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DENDROFLORA OF GRYFINO

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Streszczenie. Celem pracy było poznanie dendroflory Gryfina. Badania prowadzono w latach 2009–2010 i 2013 roku. Z 279 taksonów oznaczonych do gatunku i odmiany 5,0% stanowią rośliny europejskiego pochodzenia, 22,6% – rośliny występujące na naturalnych stanowiskach w Europie i poza Europą, 15,0% to rośliny azjatyckiego pochodzenia, 11,8% – rośliny występujące na naturalnych stanowiskach w Ameryce Północnej, 4,7% stanowią mieszańce, a 40,9% – odmiany uprawne (kultywary). Z drzew i krzewów rzadko uprawianych w Polsce są tu np. *Abies grandis*, *Abies procera* 'Glauca', *Picea omorika* 'Pendula', *Cedrus libani* subsp. *atlantica* 'Pendula', *Pinus ponderosa*, *Pinus wallichiana*, *Metasequoia glyptostroboides*, *Cryptomeria japonica*, *C. japonica* 'Elegans', *Berberis julianae*, *Berberis verruculosa*, *Crataegus persimilis* 'Splendens', *Gleditsia triacanthos*, *Ilex aquifolium*, *Viburnum* × *pragense*, *Viburnum rhytidophyllum*, *Catalpa bignonioides*, *Campsis radicans*, *Clerodendron trichotomum*. Drzew osiagających wymiary pomnikowe jest niewiele: osiem drzew nagonasiennych należących do dwóch taksonów i 12 drzew okrytonasiennych należących do siedmiu taksonów.

Key words: green areas, green area design, green areas in cities, north-west Poland, the role of green areas, Trees and shrubs.

Słowa kluczowe: drzewa i krzewy, Polska północno-zachodnia, rola zieleni, tereny zieleni, układ zieleni, zieleń w miastach.

INTRODUCTION

The dendroflora of the towns of West Pomerania is varied, what has been demonstrated by the research conducted since 1998 by the staff of the Department of Dendrology and Green Areas Management of the one-time The Academy of Agriculture. Such type of research is significant. The species and the age structure, location of the trees and shrubs is connected to the historical and cultural development of the cities. High greenery also fulfills recreational and esthetic functions and has climate-forming and habitat-forming significance.

The aim of the thesis was to acquaint oneself with the dendroflora of Gryfino, whose tree and shrub composition has not been identified before. It may be useful in actions aiming at maintenance and nursing of current, valuable resources and in indicating the direction of the changes leading to rejuvenation of the image and the quality of everyday use of the green areas. It is also important on account of the fact that Gryfino houses valuable cultural monuments located by the river and the town itself is located in the areas with attractive nature which may attract tourists.

MATERIAL AND METHODS

Between 2009 and 2010 and in 2013 trees and shrubs growing in Gryfino were catalogued – by every street and around all the properties and in other parts of the town, e.g. by the ruins of a medieval defensive walls, by a gothic (partly roman) St. Mary's church with a baroque cupola (previously St. Nicholas' church), in front of the City Hall, in the municipal park, in the cemeteries. Every tree and shrub has been examined, and branch, leaf, flower (inflorescence) and fruit samples of the plants rarely cultivated in Poland were taken for detailed specification as to their kind of species and variety. The circumference of the trunks of chosen trees has been measured, especially those trees valuable because of their size. The measurements were taken at the altitude of 130 cm above the ground level, or at another altitude, e.g. in the cases of growths or branches occurring at 130 cm. Photographic documentation has been produced.

Species and a variety of the trees and shrubs has been specified according to dendrological studies (among others Krüssmann 1960, 1962, 1972, Seneta 1987, 1991, 1994, 1996, Bugała 1991, Seneta and Dolatowski 2012). The obtained results were described and presented as a part of the list of trees and shrubs. The names of the species and varieties of trees and shrubs were provided according to Seneta and Dolatowski (2012). Measured tree sizes, which – according to the parameters provided by Kasprzak (2005) – reached monumental sizes, were bolded in the thesis.

CHARACTERISTICS OF THE RESEARCH AREA

Gryfino is a town in the West Pomerania, located on Wełtyńska Plain, around 30 km away from Szczecin, by the Regalica river (that is, the East Oder). It is located between the right bank of that river and an elevated area in the east, and also the areas with attractive nature. There is Park Krajobrazowy Dolina Dolnej Odry [Lower Odra Valley Landscape Park] in the immediate vicinity of Gryfino, taking up the area between Regalica and West Oder, from Widuchowa to Szczecin (Leśny Kompleks Promocyjny Puszcze Szczecińskie [Promotional Forest Complex of Szczecin Primeval Forests] 2009; Księga Puszczy Bukowej [The Book of Beech Primeval Forest] 2010). Gryfino received its municipal rights in 1254, it was a member of the Hanseatic League. The oldest part of town – with a rectangle market square, regular street plan and the most valuable monuments – stretches on so-called 'lower terrace', separated by a railway (Świnoujście-Szczecin-Ziemia Lubuska-Śląsk routes) [Świnoujście-Szczecin-Lubusz Land-Silesia] from so-called 'upper terrace' – with modern buildings, mostly with housing estates of multi-family houses and one-family houses (Piskorski 1966; Krajobraz Kulturowy Polski. Województwo Zachodniopomorskie [The Cultural Landscape of Poland. West Pomeranian Voivodship] 2002).

In 1945 Gryfino was destroyed in 70% (almost the entire downtown was demolished). The town was being rebuilt slowly, and its development was accelerated by the construction of a fossil-fuel power station 'Dolna Odra' in a nearby town of Nowe Czarnowo (Piskorski 1966). At present, Gryfino has a population of 24.000 and is a seat of the administration of the Gryfino district.

According to Heinze and Schreiber (1984), Gryfino is located in the area of the 7e sub-zone with an average long-term minimal temperature between -17.7°C and -15°C . Average annual air temperature – between 1956 and 1990 – in a nearby Dąbie (right-bank quarter of Szczecin) is 8.4°C . It is a temperature characteristic especially for the Lower Odra Valley. Average annual precipitation in Gryfino – between 1956 and 1990 – is 534 mm, and the highest annual precipitation is 670 mm (Kozmiński and Czarnecka 1993). Growing season lasts between 210 and 230 days (Kozmiński and Michalska 2001).

RESULTS AND DISCUSSION

Research conducted in the field and the specification of the trees and shrubs as to their species and variety indicated that Gryfino has an interesting afforestation. It applies to the woody plants occurring there (Table 1), and also to their arrangement within the town limits. A significant share (22.6%) of the trees and shrubs that grow there are plants naturally occurring in Europe and outside of Europe, with only 5.0% of those naturally occurring solely in Europe. 65% of the plants are tree and shrub species occurring naturally in Poland. Among those are common yew (*Taxus baccata*) and sea-buckthorn (*Hippophaë rhamnoides*), which are strictly protected species in Poland, and common ivy (*Hedera helix*) – flowering and fruit bearing specimen – under partial protection. There are also species of foreign origin, rarely cultivated in Poland: oriental plane-tree (*Platanus orientalis*) – a young specimen growing in the municipal park in Gryfino, eurasian smoketree (*Cotinus coggygria*) growing in the gardens adjoining residential buildings in Gryfino and common holly (*Ilex aquifolium*), 2 specimen growing on the lawn between Kościelna, 1 Maja and Bolesława Chrobrego st.

Out of species of Asian origin (constituting 15.0% of Gryfino's afforestation), those rarely cultivated in Poland are e.g. ginkgo (*Ginkgo biloba*) – a specimen (84 cm trunk c.) growing at the premises of Gryfino Cultural Centre at Bolesława Chrobrego st.; blue pine (*Pinus wallichiana*), growing by the housing estate at Z. Krasińskiego street and in the gardens adjoining residential buildings, i.a. at S. Staszica st.; dawn redwood (*Metasequoia glyptostroboides*) – in a garden adjoining the building at Okrężna st.; Japanese cedar (*Cryptomeria japonica*) – in a garden adjoining the building at Z Krasińskiego st.; thujopsis (*Thujopsis dolabrata*) growing at the premises of the Primary School at T. Kościuszki st.; star magnolia (*Magnolia stellata*) growing e.g. in a garden at Łużycka st.; wintergreen barberry (*Berberis julianae*), growing on the lawn at Piastów st., on the lawn between Kościelna, 1 Maja and Bolesława Chrobrego st., in a few gardens adjoining residential buildings, e.g. at Łużycka st., nearby schools, at Cmentarz Wojenny Żołnierzy Armii Radzieckiej [Soviet Military Cemetery]; warty barberry (*Berberis verruculosa*), occurring in a few gardens adjoining residential buildings; chinese wisteria (*Wisteria sinensis*) – a climbing plant at 1 Maja st. and growing in the gardens adjoining residential buildings, e.g. at S. Reymonta st.; Japanese Wisteria (*W. floribunda*) – a climbing plant growing in the gardens adjoining residential buildings, e.g. at Łużycka, W. Andersa, Z. Krasińskiego, Okrężna st.; tree of heaven (*Ailanthus altissima*), growing at Iwaszkiewicza st. and in a housing estate at Z. Krasińskiego st.; oriental bittersweet (*Celastrus orbiculatus*) – a climbing plant in the gardens adjoining residential buildings, e.g. at W. Andersa st., Leatherleaf Viburnum (*Viburnum rhytidophyllum*) – at the premises of the Primary School at T. Kościuszki st.; harlequin glorybower (*Clerodendron trichotomum*) growing at the premises of the seat of the Nadleśnictwo Gryfino [Gryfino Forest Division].

Table 1. The list of trees and shrubs
Tabela 1. Wykaz drzew i krzewów

Gymnospermae Gymnosperms
<i>Abies alba</i> Mill.; <i>A. ×arnoldiana</i> Nitz.; <i>A. concolor</i> (Gordon et Glend.) Lindl. ex Hildebr.; <i>A. concolor</i> 'Glauca'; <i>A. grandis</i> (Douglas ex D. Don) Lindl.; <i>A. koreana</i> E. W. Wilson; <i>A. nordmanniana</i> (Steven) Spach; <i>A. procera</i> Rehder; <i>A. procera</i> 'Glauca'
<i>Cedrus libani</i> subsp. <i>atlantica</i> (Endl.) Batt. et Trab. 'Pendula'
<i>Chamaecyparis lawsoniana</i> (A. Murray) Parl.; <i>Ch. lawsoniana</i> 'Alumii'; <i>Ch. lawsoniana</i> 'Blue Surprise'; <i>Ch. lawsoniana</i> 'Ellwoodii'; <i>Ch. lawsoniana</i> 'Golden Wonder'; <i>Ch. lawsoniana</i> 'Ivone'; <i>Ch. lawsoniana</i> 'Stardust'; <i>Ch. nootkatensis</i> (D. Don) Spach 'Pendula'; <i>Ch. obtusa</i> (Siebold et Zucc.) Endl. 'Nana Gracilis'; <i>Ch. pisifera</i> (Siebold et Zucc.) Endl.; <i>Ch. pisifera</i> 'Boulevard'; <i>Ch. pisifera</i> 'Filifera Aurea'; <i>Ch. pisifera</i> 'Filifera Nana'; <i>Ch. pisifera</i> 'Plumosa'; <i>Ch. pisifera</i> 'Plumosa Aurea'; <i>Ch. pisifera</i> 'Squarrosa'
<i>Cryptomeria japonica</i> (Thunb. ex L.f) D. Don; <i>C. japonica</i> 'Elegans'
<i>×Cupressocyparis leylandii</i> (A. B. Jacks. et Dallim.) Dallim.
<i>Ginkgo biloba</i> L.
<i>Juniperus</i> 'Blue Carpet'; <i>J. chinensis</i> 'Stricta'; <i>J. communis</i> L.; <i>J. communis</i> 'Hibernica'; <i>J. communis</i> 'Suecica'; <i>J. 'Hetzii'</i> ; <i>J. horizontalis</i> Moench; <i>J. horizontalis</i> 'Blue Chip'; <i>J. ×media</i> Melle non V. D. Dmitriev; <i>J. ×media</i> 'Mint Julep'; <i>J. ×media</i> 'Old Gold'; <i>J. ×media</i> 'Pfitzeriana Aurea'; <i>J. sabina</i> L.; <i>J. sabina</i> 'Tamariscifolia'; <i>J. sabina</i> 'Variegata'; <i>J. scopulorum</i> Sarg. 'Blue Heaven'; <i>J. squamata</i> Buch.-Ham ex Lamb. 'Blue Star'; <i>J. squamata</i> 'Meyeri'; <i>J. virginiana</i> L. 'Skyrocket'
<i>Larix decidua</i> Mill.; <i>L. kaempferi</i> (Lamb.) Carrière
<i>Metasequoia glyptostroboides</i> Hu et W. C. Cheng
<i>Picea abies</i> (L.) H. Korst.; <i>P. abies</i> 'Nidiformis'; <i>P. abies</i> 'Viminalis'; <i>P. glauca</i> (Moench) Voss 'Conica'; <i>P. omorika</i> (Pančić) Purk. 'Pendula'; <i>P. pungens</i> Engelm.; <i>P. pungens</i> 'Argentea'; <i>P. pungens</i> f. <i>glauca</i> Beissn.; <i>P. pungens</i> 'Koster'
<i>Pinus mugo</i> Turra; <i>P. nigra</i> J. F. Arnold; <i>P. ponderosa</i> Douglas ex Lawson et C. Lawson; <i>P. strobus</i> L.; <i>P. sylvestris</i> L.; <i>P. wallichiana</i> A. B. Jacks.
<i>Platycladus orientalis</i> L. Franco; <i>P. orientalis</i> 'Aurea Nana'
<i>Pseudotsuga menziesii</i> (Mirb.) Franco
<i>Taxus baccata</i> L.; <i>T. baccata</i> 'Fastigiata'; <i>T. ×media</i> 'Hicksii'
<i>Thuja occidentalis</i> L.; <i>Th. occidentalis</i> 'Aurescens'; <i>Th. occidentalis</i> 'Brabant'; <i>Th. occidentalis</i> 'Danica'; <i>Th. occidentalis</i> 'Ericoides'; <i>Th. occidentalis</i> 'Globosa'; <i>Th. occidentalis</i> 'Globosa Aurea'; <i>Th. occidentalis</i> 'Hoseri'; <i>Th. occidentalis</i> 'Rheingold'; <i>Th. occidentalis</i> 'Spiralis'; <i>Th. occidentalis</i> 'Wagneri'; <i>Th. ×plicatoides</i> Seneta 'Aureospicata'; <i>Th. ×plicatoides</i> 'Smaragd'; <i>Th. plicata</i> Donn ex D. Don 'Zebrina'
<i>Thujopsis dolabrata</i> (L. f.) Siebold et Zucc.
<i>Tsuga canadensis</i> (L.) Carrière 'Jeddeloh'
Angiospermae Angiosperms
<i>Acer campestre</i> L.; <i>A. negundo</i> L.; <i>A. negundo</i> 'Odessanum'; <i>A. negundo</i> 'Variegatum'; <i>A. palmatum</i> Thunb. ex Murray; <i>A. palmatum</i> 'Dissectum Nigrum'; <i>A. platanoides</i> L.; <i>A. platanoides</i> 'Globosum'; <i>A. platanoides</i> 'Schwedleri'; <i>A. pseudoplatanus</i> L.; <i>A. pseudoplatanus</i> 'Atropurpureum'; <i>A. saccharinum</i> L.
<i>Actinidia arguta</i> (Siebold et Zucc.) Planch. ex Miq.
<i>Aesculus ×carnea</i> Hayne; <i>A. hippocastanum</i> L.
<i>Ailanthus altissima</i> (Mill.) Swingle
<i>Alnus glutinosa</i> (L.) Gaertn.
<i>Berberis julianae</i> C. K. Schneid.; <i>B. thunbergii</i> DC.; <i>B. thunbergii</i> 'Atropurpurea'; <i>B. thunbergii</i> 'Aurea'; <i>B. verruculosa</i> Hemsl. et E. H. Wilson
<i>Betula pendula</i> Roth; <i>B. pendula</i> 'Tristis'; <i>B. pendula</i> 'Youngii'
<i>Buddleja davidii</i> Franch.
<i>Buxus sempervirens</i> L.
<i>Campsis radicans</i> (L.) Seem.
<i>Caragana arborescens</i> Lam.
<i>Carpinus betulus</i> L.
<i>Catalpa bignonioides</i> Walter
<i>Celastrus orbiculatus</i> Thunb.
<i>Chaenomeles japonica</i> (Thunb.) Lindl. ex Spach; <i>Ch. ×superba</i> (Frahm) Rehder
<i>Clematis alpina</i> (L.) Mill. 'Ruby'; <i>C. 'Jackmanii'</i> ; <i>C. 'Nelly Moser'</i> ; <i>C. tangutica</i> (Maxim.) Korsh.; <i>C. vitalba</i> L.
<i>Clerodendron trichotomum</i> Thunb.
<i>Cornus alba</i> L.; <i>C. alba</i> 'Sibirica'; <i>C. alba</i> 'Elegantissima'; <i>C. mas</i> L.; <i>C. sanguinea</i> L.
<i>Corylus avellana</i> L.; <i>C. colurna</i> L.
<i>Cotinus coggygria</i> Scop.; <i>C. coggygria</i> 'Royal Purple'
<i>Cotoneaster dammeri</i> C. K. Schneid.; <i>C. dielsianus</i> E. Pritz.; <i>C. divaricatus</i> Rehder et E. H. Wilson; <i>C. horizontalis</i> Decne.

Cont. Table 1 – cd. tab. 1

<i>Crataegus laevigata</i> (Poir.) DC.; <i>C. monogyna</i> Jacq.; <i>C. persimilis</i> Sarg. 'Splendens'
<i>Deutzia</i> × <i>rosea</i> (Lemoine) Rehder; <i>D. scabra</i> Thunb.; <i>D. scabra</i> 'Plena'
<i>Euonymus europaeus</i> L.; <i>E. fortunei</i> (Turcz.) Hand.-Mazz. 'Emerald Gaiety'; <i>E. fortunei</i> 'Emerald'n Gold'; <i>E. fortunei</i> 'Sunspot'
<i>Fagus sylvatica</i> L.; <i>F. sylvatica</i> 'Atropunicea'; <i>F. sylvatica</i> 'Pendula'
<i>Fallopia baldshuanica</i> (Regel) Holub
<i>Forsythia</i> × <i>intermedia</i> Zabel; <i>F. ×intermedia</i> 'Spectabilis'
<i>Frangula alnus</i> Mill.
<i>Fraxinus excelsior</i> L.
<i>Gleditsia triacanthos</i> L.
<i>Hedera helix</i> L.
<i>Hibiscus syriacus</i> L. (varieties)
<i>Hippophaë rhamnoides</i> L.
<i>Hydrangea arborescens</i> L. 'Grandiflora'; <i>H. macrophylla</i> (Thunb. ex Murray) Ser.
<i>Ilex aquifolium</i> L.; <i>I. ×meserveae</i> S. Y. Hu
<i>Juglans cinerea</i> L.; <i>J. regia</i> L.
<i>Kerria japonica</i> (L.) DC.; <i>K. japonica</i> 'Picta'; <i>K. japonica</i> 'Pleniflora'
<i>Laburnum anagyroides</i> Medik.; <i>L. ×watereri</i> (G. Kirchm.) Dippel 'Vossii'
<i>Ligustrum ovalifolium</i> Hassk. 'Aureum'; <i>L. vulgare</i> L.
<i>Lonicera henryi</i> Hemsl.; <i>L. periclymenum</i> L.; <i>L. pileata</i> Oliv.; <i>L. tatarica</i> L.; <i>L. ×tellmanniana</i> Magyar ex H. L. Späth; <i>L. xylosteum</i> L.
<i>Lycium barbarum</i> L.
<i>Magnolia</i> 'Betty'; <i>M. ×soulangeana</i> Soul.-Bod.; <i>M. stellata</i> (Siebold et Zucc.) Maxim.; <i>Magnolia</i> sp.
<i>Mahonia aquifolium</i> (Pursh) Nutt.
<i>Malus sieversii</i> (Ledeb.) M. Roem. 'Niedzwetzkyana'; <i>Malus</i> sp. (odmiany hodowlane)
<i>Parthenocissus quinquefolia</i> (L.) Planch.; <i>P. tricuspidata</i> (Siebold et Zucc.) Planch.
<i>Philadelphus coronarius</i> L.; <i>Ph. inodorus</i> var. <i>grandiflorus</i> (Willd.) A. Gray; <i>Ph. pubescens</i> Loisel.; <i>Ph. ×virginalis</i> Rehder 'Virginal'
<i>Physocarpus opulifolius</i> (L.) Maxim.; <i>P. opulifolius</i> 'Diabolo'; <i>P. opulifolius</i> 'Luteus'
<i>Platanus ×hispanica</i> Mill. ex Münchh. 'Acerifolia'; <i>P. orientalis</i> L.
<i>Populus alba</i> L.; <i>P. ×canadensis</i> Moench; <i>P. nigra</i> L. 'Italica'; <i>P. trichocarpa</i> Torr. et A. Gray ex Hook.
<i>Potentilla fruticosa</i> L.
<i>Prunus</i> 'Amanogawa'; <i>P. avium</i> L.; <i>P. cerasifera</i> Ehrh.; <i>P. cerasifera</i> 'Pissardii'; <i>P. cerasus</i> L.; <i>P. domestica</i> subsp. <i>domestica</i> L.; <i>P. 'Kanzan'</i> ; <i>P. 'Kiku Shidare'</i> ; <i>P. laurocerasus</i> L.; <i>P. padus</i> L.; <i>P. serotina</i> Ehrh.; <i>P. triloba</i> Lindl.; <i>Prunus</i> sp.
<i>Pterocarya fraxinifolia</i> (Poir.) Spach
<i>Pyracantha coccinea</i> M. Roem.; <i>P. coccinea</i> 'Orange Glow'; <i>P. coccinea</i> 'Soleil d'Or'
<i>Pyrus communis</i> L.
<i>Quercus petraea</i> (Matt.) Liebl.; <i>Q. robur</i> L.; <i>Q. robur</i> 'Fastigiata'; <i>Q. rubra</i> L.
<i>Rhamnus cathartica</i> L.
<i>Rhododendron</i> 'Cunningham's White'; <i>Rh. luteum</i> Sweet; <i>Rhododendron</i> sp.
<i>Rhus typhina</i> L.
<i>Ribes aureum</i> Pursh; <i>R. nigrum</i> L.; <i>R. rubrum</i> L.; <i>R. sanguineum</i> Pursh
<i>Robinia pseudoacacia</i> L.; <i>R. pseudoacacia</i> 'Frisia'; <i>R. pseudoacacia</i> 'Umbraculifera'
<i>Rosa canina</i> L.; <i>R. rugosa</i> Thunb.; <i>Rosa</i> sp. (odmiany hodowlane)
<i>Rubus idaeus</i> L.
<i>Salix alba</i> L.; <i>S. aurita</i> L.; <i>S. babylonica</i> L. 'Tortuosa'; <i>S. caprea</i> L. 'Kilmarnock'; <i>S. fragilis</i> L.; <i>S. integra</i> Thunb. 'Hakuro Nishiki'; <i>S. ×sepulcralis</i> Simonk. 'Chrysocoma'; <i>S. viminalis</i> L.
<i>Sambucus nigra</i> L.
<i>Sarothamnus scoparius</i> (L.) W. D. J. Koch
<i>Sorbus aucuparia</i> L.; <i>S. aucuparia</i> 'Pendula'; <i>S. intermedia</i> (Ehrh.) Pers.
<i>Spiraea</i> 'Arguta'; <i>S. chamaedryfolia</i> L. emend. Jacq.; <i>S. 'Grefsheim'</i> ; <i>S. japonica</i> L. f. 'Anthony Waterer'; <i>S. japonica</i> 'Golden Princes'; <i>S. ×vanhouttei</i> (Briot) Zabel
<i>Symphoricarpos albus</i> (L.) S. F. Blake
<i>Syringa vulgaris</i> L. (i odmiany)
<i>Tamarix ramosissima</i> Bunge; <i>T. tetrandra</i> Pall.
<i>Tilia cordata</i> Mill.; <i>T. 'Euchlora'</i> ; <i>T. platyphyllos</i> Scop.
<i>Ulmus glabra</i> Huds.; <i>U. laevis</i> Pall.
<i>Viburnum lantana</i> L.; <i>V. opulus</i> L. 'Roseum'; <i>V. ×pragense</i> Vik.; <i>V. rhytidophyllum</i> Hemsl.
<i>Vinca minor</i> L.
<i>Weigela</i> 'Bristol Ruby'; <i>W. florida</i> (Bunge) A. DC.; <i>W. florida</i> 'Variegata'
<i>Wisteria floribunda</i> (Willd.) DC.; <i>W. sinensis</i> (Sims) Sweet
<i>Yucca filamentosa</i> L.

Out of species of North American origin (constituting 11.8% of Gryfino's afforestation), those rarely cultivated in Poland are e.g. grand fir (*Abies grandis*), growing in Gryfino on the lawn between Kościelna, 1 Maja and Bolesława Chrobrego st.; noble fir (*A. procera*), growing in the gardens adjoining residential buildings, i.a. at S. Staszica and Mazowiecka st.; ponderosa pine (*Pinus ponderosa*) – in the gardens adjoining residential buildings, e.g. at W. Andersa, at a housing estate at Z. Krasińskiego st., near school premises; honey locust (*Gleditsia triacanthos*) – a tree with a 179 cm trunk c. growing in the municipal park in Gryfino; southern catalpa (*Catalpa bignonioides*) – in gardens adjoining residential buildings, e.g. at 128 Łużycka st.; trumpet vine (*Campsis radicans*) – a climbing plant growing in the gardens adjoining residential buildings, e.g. at 17 Mieszka I st.

Out of trees and shrubs of hybrid origin (constituting 4,7% of Gryfino's afforestation), there are rare specimen of blue holly (*Ilex xmeservae*) growing in the gardens adjoining residential buildings, e.g. at 15 Mieszka I st. and Viburnum 'Pragense' (*Viburnum xpragense*) growing in a garden adjoining residential buildings at Okrężna st.

40.9% of Gryfino's afforestation constitute domesticated plants (cultivars). Out of those species, rare are e.g. noble fir 'Glauca' (*Abies procera* 'Glauca'), growing in Gryfino in the gardens adjoining residential buildings at B. Limanowskiego and W. Andersa st.; Serbian Spruce 'Pendula' (*Picea omorika* 'Pendula'), growing in the gardens adjoining residential buildings at Mieszka I st. and at Okrężna st.; Atlas cedar 'Pendula' (*Cedrus libani* subsp. *atlantica* 'Pendula') – in the gardens adjoining residential buildings in Okrężna st. – a specimen with a 40 cm trunk c.; Japanese cedar 'Elegans' (*Cryptomeria japonica* 'Elegans'), growing in a garden adjoining a residential building in Okrężna st.; Sawara Cypress 'Filifera Aurea' (*Chamaecyparis pisifera* 'Filifera Aurea'), growing in a small number of gardens adjoining residential buildings; Sawara Cypress 'Filifera Nana' (*Ch. pisifera* 'Filifera Nana') – in a garden adjoining a building in Okrężna st.; Broad-leaved cockspur thorn 'Splendens' (*Crataegus persimilis* 'Splendens') growing by the City Hall; Crimean lime (*Tilia* 'Euchlora') – a specimen with a 113 cm trunk c. growing in a municipal park in Gryfino.

There is a small number of old trees in Gryfino, reaching monumental sizes. Most of all, it is a result of a significant damage of 1945, when the buildings were demolished along with the trees and shrubs. During the rebuilding process, damaged trees were removed. Out of the remaining gymnosperm plants, European yews (*Taxus baccata*) reached monumental sizes – a specimen with a **205** cm trunk c. growing at Wyspiańskiego st., specimen with **158, 140, 130, 125** cm trunk c. growing at Kościelna st, a specimen with a trunk c. of **140** cm in Grunwaldzka st. and a specimen with a trunk c. of 140 cm in Pomorska st., and also white fir (*Abies concolor*) with a trunk c. of **261**, growing at Mieszka I st. Out of angiosperms, the following trees reached monumental sizes: common beech (*Fagus sylvatica*), with a **367** cm trunk c., growing at Łużycka st., common beech 'Atropunicea' (*F. sylvatica* 'Atropunicea'), with a **256** cm trunk c., growing in a municipal park and a tree with a **249** cm trunk c. in a garden at Sprzymierzonych st.; common hornbeam (*Carpinus betulus*) with a 184 cm trunk c., growing at Cmentarz Komunalny [municipal cemetery]; white willow (*Salix alba*) with a **325** trunk c., growing at Energetyków st.; small-leaved lime (*Tilia cordata*) with a **292** cm trunk c., growing at the premises of Powiatowe Centrum Pomocy Rodzinie [District Family Support Centre] at Łużycka st. and trees with a **270** and **263** cm trunk c., growing in the

avenue at Łużycka st.; European White Elm (*Ulmus laevis*) with a **345** cm trunk c. growing at Mieszka I st. and the trees with a **310** and **275** cm trunk c. (common ivy) in the municipal park; Norway maple (*Acer platanoides*) with a **346** cm trunk c., growing in the municipal park.

Various areas of Gryfino deserves attention with regard to the occurrence of woody plants. In the oldest part of the town, in the market square – Duke Barnim's Square, as it is called today – four old small-leaved limes grow, and old English yews and a cherry plum (*Prunus cerasifera*) with a 140 cm trunk c. stand out in the vicinity of the historic church of The Holy Virgin Mary's Nativity, by a former churchyard. The Old Town was once surrounded by defensive walls built in 14–15th c., of which only fragments still remain, along with Brama Bańska [Bańska Gate] with a stone square base - cylindrical, brick, with a multilateral cupola higher up. Young specimen of the following plants grow by Bańska Gate, such as, e.g. *Larix decidua*, *Acer platanoides* 'Globosum', *Fraxinus excelsior*. The areas with defensive walls and garden stretch westward from the Bańska Gate. Common hornbeams (*Carpinus betulus* – e.g. trees with 164, 119, 92 and 59 cm trunk c.) form a line by the defensive walls. *Tilia cordata* (trees on a row), *Salix alba* and *S. xsepulcralis* 'Chrysocoma', *Sorbus aucuparia*, *Prunus cerasifera* 'Pissardii', *Acer platanoides* also grow there. Among the shrubs are, for example: *Spiraea xvanhouttei*, *Cotoneaster horizontalis*, *Hippophaë rhamnoides*, *Philadelphus xvirginialis* 'Virginal', *Weigela florida*, *Forsythia xintermedia*.

An interesting garden and park project is located at 48 Bolesława Chrobrego st. – within the limits of the Old Town, with the fragment of a medieval defensive wall from the south side – at the premises of the 19th c. Pałacyk pod Lwami [Lion's Palace], the seat of Gryfino's Cultural Centre. There is a big lawn with an indentor pin there; there is a stone sculpture of a child and – in the middle of the courtyard – a brick fountain laid with green tiles with the motives of masks and water animals. A double line of English yews leads to the Palace. The specimen of gymnosperms, rarely occurring in other parts of the town, grow within the limits of the premises: *Ginkgo biloba* (a specimen with an 84 cm trunk c.), *Pseudotsuga menziesii*, *Pinus mugo* and *P. nigra* (e.g. a tree with a tree with a 168 cm trunk c.), *Chamaecyparis nootkatensis* 'Pendula' (a tree with a tree with a 42 cm trunk c.). Angiosperm trees and shrubs also grow there, occurring more frequent in Gryfino, and those species are: *Betula pendula*, *Carpinus betulus*, *Salix xsepulcralis* 'Chrysocoma', *Pyrus communis* (a tree with a 177 cm trunk c), *Acer platanoides*, *Aesculus hippocastanum* (e.g. trees with 213, 174, 163 cm trunk c.), *Parthenocissus quinquefolia* (on the fence), *Syringa vulgaris*.

A bigger green space – with the area of 6.02 ha – is a municipal Stanisława Siarkiewicz park, named after a local teacher, a poet and a painter, a lover of Gryfino and nature. It takes up a space between the railway and 1 Maja, Parkowa and Armii Krajowej st., where a cemetery was previously located (established in the 19th c, after the area within the defensive walls had been leveled). Deciduous trees dominate in the park: *Quercus robur*, *Ulmus laevis*, *Tilia cordata* and *T. platyphyllos*, *Aesculus hippocastanum* and *Ae. xcarnea*, *Fraxinus excelsior*. There is a small number of deciduous shrubs, i.a. *Spiraea xvanhouttei*, *Cornus alba* 'Sibirica', *Lonicera xylosteum*. Gymnosperm plants are scarce; there are: *Taxus baccata*, *Pseudotsuga menziesii*, *Picea abies*, *Larix decidua* and *L. kaempferi*, *Pinus mugo* and *P. nigra*, *Platycladus orientalis*. The design of the park is impressive mostly because of a great number of avenues and trees whose leaves change colour during the vegetative

period, such as: *Acer pseudoplatanus* 'Atropurpureum', *A. saccharinum*, *A. negundo* 'Odessanum' and *A. negundo* 'Variegatum', *Fagus sylvatica* 'Atropunicea', and also trees with interesting habits, trunks, fruit, so trees such as: *Fagus sylvatica* 'Pendula', *Tilia* 'Euchlora', *Gleditsia triacanthos*. A young specimen of oriental plane-tree (*Platanus orientalis*), a tree rare in Poland, grows in the municipal park. There is a small playground there. There is a glacial erratic by one of the avenues with a plaque dedicated to the patron of the park.

There are 2 cemeteries on the so-called 'upper terrace' (high former bank of the Regalica river) – the Municipal Cemetery and the Soviet Military Cemetery. At the Municipal Cemetery – established in 1911, currently taking up a surface of about 7 ha – impressive avenues made out, among others, of small-leaved limes lead to a centrally located neogothic chapel. Various domestic trees grown at the cemetery, with a high number of domesticated plants (cultivars), especially cypresses (*Chamaecyparis* sp.), thujas (*Thuja* sp.) and junipers (*Juniperus* sp.). There are also plants not so common to green areas: *Tsuga canadensis* 'Jeddeloh', *Larix kaempferi*, *×Cupressocyparis leylandii*, *Platanus ×hispanica* 'Acerifolia'. Deciduous shrubs, i.a. *Spiraea* 'Grefsheim' and *S. ×vanhouttei*, *Kerria japonica* 'Pleniflora', *Hydrangea macrophylla*, *Philadelphus coronarius* and *Ph. ×virginalis* 'Virginal'. The Soviet Military Cemetery – established in Gryfino between 1946 and 1952, rebuilt between 1972 and 1974 – is a burial site of 7 134 soldiers (according to the documentation of Wojewódzki Urząd Ochrony Zabytków in Szczecin [The Province Heritage Monuments Protection Office]. It is surrounded by dense trees, there are e.g. *Taxus baccata*, *Picea abies* and *P. abies* 'Viminalis', *Thuja occidentalis*, *Betula pendula*, *Tilia cordata* and *T. platyphyllos*, *Sorbus intermedia* and *Acer negundo*. By the main footway, there are junipers (*Juniperus* sp.) in various domesticated varieties, and deciduous plants, i.a. *Berberis julianae* and *B. thunbergii* 'Atropurpurea', *Spiraea ×vanhouttei*, *Chaenomeles japonica*, *Cotoneaster dammeri*. Roses (*Rosa* sp.) grow between the tombstones.

Within the town limits, there are also other impressive green areas with rarely cultivated trees and shrubs. For example, on the lawn between Kościelna, 1 Maja and Bolesława Chrobrego st. – with a small fountain – i.a. *Sorbus intermedia* and *Buddleja davidii* grow there; on the lawn between Niepodległości, 1 Maja and Bolesława Chrobrego st. – with a bigger fountain decorated with the sculptures of fish – there are i.a. rhododendrons (*Rhododendron* sp.), *Acer platanoides* 'Schwedleri' and *Ilex aquifolium*, and also a grand fir (*Abies grandis*); on the lawn by the defensive walls – called Plac Solidarności [Solidarność Square] – there are young trees and shrubs, i.a. *Physocarpus opulifolius* and *Laburnum ×watereri* 'Vossii'. At the walking areas by the Regalica river, there grow common trees and shrubs, with a climbing clematis (*Clematis vitalba*), not occurring in other parts of the town.

The lawns near schools, by the Ośrodek Pomocy Rodzinie [Family Support Centre], by the premises of Opieka Zdrowotna [Healthcare Centre], and also by the multi-family residential buildings, are populated by plants easy in cultivation, occurring also in other parts of Gryfino. The premises of Nadleśnictwo Gryfino [Gryfino Forest Division] (at 4 1 Maja st.) are nicely developed, where a rare *Clerodendron trichotomum* grows.

Interesting plants, rarely cultivated in Poland, occur in the gardens adjoining one-family houses. There are e.g. *Tsuga canadensis* 'Jeddeloh' and *Acer palmatum* (in a small number

of gardens), *Picea omorika* 'Pendula' (in the gardens at Mieszka I and Okrężna st.), *Pinus ponderosa* (at W. Andersa st.) and *P. wallichiana* (at Staszica st.), *Cedrus libani* supsp. *atlantica* 'Pendula', *Metasequoia glyptostroboides*, *Cryptomeria japonica* 'Elegans', *Acer palmatum* 'Dissectum Nigrum', *Cotinus coggygria* and *C. coggygria* 'Royal Purple' and *Viburnum xpragense* (in the gardens at Okrężna st.), *Berberis verruculosa* (in the gardens, e.g. at Okrężna st.), *Cryptomeria japonica* (at 14 Z. Krasińskiego st.), *Berberis julianae* (in the gardens, e.g. at Łużycka st.), *Catalpa bignonioides* (in the gardens, e.g. at 128 Łużycka st.), *Ilex xmeserveae* (e.g. in the garden at 15 Mieszka I st.).

Some of the streets in Gryfino are avenues. For example, Łużycka st. – leading to the Old Town from the south, from Pniewo – is lined with small-leaved limes, large-leaved limes and common-horse-chestnuts (*Aesculus hippocastanum*). In that street at number 90, a *Quercus robur* 'Fastigiata' grows. Small-leaved limes also grow along Parkowa and Rapackiego st. In Sportowa st. there is an avenue lined with horse-chestnuts (*Aesculus hippocastanum* and *Ae. xcarnea*).

Gryfino is a town with frequently occurring climbing plants, with the species rarely cultivated in Poland growing most of all in the gardens adjoining private residential buildings. In public green spaces, there are mostly more common climbing plants, easier to cultivate, such as: *Fallopia baldshuanica*, *Parthenocissus quinquefolia*, *Hedera helix* and *Lonicera periclymenum*, and of those rarely cultivated, there is – in the buildings at 1 Maja st. - *Wisteria sinensis*. The mentioned climbing plants occur also in private gardens adjoining residential buildings. In those gardens, there are also: *Actinidia arguta* (at 15 Mieszka I st.), *Wisteria floribunda* (in the gardens at Łużycka, W. Andersa, Z. Krasińskiego, Okrężna st.), *Celastrus orbiculatus* (at W. Andersa st.), *Parthenocissus tricuspidata* and *Lonicera xtellmanniana* (in the gardens at Mieszka I, 7 W. Witosa, S. Wyspiańskiego st.), *Campsis radicans* (at 17 Mieszka I st.). Clematis is often cultivated in the gardens: *Clematis alpina* 'Ruby', *C. tangutica* (at Okrężna st.), *C.* 'Jackmanii', *C.* 'Nelly Moser'.

Dendroflora of Gryfino in comparison with the afforestation of other towns

The analysis of the dendroflora of Gryfino in comparison with the afforestation of 18 other towns (up to several thousands of inhabitants) in north-west Poland (Kubus and Nowak 1998, 2004, Stachak et al. 1999, Stachak and Kubus 2000, 2001, Kubus 2001, 2002, 2003, 2004a, 2004b, 2008, Kubus et al. 2003, Kubus and Skorodecka 2002, Kubus and Szewczyk 2006, Nowak 2003, Nowak and Wrona 2004, Nowakowska 2007, Nowak and Jurzyk 2008) indicates that in Gryfino – similarly to many other towns, especially those significantly damaged in the military operations of 1945 – there is a dominance of domesticated plants (cultivars). Trees and shrubs occurring naturally in Europe and outside of Europe have a significant share in the afforestation of Gryfino and other towns. In some towns, e.g. in Lipiany, Maszewo, Mieszkowice, Myślibórz, Nowe Warpno – with insignificant damage in 1945, and also in Kamień Pomorski – destroyed in 75% and in Łobez and Płoty – destroyed in 60% (Piskorski 1966), those plants dominate in the stand. In Gryfino – similarly to other towns – plants of European origin constitute a small percentage of the stand, with the smallest number of hybrids (not classified as cultivars). The percentage of trees and shrubs of Asian origin is usually bigger than those with North American origin.

There are very few trees reaching monumental sizes in Gryfino. Among the analysed 18 towns, there are some, as e.g. Łobez, Maszewo, Myślibórz, Trzebiatów, with a higher number of such trees.

Deciduous trees growing in Gryfino, rarely cultivated in green areas in Poland, occur also in other towns in the north-west part of the country.

CONCLUSIONS

In Gryfino between 2009 and 2010 and in 2013, trees and shrubs of 283 taxons were identified (including 89 gymnosperms and 194 angiosperms), from which 279 taxons were classified as species and varieties. Among the 279 taxons: 5.0% are European plants, 22.6% – plants occurring naturally in Europe and outside Europe, 15.0% – are plants of Asian origin, 4.7% are hybrids (not classified as cultivars), and 40.9% – domesticated plants.

There are species and varieties of woody plants in Gryfino that are rarely cultivated in the green areas in Poland.

There are few trees reaching monumental sizes (8 gymnosperm trees belonging to 2 taxons and 12 angiosperm trees belonging to 7 taxons).

Gryfino, with its interesting green areas (e.g. municipal parks, lawns), and also located near areas with attractive nature and valuable cultural monuments, has a potential to develop as a tourist destination.

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Abstract. The aim of the thesis was to acquaint oneself with the dendroflora of Gryfino. The research was carried out between 2009 and 2010 and in 2013. Out of 279 taxons specified to their as species and a variety, 5.0% are plants of European origin, 22.6% – plants occurring naturally in Europe and outside of Europe, 15.0% are plants of Asian origin, 11.8% – plants occurring naturally in North America, 4.7% are hybrids, and 40.9% – domesticated plants (cultivars). Out of trees and shrubs rarely cultivated in Poland, there are for example *Abies grandis*, *Abies procera* 'Glauca', *Picea omorika* 'Pendula', *Cedrus libani* subsp. *atlantica* 'Pendula', *Pinus ponderosa*, *Pinus wallichiana*, *Metasequoia glyptostroboides*, *Cryptomeria japonica*, *C. japonica* 'Elegans', *Berberis julianae*, *Berberis verruculosa*, *Crataegus persimilis* 'Splendens', *Gleditsia triacanthos*, *Ilex aquifolium*, *Viburnum xpragense*, *Viburnum rhytidophyllum*, *Catalpa bignonioides*, *Campsis radicans*, *Clerodendron trichotomum*. There are few trees reaching monumental sizes: 8 gymnosperm trees belonging to 2 taxons and 12 angiosperm trees belonging to 7 taxons.