the left-hand pages contained 13,665 species from 1,707 genera, with more than 1,500 taxa being woody plants (*Enumeratio*…, 1845). The genera *Alnus*, *Betula* and *Carpinus* appeared on torn-out pages. Part of the 13,665 taxa have been crossed out later and rather many are unidentified and recorded with numbers. Considering the fact that eight pages had been torn out (with an average of 35 taxa per page) and three were partly torn out, the list may have included approximately 14,000 taxa. In places, plants have been recorded also on right-hand pages – these are pencil-written and appear to have been added later. A total of 438 additional taxa from 81 genera were listed on such pages, 87 of them being woody plants (*Enumeratio*..., 1845). The most extensively represented genera were *Silene* (190 taxa), *Hieracium* (160), *Veronic*a (148), *Centaurea* (131), *Rosa* (128, of which 40 were unidentified), *Potentilla* (116), *Thalictrum* (104) and *Salvia* (100 taxa), followed by *Dianthus*, *Iris*, *Triticum* and *Vicia* (each with 94 taxa). Of woody plants, the genus *Rosa* was represented with 166 supposed taxa, of which 13 were recorded just by

the author's name and 27 were recorded with numbers. The genus *Rosa* was followed by *Ribes* (42 taxa); *Pyrus,* incl. *Malus*, (39); *Crataegus* (31); *Pinus* (incl. *Abies*, *Larix*, *Picea*), *Erica* and *Cytisus* (27); *Lonicera* (25); *Acer* (20); *Caragana* (19); *Rhamnus* (18); and *Rhododendron* and *Cotoneaster* (14).

By 1851, the species richness of the garden had not decreased – the list contained 13,180 taxa from 1,886 genera (EAA 1). The most extensively represented genera were *Silene* (196 taxa), *Hieracium* (158), *Potentilla* (152), *Veronica* (123), *Centaurea* (115), *Iris* (114), *Thalictrum* (110), *Allium* (109), *Astragalus* (95) and *Salvia* (90). The biggest genus of woody plants was *Rosa* (90 taxa), followed by *Crataegus* (38), *Spiraea* (35), *Lonicera* (31), *Fraxinus* and *Berberis* (25) and *Acer* (22). Also the genus *Clematis*, which includes both herbaceous and woody plants, was numerously represented – with 45 taxa.

Contributors of live plants and seeds in 1823–1854

General data

In the period covered in this paper, the Botanical Garden received 48,096 accessions of live plants and seeds. In eight years the number of accessions amounted to more than three thousand. The largest number of accessions (nearly 4,000) was received in 1840. The figure for 1839 refers to accessions received in April and the one for 1846 refers to the ones received in May (Table 2).

The senders of live plants and seeds to the Botanical Garden are referenced in the manuscripts by their names and places of dispatch. The title 'professor' (prof.) and the initials are sometimes added, and the first name is added in very rare cases. The authors are of the opinion that the persons referred to in this paper are likely to have been the senders. Data on the persons were obtained from various encyclopaedic publications, websites of universities, various overviews (Trautvetter, 1837, pp. 137–145; Pontt & Döhren, 1845; Pritzel, 1851; Meyer, 1857; Trautfetter", 1873; Hasselblatt & Otto, 1889; Levitskii, 1902/1903; Lipshits, 1947–1952; Bugyi, 1965; Rowell, 1980; Morton, 1981; Siilivask, 1982; Minelli, 1988; Barthlott, 1990; Peterson, 1996, pp. 77–80; Doctor, 2001; Kongo, 2003; Bumblauskas *et al.*, 2004, pp. 29–39; Zdenek & Zalewska-Galosz, 2004, pp. 1033–1034; Ričkienė, 2009, pp. 168–169; Franz Paula von Schrank 2011; *Index Collectorum*, 2011; *Italian botanists*, 2011).

Contributions were received from a total of nearly 180 persons and nearly 10 nurseries, with 32 persons having sent more than 400 accessions and 12 persons

– over 1,000 accessions (Table 3). A total of 35,708 accessions (74%) were received from the 32 persons.

In addition to the 32 persons listed in the table, 301–400 accessions were received from five persons: **Martin Martens** (1797–1863), professor of chemistry and botany at the Louvain Catholic University, sent 357 accessions from Louvain; apothecary **Williams** – 357 from Tbilisi; botanist and agronomist **Joseph Decaisne** (1807–1882) – 378 from Paris; botanist **Jean Baptiste Verlot** (1825–1891) – 365 from Grenoble; and **Ernst Rudolph Trautvetter** – 370 from Kiev. 200–300 accessions were received from 18 persons.

Table 2. Accessions received by the Botanical Garden in different years

Year	No. of accessions	Year	No. of accessions	Year	No. of accessions	Year	No. of accessions	Year	No. of accessions
1823	2,534	1824	3,031	1825	3,227	1826	3,230	1827	2,019
1828	1,909	1829	3,578	1830	3,546	1831	3,452	1832	3,685
1839	726	1840	3,965	1841	2,835	1846	368	1847	1,250
1848	1,116	1849	766	1850	629	1851	2,395	1852	1,054
1853	1,774	1854	1,007	Total 48,096					

Table 3. Major contributors of accessions to the Botanical Garden of the University of Tartu

Senders and places of dispatch	Years of sending	No. of accessions	Senders and places of dispatch	Years of sending	No. of accessions
Carl Anton Meyer, St Petersburg, Caucasus, Baku, Kazbek, Balastan (Iran)	1828–1831 1850–1854	2,908	Gustav Schübler, Tübingen	1825–1832	790
Johann Jakob Bernhardi, Erfurt	1823–1832 1840, 1841 1846, 1847	2,417	F. Hunneman, London, Mexico, South America, Chile	1830, 1831 1832	767
Jens Wilken Hornemann, Copenhagen	1823–1825	2,314	Gustav Kunze, Leipzig	1840, 1841 1847–1851	747
Christoph Friedrich Otto, Berlin	1823–1832 1840, 1841	2,232	Friedrich Georg Gottlieb Bartling, Göttingen	1841, 1846–1848 1850, 1852 1853	743

Senders and places of dispatch	Years of sending	No. of accessions	Senders and places of dispatch	Years of sending	No. of accessions
Friedrich Ernst Ludwig Fischer, St Petersburg	1825–1832 1840, 1841 1846	2,059	Curt Polycarp Joachim Sprengel, Halle	1823–1825 1828–1832	740
Heinrich Gottlieb Ludwig Reichenbach or his son Heinrich Gustav Reichenbach, Dresden	1823–1825 1827, 1828 1830, 1832 1839, 1840 1848–1852	1,761	Michał Szubert, Warsaw	1823–1828 1830, 1832 1840, 1841	731
Heinrich Adolf Schrader, Göttingen	1823–1832	1,659	Wilibald Swibert Joseph Gottlieb von Besser, Krzemeniec	1823–1825 1827, 1828 1830, 1832	678
Carl Friedrich von Ledebour, Kazan, Tomsk, Barnaul	1826	1,498	Ernst Meyer, Königsberg	1828–1832 1840, 1841 1847–1851	637
Charles-François Brisseau de Mirbel, Paris	1829–1832 1841, 1847 1848	1,431	Bartels, Kharkov	1823–1825 1828–1830	621
Johann Georg Christian Lehmann, Hamburg	1823–1826 1828–1832 1840, 1841 1847–1854	1,369	Georg Matthias von Martens, Munich, Trieste, Christiania (Oslo)	1827, 1830–1832	618
Carl Constantin Christian Haberle, Pest	1823–1830 1832	1,260	Frederic von Gebler, Barnaul	1823–1828 1839	615
Ludolph Christian Treviranus, Wroclaw, Prague, Bonn	1823–1832	1,046	Johann Anton Weinmann, Pavlovsk, St Petersburg	1824, 1825 1828–1830 1840, 1853	598
Alojzy Rafal Estreicher, Krakow	1824, 1826 1829–1831 1840, 1841	995	Friedrich Sigmund Voigt, Jena	1823–1825 1827, 1830–1832 1841 1847–1849 1851	526
Jósef Jundziłł, Vilnius	1824–1829	829	Eduard August von Regel, Zürich	1847–1852 1854	513
Vincenz Frantisek Kosteletzky, Prague	1831, 1832 1840, 1841 1847, 1851 1853, 1854	809	Michele Tenore, Navre?	1840	508
Christian Friedrich Hornschuch, Greifswald	1823–1825 1828, 1830–1832 1847, 1850 1851	807	Vassili Matveevich Tschernajew? (Czernajew)	1840	481

Major contributors of live plants or seeds

The biggest amount of live plants and seeds was contributed by **Carl Anton Meyer** (1795–1855, St Petersburg), who sent 2,908 accessions in the years 1828–1831 and 1850–1854 (Table 3). He was born in Vitebsk, studied pharmacy at the University of Tartu in 1813–1814 and continued his studies at the University of Königsberg, where he earned his doctorate in Philosophy in 1825. Meyer carried out several botanical expeditions in Russia and authored scientific works both on his own and together with August Gustav Heinrich von Bongard, Bunge, Ledebour, Trautvetter and Fischer from St Petersburg. He examined the vascular plant collections of several researchers, wrote treatments of the flora of the Vyatka area and of various plant genera, and described numerous new plants. Meyer was the assistant director of the St Petersburg Botanical Garden in 1831–1851, the director in 1851–1855 and full member of the St. Petersburg Academy of Sciences since 1845. In 1850–1855, Meyer also supervised the collections of the botanical garden (Trautvetter, 1837; pp. 19, 31–33, 28, 45, 61, 64, 88–90, 96, 122, 134; Trautfetter", 1873, pp. 158, 177–178, 211; Hasselblatt & Otto, 1889, p. 60).

The second most active contributor after Meyer was **Bernhardi** (also prof. Bernhardi) from Erfurt. The name 'Theod. Bernhardi', also from Erfurt, is also referenced in one case. The former is likely to be the above-mentioned **Johann Jakob Bernhardi** and the latter – **Theodor Bernhardi** (who sent 11 accessions in 1850). Three parcels were received from Erfurt in 1846 from a gardener and botanist **Friedrich Adolph Haage** (1796–1866), member of a famous family of ten generations of gardeners. He was the founder of a small cacti and succulent trade and seed gardening company in 1822.

From his first journey to the Crimea, from May to October 1818, **Ledebour** brought approximately 200 plants to the Botanical Garden (Tankler & Pullonen, 1994, p. 19). Ledebour also sent forty-two parcels with live plants and seeds by mail from the Altai expedition carried out in 1826–1827 together with Bunge and physician and botanist Meyer, with 500 of the species being new to the Botanical Garden. The botanical collection contained 1,600 species on herbarium sheets, 241 species of live plants for the Botanical Garden of Tartu, and seeds of 1,341 species (Poots, 1994, pp. 39–40). Another source (Tänavots, 1994, p. 33) refers to the seed registration list, according to which 1,404 species were brought along both as live plants and as seeds. The material was collected from several locations and some species were therefore repeated (Tänavots, 1994, p. 32). According to the registration list of plants and seeds, Ledebour sent 1,498 accessions in 1826.

Contributions were received from St Petersburg from **Friedrich Ernst Ludwig von Fischer** (1782–1854), the director of the botanical garden of Gorenki (1806–1822), compiler of plant catalogues (1805, 1808, 1812) and later director of the St Petersburg Botanical Garden (1823–1850); and from **Stanisław Boniface Jundziłł** (1761–1847), professor and director of the Botanical Garden of the University of Vilnius. Next to Jundziłł, contributions were sent from Vilnius by **Stanislaw Batys Górski** (1802–1864), a student and successor of professor of pharmacy (1810–1831) Jan Fryderyk Wolfgang (Johann Friedrich Wolfgang; 1775–1859) at the Vilnius University. Górski was a Polish botanist, entomologist, physician and pharmacist, head of the Botanical Garden of the University of Vilnius. After the closure of the University of Vilnius in 1832 by special decree of Czar Nicholas I (Venclova, 1981, p. 38), plants of 261 species were obtained from its botanical garden in 1841.

Of the better-known researchers, contributions were sent by **Karl Konstantin Christian Haberle** (1764–1832), naturalist and meteorologist, teacher of botany at the University of Pest; **Jens Wilken Hornemann** (1770–1841), Danish botanist, professor of botany at the University of Copenhagen since 1808 and director of the Botanical Garden since 1817; **Johann Georg Christian Lehmann** (1792–1860), a botanist, professor of physics and natural sciences and head librarian at the Gymnasium Academicum in Hamburg, the founder of the Hamburg Botanical Garden; **Christoph Friedrich Otto** (1783–1856), a German gardener and botanist, supervisor of the Berlin Botanical Garden from 1805 to 1843; **Heinrich Adolf Schrader** (1767–1836), professor and director of the Botanical Garden of the University of Göttingen; **Kurt Sprengel** (1766–1833), professor and director of the Botanical Garden of the University of Halle; **Heinrich Gottlieb Ludwig Reichenbach** (1793–1879), a naturalist, zoologist and botanist, professor at the Surgical-Medical Academy of Dresden, founder of the Dresden Botanical Gardens; and **Friedrich Siegmund Voight** (1781–1850), a palaeontologist and botanist, professor of medicine and botany and director of the Botanical Garden of Jena University.

Many accessions were sent also by **Ernst Heinrich Friedrich Meyer** (1791–1858), professor of botany and director of the Botanical Garden of the University of Königsberg, and by the Czech botanist **Vincenc Frantisek Kosteletzky** (1801–1887), who taught Medical Botany at the famous botanical research school in Prague. Among the contributors were also **Gustav Schübler** (1787–1834), German naturalist, professor of botany, natural history and agricultural chemistry and founder of applied meteorology in Germany, and by his colleague **Georg Matthias Martens** (1788–1872), member of the German Academy of Sciences Leopoldina since 1832. Schübler and Martens worked together in describing and

classifying new species. Other contributors included **Friedrich Gottlieb Bartling** (1798–1875), German botanist, researcher of Hungarian and Croatian flora, lecturer at the University of Göttingen since 1822 and director of the botanical garden since 1837; **Frederic Gebler** (1781–1850), alumnus of the medical faculty of the University of Jena (1802), who worked in Russia since 1808, being a physician at Barnaul since 1810 and also a naturalist, explorer and founder of the Barnaul Museum; **Wilibald Swibert Joseph Gottlieb Besser** (1784–1842), botanist, plant taxonomist, gardener and founder of the Kremenets (Krzemieniec) Botanical Garden; **Vassili Matveevich Tschernajew (Czernajew)** (1796–1871), professor of botany at the University of Kharkov and the director of the Botanical Garden; and **Bartels** from Kharkov. Overviews of Russian botanical science and botanists (Trautvetter, 1837, pp. 137–145; Borodin, 1908, pp. 1–158) do not refer to Bartels.

In 1853, nine deliveries arrived from Jena from **Mattias Jacob Schleiden** (1804–1881), student of Bartling at the University of Göttingen. He initially studied law at the University of Heidelberg and received a degree of Doctor of Medicine there. In 1832, he began to study medicine in Göttingen, where he became interested in natural sciences, in particular botany. In 1839, Schleiden became a Doctor of Philosophy and extraordinary professor at the University of Jena, becoming a full professor and director of the botanical garden in 1850. He was one of the founders of the cell theory together with Theodor Schwamm. In 1863, Schleiden became the first teacher of plant physiology at the University of Tartu, from where he returned to Dresden in 1864 due to misunderstandings with the university (Moorits, 1968, pp. 138–151; Siilivask, 1985, pp. 93–94).

Polish botanist and entomologist **Alojzy Rafal Estreicher** (1786–1852) studied at the Jagiellonian University in Krakow, earning his doctorate in Medicine there in 1807 and doctorate in Philosophy in 1811. Since 1809, he led the Chair of Botany and Zoology at the same university and worked at the university as a professor, rector (1831–1833) and the first director of the botanical garden. He sent 995 accessions.

Ludolph Christian Treviranus (1779–1864) sent 1,046 accessions from Wrocław, Prague and Bonn. He was a German botanist, since 1806 a professor of natural history and botany at the University of Rostock and director of the botanical garden of the university. Later he worked as a professor at the universities of Wrocław and Bonn, being also the director of the Botanical Garden of the University of Bonn.

Eduard August von Regel (1814–1892) sent 513 accessions from Zürich in 1847–1852 and 1854. He graduated from the University of Bonn and worked

in 1832–1842 at the Botanical Garden of Göttingen and later at the botanical gardens of Bonn and Berlin. Since 1842, Regel was the head of the Botanical Garden of Zürich and lectured at the Zürich University. In 1855–1892, he headed the Botanical Garden of St Petersburg.

Italian botanist **Michele Tenore** (1780–1861) sent 508 accessions in 1840. He worked in Naples, Italy. In 1810, he was nominated director of the Botanical Garden of Naples (established in 1807).

Botanist **Roberto de Visiani** (1800–1878) from the Botanic Garden of Padua sent 195 accessions. Visiani graduated from the medical faculty of the University of Padua in 1822 and became an assistant of Giuseppe Antonio Bonato (1753–1836). After Bonato's death, he became his successor as the head of the Chair of Botany and the director of the Botanical Garden of Padua since 1837.

58 accessions were sent from Bologna by **Bertoloni**. The sender could have been either **Antonio Bertoloni** (1775–1869), famous botanist and compiler of the 10-volume *Flora of Italy*, or his son **Giuseppe Bertoloni** (1804–1878), professor of botany at the University of Bologna. Plants or seeds were sent from Italy also by **Bartolomeo Biasoletto** (1793–1858), pharmacist and botanist from Trieste, and by **Carlo Donarelli** (1797–1851), physician, professor of practical botany and director of the Botanical Garden of Rome at the University La Sapienza from 1833 to 1851.

Contributors of rare plants from exotic locations

Plants were sent from Mexico by **Christian Julius Wilhelm Schiede** (1798–1836), a German physician and botanist born in Kessel. He studied natural sciences and medicine at the universities of Berlin and Göttingen, where he earned his doctorate in 1825. Thereafter, he worked as a practicing physician in Kessel. In 1828, he emigrated to Mexico, where he accompanied the naturalist Ferdinand Deppe (1794–1861) on his expeditions. The two explorers collected zoological and botanical specimens for various museums, universities and botanical gardens of Europe. In the summer of 1828, Schiede and Deppe settled in Jalapa and organised research expeditions throughout the state of Veracruz. Schiede sent 97 accessions in 1829 from Jalapa, Laguna, Pico de Orizaba and California.

Thirty accessions were sent from Guatemala in 1852 by **Jegor Julius von Sivers** (1824–1879), descendant of the Sivers family of Õisu (Euseküll) Manor, born in Heimtali (Heimthal) Manor (Estonia) in the family of Peter Reinhold Sivers. He

is known as a naturalist, literature historian, economist and poet. Sivers travelled in Central America in 1850–1852 (von Sivers, 1861a, pp. 1–334; 1861b, pp. 1–388).

In 1825 and 1827, 64 accessions arrived from **Eschscholtz** from Brazil, Chile and Kamchatka, from his second round-the-world journey led by Kotzebue.

A total of 230 accessions was received in 1827–1829 from St Helena Island, Jamaica, East India and from two places with poorly legible names. These appear to have been sent via **William Jackson Hooker** (1785–1865), a British botanist and taxonomist. In 1820, Hooker accepted the Regius Professorship of Botany at the University of Glasgow. He compiled the *Flora Scotica* and helped to build up the Glasgow Botanic Gardens. In 1841, Hooker was appointed director of the Royal Botanic Gardens, Kew. Together with the Scottish botanist George Arnott Walker-Arnott (1799–1868), he examined the materials collected by Captain Frederick William Beechey (1796–1856) on his expeditions, including plants collected from North America. Arnott, together with the Scottish surgeon and botanist Robert Wright, also examined the plant material collected by Wright in India over 30 years. The seeds sent to the Botanical Garden of Tartu appear to originate from several collections.

The same is likely to concern also the 40 accessions sent by **Lindemann** in 1840. These originated from Jelgava (Mitau) and the states of Rio de Janeiro and Minas Gerais of Brazil and could have been sent from Jelgava by the hobby botanist **Emanuel Lindemann** or his son **Eduard Lindemann**. Emanuel Lindemann established an extensive herbarium and his work was carried on by Eduard. Their herbarium amounted to 200,000 specimens and was replenished with contributions from 844 collectors from across the world. The Lindemanns exchanged plants with some of the most famous botanists of the 19th century (Byalt *et al.*, 2008). Emanuel Lindemann (1839) is also known as the compiler of the *Flora of the Baltic Governorates*.

Exotic plants were sent by **F. Hunneman** (Hunneman, Hünnemans) from London and from South America: Mendosa (Argentina) and Chile. The places of dispatch also include Mexico, New Orleans, Nepaera?, Nova Hollandia (Australia), India Orient (India) and Iwan Rivers (Indonesia, Kalimantan Island). Hunneman sent 767 accessions in the years 1830, 1831 and 1832. **Tables** sent 77 accessions in 1832 from Las Palmas, Quintero (Chile), and the Andes, South America. Professor **Murrey** sent 97 accessions in 1830 from Calcutta, Jergentabao?, Mauritius and a place with a poorly legible name.

Some outstanding persons and other contributors of plants

Seeds were received on several occasions via Count **Nikolai Petrovich Rumyantsev** (1754–1826) (Tankler & Pullonen, 1994, p. 18), who may have dispatched plant seeds obtained from the round-the-world expedition of Adam Johann von Krusenstern in 1803–1806, and from Vassili Golovin's round-the-world expedition in 1817–1819 with the participation of Ferdinand von Wrangell, as Rumyantsev was on very good terms with Krusenstern and Wrangell (Lundalin, 2011). The Imperial Garden of Pavlovsk (St Petersburg) received 270 tropical plant species in 1825 as a gift from Empress **Maria Fyodorovna** (supposedly *via* Weinmann) and a greenhouse was built for them in the valley in the central part of the garden in 1825 (Siilivask, 1982, p. 186).

In 1823, 215 accessions were received from London from **Lieven**, apparently from **Christoph-Heinrich von Liewen** (1774–1839), who was a Russian military general with Livonian roots, born in Kiev. He was the Russian ambassador to London in 1812–1834 and later the tutor of Russian Czar Alexander II. The plants are likely to have been sent via him, although it is also possible that they were sent by his wife **Dorothea von Lieven** (1785–1857), who was very well known in Europe for her beauty, extensive knowledge and a broad scale of activities.

James G. Booth from Hamburg was the son of **Jacob James Booth** (1760 or 1770–1814), founder of the former famous nursery James Booth & Söhne (Booth & Sons). The nursery was founded jointly with Baron Kaspar von Voight (1752–1839) in 1795 at Flottbeck, near Hamburg, and operated until 1884(6). The nursery was mainly a distributor of the novelties of the day and represented an important mark in the history of German rose breeding. The nursery was also specialised in North American trees (Pontt & Dähren, 1845). Booth sent 226 accessions in the years 1840, 1841, 1847–1850 (each year) and 1852 and 1853.

Swiss botanist **Alphonse de Candolle** (1806–1893) sent 36 accessions in 1840 from Geneva. Candolle initially studied law but graduated in botany and later succeeded to his father's chair at the University of Geneva. His father, naturalist Augustin Pyramus de Candolle (1778–1841), was interested in botany in his youth, commenced medical studies in Geneva, continued his studies in medicine and natural history in Paris and was appointed as professor of botany at the Medical School in Montpellier and later in Geneva. His scientific research covered plant taxonomy, phytochemistry, plant pathology, medical botany, agronomy and phytogeography. A. de Candolle's son was the botanist Casimir de Candolle (1836–1918).

Charles-François Brisseau de Mirbel (1776–1854) was a French botanist and politician, founder of the science of plant cytology. In 1806, he rose to the post of superintendent of the gardens of Napoleon's Château de Malmasion, becoming the chair of the Botany Department of the Sorbonne University in 1808 and head of the National Museum of Natural History and *Jardin des Plantes* (the main Botanical Garden in France) in Paris in 1829.

Johann Jakob Friedrich Parrot (1791–1841) studied medicine at the University of Dorpat (Tartu) and was a professor of physics at the university. He was keen on botany and explored also the local vegetation on his expeditions. When travelling in the Crimea and the Caucasus in 1811–1812 and later in France, Spain, Italy and the Alps, he made observations on the flora there. The best-known journey of Parrot took him through Southern Russia to Mount Ararat, lasting from September 1929 to March 1930. An overview of the expedition was published in Berlin in 1834, describing the vegetation of the surroundings of Ararat, listing the herbaceous plants, trees and shrubs growing there and describing the collection of specimens (Trautvetter, 1837, p. 30; Parrot, 1834, pp. 180–185). Parrot sent 15 accessions in 1825. In 1830, two accessions arrived from him and 114 accessions collected from Tbilisi and Ararat arrived from **Julius Friedrich Adolph Hehn**, who participated in his expedition.

George François Reuter (1805–1872) was a French botanist and plant collector. He worked as a professor of chemistry in the Atheneum of Luxembourg since 1848 and as the director of the Botanical Garden of Geneva from 1849 until his death. Reuter sent 38 accessions in 1851 and 1852.

Franz Paula von Schrank (1747–1835) was a German botanist, entomologist and member of the Jesuit Order. Schrank attended a Christian school in Passau and joined the Jesuit Order. After a period as a novice in Vienna, he took part in a mission to Brazil, where he became interested in natural sciences. He continued his theological career, however, and earned a doctorate in Theology in Vienna in 1776. Already the same year he became a professor of mathematics and physics at the Lyzeum of Amberg (Bavaria) and in 1784 he took up the position of professor at the University of Ingolstadt. Between 1809 and 1832, Schrank worked as the first director of the Botanic Garden of Munich. He also assisted in analysing the materials of naturalists Johann Baptist von Spix and Carl Friedrich Philipp von Martius, who travelled together in Brazil.

The Botanical Garden also received contributions from botanists **Carl Peter Thunberg** (1743–1828) and **Johan Emanuel Wikström** (1789–1856). The botanical explorer Thunberg studied medicine and natural philosophy at the

University of Uppsala and defended his doctoral dissertation in 1767. In 1770, he continued his studies in Paris, Amsterdam and Leiden. In 1772–1778, he travelled in South Africa and East Asia, working in Japan for a prolonged period. Since 1781, Thunberg worked as a professor of medicine and natural philosophy at the University of Uppsala. Among his most significant scientific works were overviews of South American and Japanese floras. He also collected big quantities of live plants and seeds for botanical gardens. Since 1818, Wikström was the director of the Bergius Botanical Garden, Stockholm. Thunberg sent 62 accessions in 1823–1825 and Wikström sent 15 accessions in 1823.

In 1839 and 1840, 196 accessions were sent from Munich by the botanist **Joseph Gerhard Zuccarini** (1797–1848), professor of botany at the University of Munich. He commenced medical studies in 1815 at the University of Erlangen-Nürnberg, with botanist and nature philosopher Christian Gottfried Nees von Esenbeck being his teacher of natural history. Zuccarini was invited in 1826 to work as an extraordinary professor at the University of Munich, where he became a full professor of agricultural botany and forest botany in 1835. In 1836, he also became the curator of the Botanical Garden of Munich. Zuccarini worked since 1820 on the taxonomic treatment of the Brazilian plant collections of Carl Friedrich Philipp von Martius (above all Cactaceae) as well as the plants collected in Japan by Philipp Franz von Siebold, a German physician and traveller. Zuccarini also described plants discovered in other areas, including Mexico. **Nees von Esenbeck** (1776–1858) sent 63 accessions from Wrocław in 1847 and 1849.

Summary

Similarly to the respective developments elsewhere in Europe, botanical science had developed to a high level by the end of the 18th century and the first decades of the 19th century also in Russia, where the development of botany was fostered by links with Carl Linné and his school, academic research together with extensive expeditions, collection of plants and exchange of seeds, establishment of herbaria and development of ornamental gardening and park culture (Trautvetter, 1837, pp. 4–136; Rowell, 1980, p. 15; Kolchinsky, 2004; Sokoloff *et al.*, 2002, pp. 129–191). When the Botanical Garden of the University of Tartu was about to be established, all preconditions were in place for the rapid growth of its species richness. This was undoubtedly fostered also by the network of botanical researchers formed in the 18th century, and by the Society of Corresponding Botanists (established in 1815), which involved 70 botanists, pharmacists,

teachers, medical students, etc. in the 1820s, including such active contributors of plants and seeds to the Botanical Garden of the University of Tartu as Christian Gottfried Nees von Esenbeck, Karl Wilhelm Eysenhardt, Christian Friedrich Hornschuch, Gustav Kunze, Johann Georg Christian Lehmann, Ernst Heinrich Friedrich Meyer and Diederich Franz Leonhard von Schlechtendal (Röther *et al.*, 2006, pp. 597–602; Feistauer *et al.*, 2006; Sigrist *et al.*, 2006).

The development of the botanical garden was also fostered by the proximity of St Petersburg, the then capital of Russia, and the high level of botany and horticulture there. A significant role was also played by the research activities, expeditions and personal contacts of the professors of botany and directors of the Botanical Garden of the University of Tartu Germann, Ledebour, Bunge, Maximowicz and Trautvetter. All this was reflected in the growth of species richness in the garden on account of plants and seeds sent by many persons, with the new plants and seeds originating both from the distribution areas and from other botanical gardens. According to the data of 1810, there were 4,586 species of plants from 986 genera at the present location of the Botanical Garden. In 1827, the number of taxa totalled at 10,449, in 1845 – at about 14,000, and in 1851 – at 13,180 taxa from 1886 genera. The species richness in the Botanical Garden also increased on account of bringing into cultivation of numerous plant species new to science, in particular East Asian species. In the period covered in this paper, the Botanical Garden of the University of Tartu was not much inferior in its species richness to Europe's older and bigger botanical gardens in more favourable climates, while even surpassing in its species richness the St Petersburg Botanical Garden, a rapidly developing and the region's most important botanical garden in the first half of the 19th century. The latter garden contained no more than 1,500 species in 1823, 5,682 species in 1824, and 12,000 and 12,061 species in 1830 and 1850, respectively. (Trautfetter", 1873, p. 203)

The broad range of persons who sent live plants or seeds to the Tartu Botanical Garden is indicated also by the manuscript registration lists of arriving accessions. In 1823–1832, 1839–1841 and 1846–1852, the garden received 48,096 accessions from about 180 persons and nearly 10 nurseries, with 32 persons having sent more than 400 accessions (35,708 in total; 74%) and 12 persons having sent over 1,000 accessions. Of the 48,096 accessions, 32,937 (68.5%) arrived from 134 persons from Western Europe, 13,346 (27.7%) – from 38 persons from Russia, 1,466 (3.0%) – from 8 persons from Central and South America and East Asia, and the place of dispatch remained unknown for 347 accessions. Among the contributors were most of the then well-known researchers from Western Europe and Russia, but also physicians, pharmacists,

travellers and other persons. By the middle of the 19th century, the Botanical Garden of the University of Tartu had been effectively integrated into the world network of botanical gardens and botanical researchers, as evidenced by the comparison of the research published here and the species richness in the garden with those in other botanical gardens. Authentic plant material in the form of seeds was also sent to other researchers. Ledebour sent seeds collected from his expeditions, for example, to William Hooker, professor of Botany of the University of Glasgow, who received from him 188 accessions of high quality seeds of Altaian plants (Le Lièvre, 1997, pp. 50–51).

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