NAT. CROAT. | VOL. 29 | No 1 | 143-171 | ZAGREB | October 30, 2020

professional paper/stručni članak – museal collections/muzejske zbirke
DOI 10.20302/NC.2020.29.15

PLETHORA OF PLANTS - COLLECTIONS OF THE BOTANICAL GARDEN, FACULTY OF SCIENCE, UNIVERSITY OF ZAGREB (4): PEONIES (*PAEONIA*, PAEONIACEAE) AND ST. JOHN'S WORTS (*HYPERICUM*, HYPERICACEAE)

Vanja Stamenković & Sanja Kovačić*

Botanical Garden, Department of Biology, Faculty of Science, University of Zagreb, Marulićev trg 9a, HR-10000 Zagreb, Croatia (*e-mail: sanja.kovacic@biol.pmf.hr)

Stamenković, V. & Kovačić, S.: *Plethora of plants* – collections of the Botanical Garden, Faculty of Science, University of Zagreb (4): Peonies (*Paeonia*, Paeoniaceae) and St. John's Worts (*Hypericum*, Hypericaceae). Nat. Croat., Vol. 29, No. 1, 143-171, 2020, Zagreb.

In this paper, the plant lists of the woody and herbaceous members of Paeoniaceae and Hypericaceae families, grown in Zagreb Botanical Garden of the Faculty of Science since 1892 until 2020, are studied. Synonymy, nomenclature and origin of plant material were sorted. Lists of species grown in the last 128 years have been constructed to show that during that period at least **50** taxa of woody and herbaceous wild and cultivated peonies (*Paeonia* spp.) and **44** St. John's worts (*Hypericum* spp.) inhabited the Garden's collections. Today we have 46 *Paeonia* species, cultivars and hybrids, and 14 *Hypericum* species, cultivars and hybrids.

Key words: Zagreb Botanical Garden, Faculty of Science, historic plant collections, *Paeonia* collection, *Hypericum* collection

Stamenković, V. & Kovačić, S.: *Obilje bilja* – zbirke Botaničkoga vrta Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu (4): Zbirke božura (*Paeonia*, Paeoniaceae) i pljuskavica (*Hypericum*, Hypericaceae). Nat. Croat., Vol. 29, No. 1, 143-171, 2020, Zagreb.

U ovom članku sastavljeni su popisi drvenastih i zeljastih svojta božura (rod *Paeonia*, porodica Paeoniaceae) i pljuskavica (rod *Hypericum*, porodica Hypericaceae) uzgajanih u Botaničkom vrtu zagrebačkog Prirodoslovno-matematičkog fakulteta između 1892. i 2020. godine. Uređena je sinonimika i nomenklatura te istraženo podrijetlo biljnog materijala. Rezultati pokazuju da je tijekom 128 godina kroz zbirke Botaničkog vrta prošlo najmanje **50** svojta božura, te **44** pljuskavica. Danas uzgajamo **46** svojti roda *Paeonia* te **14** svojti roda *Hypericum*.

Ključne riječi: Botanički vrt PMF-a u Zagrebu, povijesne zbirke biljaka, rod *Paeonia*, rod *Hypericum*

INTRODUCTION

The comprehensive investigation of plant collections in the Botanical Garden of the Faculty of Science, University of Zagreb (in further text "Botanical Garden" or "the Garden") initiated in 2012 is continuing with inventories of indigenous, wild and cultivated taxa of peonies (*Paeonia* L., Paeoniaceae) and St. John's worts (*Hypericum* L., Hypericaceae), following the principles established in the previous papers of this series (Kovačić, 2015; Sandev *et al*., 2018; Kovačić, 2019).

Woody and herbaceous taxa of *Paeonia* and *Hypericum* are cultivated globally for centuries, useful in pharmacy and perfumery, admired in horticulture. In our Garden's collections, both are sawn, grown, overwintered and permanently planted outdoors. Scattered around our arboretum, rockeries with indigenous species, systematic fields and several nurseries, peonies and St. John's worts are being merged lately; in 2015 we planted a small "Paeoniarium" (Photo-tables 1 and 2), and since 2019 even smaller "Hypericarium" (Photo-table 3). Most of the samples in our collections were obtained through *Index Seminum*-network of inter-botanic-garden seed exchange, and some were brought as living plants, mostly from the field research in Croatia and former Yugoslavia, or received as gifts from our colleagues and visitors.

Peonies (*Paeonia*, Paeoniaceae)

Family Paeoniaceae Raf. (formerly merged to Ranunculaceae Juss.), as comprehended today, is strictly monotypic: it consists of a single genus, an eponymous *Paeonia* L. (Christenhusz & Byng, 2016). According to the recent taxonomic frame (Hong, 2010), there are 8 woody and 27 herbaceous species in this genus, divided to three sections: two woody (Euroasian *Moutan* and North-American *Onaepia*) and one herbaceous (*Paeoniae*), characterised by complicate reticulate evolution. From the "garden point of view", one would not expect of a small, Northern-hemisphere genus with only 35 species to be very complicated, but one could not be more wrong with respect to the peonies: due to the thousands of years of intensive cultivation, selection and hybridization, the lines between taxa become blurred, and wild origin (if any) extremely difficult to trace. For example, famous and beautiful woody peony (*Paeonia* × *suffruticosa* Andrews, Figs. 2bc) is not a natural species, but a cultivated "hybrid swarm" (Ji *et al*., 2012).

Four taxa of peonies are listed as (potentially) invasive acc. to EASIN (http://alien.jrc.ec.europa.eu/SpeciesMapper), though of the low/unknown impact. IUCN *Red List of Threatened Species* holds the endangered (EN) Greek *Paeonia parnassica* Tzanoud., while widely spread *P. officinalis* L. is estimated to be of low concern (LC). *Flora Croatica Database* inventories just three *Paeonia* species (https://hirc.botanic.hr/fcd/): *Paeonia mascula* (L.) Mill. (Fig. 9a; with subsp. *russoi* (Biv.) Cullen & Heywood), *P. officinalis* (Fig. 6) and *P. peregrina* Mill. (Fig. 8a). All native peonies are statutorily strictly protected in Croatian wild habitats via *Ordinance of strictly protected species* (http://www.propisi.hr/print.php?id=12728), and two are estimated to be nearly threatened (NT) acc. to *Croatian Red List* (https://hirc.botanic.hr/fcd/CrvenaKnjiga/). All three indigenous species are grown in our collections for decades (Kovačić *et al*., 2014), but not all samples originated from Croatian localities.

St. John's Worts (*Hypericum*, Hypericaceae family)

Family Hypericaceae Juss. (formerly Guttiferae Juss. and Clusiaceae Lindl.), with more than 600 species arranged in nine genera (Christenhusz & Byng, 2016), consists of annual and perennial herbs, subshrubs and shrubs. Modern comprehension differs in inter-relationships of this large family and its largest genus, an eponymous *Hypericum* (Nürk & Blattner, 2010; Govaerts, 2016; Robson *et al*., 2020), which are very complex and not subjected to this inventory. However, we never grew in our Garden any of the other Hypericaceae genera besides the largest, *Hypericum* L. (with exception of *Webbia floribunda* (Aiton) Spach., a "new name" of "old" *Hypericum floribundum* Aiton of section Webbia), so this inventory is focused on this genus. Genus *Hypericum* is divided to several clades with more than 30 sections (Nürk & Blattner, 2010), some with

subsections, some holding a single species. (Comprehensive list of literature is regularly amended in Robson *et al*. (2020) website: http://hypericum.myspecies.info/biblio; as well as in the *World Flora Online* website: http://www.worldfloraonline.org/).

Up to 23 *Hypericum* taxa are registered as (potentially) invasive acc. to EASIN, but of the low/unknown impact. IUCN *Red List of Threatened Species* holds 33 *Hypericum* species: three critically endangered (CR), four endangered (EN) and six vulnerable (VU), while the rest are listed as data deficient (DD) or estimated as of low concern (LC). Out of 16 St. John's worts listed in *Flora Croatica Database*, Croatian flora does not hold endangered or statutorily strictly protected taxa.

MATERIAL & METHOD

As explained in our previous papers (f.e. Kovačić, 2015), main sources used for constructing the lists of individual plant groups growing in our Botanical Garden are the published records on the historic collections from the late 19th century, and our central database of plants, established in the late 1940-ies. The initial part of this study is based on the papers of Ettinger (1892) and Heinz (1895–1896), both imprecise in stating the details on the Garden inventory. After that, quite poor evidence on the genera in focus, there is a gap of more than 50 years during which the data on our collections are missing – until recent records were founded after the WWII, and since than systematically gathered (details in Kovačić, 2015 and Budisavljević & Kovačić (in this issue), systematizing the Botanical Garden archives). To make the inventory lists of *Paeoniaceae* and *Hypericaceae* as simple as possible, the data are arranged in two tables (1 and 2, respectively), each consisting of the inventories from our paper-card database. Each entry is accompanied with data on the sample origin and date of acquire, as well as the original notes from the database. Due to immense synonymy (especially with respect to *Paeonia*), Tabs. 1 and 2 are designed according to the currently valid nomenclature of the *World Flora Online* (http://www.worldfloraonline.org/) database. However, to preserve the historic plant names, column 5 ("Arrived as") in both Tables contains the entries by which were the specimens originally recorded/arrived to our collection.

Names of cultivars and hybrids follow botanical nomenclature whenever possible, but in some cases the *Hypericum Online* website (Robson *et al*., 2020) and international authority for peony-cultivars registration, the *American Peony Society* website (https://americanpeonysociety.org/), were consulted too.

Details about the Garden 'rockeries' – Karstic, Mediterranean and Sub-Mediterranean phytogeographical sections, in which we are growing indigenous plant collections – could be found in Kovačić *et al.* (2014) and Stamenković & Kovačić (2014).

Some details of sampling through former Yugoslavian states could be found in Kovačić (2019).

RESULTS & DISCUSSION

According to two earliest sources (Ettinger, 1892; Heinz, 1895–1896), in the late 19th century only one *Paeonia* and four *Hypericum* species mentioned by-name were living in our Botanical Garden, but without any details where those plants were planted or originated from.

Our post-WWII database provides much more information, although again some entries are rather scarce (Tabs. 1 and 2).

Peonies (*Paeonia*, Paeoniaceae family)

In his perfunctory list of Botanical Garden trees and shrubs, Ettinger (1892) recorded only "Poeonia arborea", most probably misspelled *Paeonia arborea* Donn (or *P.* × *arborea* C.C.Gmel., today a synonym of *P.* × *suffruticosa*). Several years later, Heinz (1895–1896) pointed out that „many *Paeonia*-species" (of the Ranunculaceae family) are growing in the Garden, but without further details on the species.

Since the WWII, we can track most of the specimens in our collection: a minor part (nine entries, among which three Croatian species) was collected in their natural habitats, mostly as living plants (f.e. Figs. 6, 7, 8a, 9a), which were grown in our indigenous plant collections. Other samples of that time, listed in Table 1, were grown predominantly from the seeds obtained via *Index Seminum* publications. Also, various *Paeonia*-cultivars were gained through the years as living plants, but also grown from seeds. Although most of the peonies in the Table 1 are listed as "pure species", most of them originate from garden-growth, so, consequently, some could have been hybrids or horticultural varieties – at least, results of the "open pollination" (as frequently stated in the *Index Seminum* publications), rather than wild species *sensu stricto*.

As seen in Table 1, during the investigated time (since 1951) we had at least 20 named cultivars, but most of the older garden-varieties entered the collections as unnamed *plantae vivae* (mostly from *P. lactiflora* Pall. and *P.* (×) *suffruticosa* range), as gifts from the person(s) today unknown. For years we are maintaining in our collections plants of the same name but different appearance (Fig. 12abc), sometimes *vice versa*: similarly looking specimens sprouting from the seeds arrived under different names (Fig. 10). Though it is not uncommon for the seed of garden varieties (cultivars and hybrids) to sprout differently than expected, while the morphologic/phenotypic traits are repeated only via vegetative reproduction (root dividing), it is still interesting to see the deviations from the original form. It is also seen in Table 1 that the first sample registered in 1951 in our new database was "Peonia albiflora" (today a syn. of *P. lactiflora*, probably white-flowered form, as in Fig. 12b), of the unknown source. During the following decades collection of peonies remained small in number of taxa and of specimens: essentially, beside native species, we grew only the unnamed cultivars of woody *P.* × *suffruticosa* (Fig. 2bc) and herbaceous *P. lactiflora* ("pink", "white" and "red"; Fig. 12abc) brought by the employees or visitors.

In 2010 we decided to enlarge the number of taxa of this attractive genus, and plant a little "Paeoniarium" for our visitors (Fig. 5a; Plan 1). More than 60 species and cultivars were ordered between 2010 and 2013 via *Index Seminum*-network: woody (Section Moutan; Photo-table 1) were added to the Garden arboretum collection (Fig. 2a), while herbaceous (Section Paeonia; Photo-table 2 and Plan 1) were planted in the new Paeoniarium (Fig. 5ab), starting in 2015. New taxa are still added occasionally, with most of the plants already flowering (Figs. 3, 4, 5b, 8b, 9b). It is worth mentioning, however, that as most of the recent collection was grown from the seed (Fig. 11) many plants (especially cultivars) show deviations from the original descriptions (f.e. Figs. 9b, 10). Besides, many samples arrived to the Garden by their "older names" (synonyms, and various combinations of subspecies and varieties) today unrecognized by taxonomic authorities. That is also the case with the interesting, original hybrid peonies of the *P. lactiflora* species range, grown from the seed obtained from the Lithuanian Kaunas

Tab. 1. Peonies grown in Zagreb Faculty of Science Botanical Garden from 1951 to 2020 acc. to *The World Flora Online*. "HR" - species of Croatian flora. Asterisk (*) marks the wild locality of material sampling. Affiliations to Sections and Subsections are acc. to Hong (2010). Last column links taxon with designated number in the Plan 1 (*Paeoniarium*).

No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
1	anomala L.	Akureyri	2010	2020	Paeoniarium	P. anomala L. subsp. anomala	syn. P. veitchii Lynch subsp. altaica (K.M.Dai & T.H.Ying) Halda; P. altaica K.M.Dai & T.H.Ying	Sect. Paeonia; Subsect. Albiflorae	3
2	anomala L. subsp. veitchii (Lynch) D.H.Hong & K.Y.Pan	Akureyri	2010	2020	Paeoniarium	P. veitchii Lynch var. veitchii	incl. P. veitchii Lynch and P. woodwardii Stapf ex Cox, with subspecies'		1
3	anomala L. subsp. veitchii (Lynch) D.H.Hong & K.Y.Pan 'Alba'	Graz	2010	2020	Paeoniarium	P. veitchii Lynch var. woodwardii (Stapf ex Cox) Stern 'Alba'			2
4	arietina G.Anderson	Innsbruck	2010	2020	Paeoniarium	P. mascula (L.) Mill. subsp. arietina (G.Anderson) Cullen & Heywood		Sect. Paeonia; Subsect. Paeonia	44
		Nancy	2010	2012	Nursery	P. bakeri Lynch			
		Braunschweig	2015	2020	Paeoniarium	P. bakeri Lynch			48
5	broteri Boiss & Reut.	Gdanjsk	2015	2020	Nursery		syn. P. corallina Retz. var. broteri (Boiss. & Reut.) Coss, P. mascula (L.) Mill. var. broteri (Boiss. & Reut.) Gürke	Sect. Paeonia; Subsect. Foliatae	49
6	cambessedesii (Willk.) Willk.	Ulm	2010	2020	Paeoniarium			Sect. Paeonia; Subsect. Foliatae	5
7	coriacea Boiss.	Bonn	2017	2020	Paeoniarium		syn. P.corallina Retz. v. coriacea (Boiss.) Coss, P. mascula (L.) Mill. subsp. coriacea (Boiss.) Malag.	Sect. Paeonia; Subsect. Foliatae	6

Tab. 1. Continued

No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
8	daurica Andrews	Moscow	1964	1969	Nursery	P. triternata Pall.	under Ranunculaceae	Sect. Paeonia; Subsect. Foliatae	
		Jalta	1973	1984	Nursery	P. triternata Pall.			
		Wuppertal	2010	2020	Paeoniarium				11
		Ulm	2015	2020	Paeoniarium	P. mascula subsp. triternata (Boiss.) Stearn & P.H.Davis			50
9	daurica Andrews subsp. coriifolia (Rupr.) D.Y.Hong	Halle	2010	2020	Nursery	P. caucasica Schipcz.			
10	daurica Andrews subsp. mlokosewitschii (Lomakin) D.Y.Hong	Graz	2010	2020	Paeoniarium	P. mlokosewitschii Lomakin			7
11	daurica Andrews subsp. tomentosa (Lomakin) D.Y.Hong	Nancy	2010	2020	Paeoniarium	P. tomentosa (Lomakin) N.Busch	syn. P. paradoxa G. Anderson		8
12	daurica Andrews subsp. wittmanniana (Hartwiss ex Lindl.) D.Y.Hong	Wuppertal	2010	2020	Paeoniarium	P. wittmanniana var. wittmanniana	combination unknown to WFO (syn. P. wittmanniana Hartwiss ex Lindl.)		4
13	delavayi Franch.	nn	1958	1989	Flowerbeds			Sect. Moutan; Subsect. Delavayanae	
		nn	1958	1970	Flowerbeds	P. lutea Franch.	under Ranunculaceae		
		Leiden	1959	1984	Nursery	P. potaninii Kom.	under Ranunculaceae		
		Utrecht	1962	2001	Nursery	P. potaninii Kom. var. trollioides (Stapf. ex Stern) Stern	under Ranunculaceae		
		nn	1963	1993	Nursery		under Ranunculaceae; incorrect		
		Utrecht	1964	1984	Nursery	P. potaninii Kom. var. trollioides (Stapf. ex Stern) Stern	under Ranunculaceae		
		Warsaw	1969	1984	Flowerbeds	P. potaninii Kom. var. trollioides (Stapf. ex Stern) Stern			
		nn	1969	1987	Nursery	P. lutea Franch.			
		Delft	1982	1987	Flowerbeds	P. lutea Franch.			

Tab. 1. Continued

No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
13	delavayi Franch.	Keele	1983	1986	Nursery	P. delavayi Franch. 'Lutea'			
		Göttingen	1985	1992	Flowerbeds	P. lutea Franch.			
		Harrogate	1985	1988	Nursery	P. lutea Franch.			
		Harrogate	1986	1992	Nursery	P. lutea Franch.	incorrect		
		Reading	1987	1991	Nursery	P. lutea Franch.			
		Wuppertal	1987	2006	Nursery	P. potaninii Kom.			
		Kalmthout	2001	2003	Nursery				
		St. Andrews	2010	2020	Arboretum	P. lutea x delavayi			
		Rostock	2015	2020	Arboretum		not completely to description		
		Braunschweig	2015	2020	Arboretum		not completely to description		
		Gift from mr. Igor Horvat	2016	2020	Arboretum		"very slow growing"		
14	emodi Royle	München	2015	2018	Paeoniarium		single seedling	Sect. Paeonia; Subsect. Albiflorae	
15	intermedia C.A.Mey.	Žeden*	1982	2012	Sub-Mediterranean rockery	?	(Original inventory-card lost)	Sect. Paeonia; Subsect. Paeonia	
16	lactiflora Pall.	nn	1951	1979	Flowerbeds	P. albiflora Pall. under Ranunculaceae; planta viva	many synonyms P. chinensis hort., P. sinensis hort., P. edulis Salisb., P. fragrans Anders.	Sect. Paeonia; Subsect. Albiflorae	25
		nn	1953	2020	Paeoniarium	P. albiflora Pall.	under Ranunculaceae; planta viva		37
		nn	1987	1995	Flowerbeds		planta viva		34
		nn	1993	2020	Paeoniarium		planta viva		38
		nn	1994	1994	Paeoniarium		planta viva		
		Tartu	2010	2020	Paeoniarium				27

Tab. 1. Continued

No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
		Graz	2010	2020	Paeoniarium	P. lactiflora Pall. var. trichocarpa (Bunge) Stern			26
17	lactiflora Pall. 'Alba'	nn	1996	2020	Flowerbeds		planta viva		23
		nn	2003	2020	Paeoniarium		planta viva		35
18	lactiflora Pall. 'Danutė'	Kaunas	2010	2020	Paeoniarium		2 plants stolen!		21
19	lactiflora Pall. 'Elena'	Kaunas	2010	2014	Nursery		stolen!		
20	lactiflora Pall. 'L'Enticelante'	Porrentruy	2012	2020	Paeoniarium	P. lactiflora Pall. 'Etincelant'	not entirely to description		28
21	lactiflora Pall. 'Felix Crousse'	Zagreb nursery	2011	2020	Paeoniarium		planta viva		30
22	lactiflora Pall. 'Jonas'	Kaunas	2010	2020	Paeoniarium				17
23	lactiflora Pall. 'Kastys'	Kaunas	2010	2020	Paeoniarium				13
24	lactiflora Pall. 'Maironis'	Kaunas	2010	2020	Paeoniarium				22
25	lactiflora Pall. 'Ona'	Kaunas	2010	2020	Paeoniarium				15
26	lactiflora Pall. 'Ramunis'	Kaunas	2010	2020	Paeoniarium				14
27	lactiflora Pall. 'Regina'	Kaunas	2010	2020	Paeoniarium				18
28	lactiflora Pall. 'Rosea'	nn	2003	2020	Nursery		planta viva		24
		nn	2010	2020	Nursery		planta viva		36
29	lactiflora Pall. 'Sarah Bernhardt'	Zagreb nursery	2011	2020	Paeoniarium		planta viva		32
30	lactiflora Pall. 'Shirley Temple'	Zagreb nursery	2011	2020	Paeoniarium		planta viva		31
31	lactiflora Pall. 'Tadas'	Kaunas	2010	2020	Paeoniarium				20
32	lactiflora Pall. 'Virgilijus'	Kaunas	2010	2020	Paeoniarium				19
33	lactiflora Pall. 'Žilvinas'	Kaunas	2012	2020	Paeoniarium				16
34	ludlowii (Stern & G.Taylor)	Nancy	2010	2020	Arboretum	P. lutea Delavay ex Franch. var. ludlowii Stern & G.Taylor		Sect. Moutan; Subsect. Delavayanae	
		München	2015	2020	Arboretum	P. lutea Delavay ex Franch. var. ludlowii Stern & G.Taylor			

Tab. 1. Continued

No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
		Göteborg	2015	2020	Arboretum	P. lutea Delavay ex Franch. var. ludlowii Stern & G.Taylor			
35	mairei H.Lev.	St. Andrews	2010	2020	Paeoniarium			Sect. Paeonia; Subsect. Foliatae	9
36	mascula (L.) Mill. (HR)	nn	1962	2020	Karstic rockery, Systematic fields, Flower beds, Paeoniarium	P. corallina Retz.	under Ranunculaceae	Sect. Paeonia; Subsect. Foliatae	52
		Medvednica*	1974	1984	Nursery	P. corallina Retz.	Croatian locality		
		Žeden*	1982	2001	Sub-Medi-terranean rockery	P. corallina Retz.			
		Velebit*	1995	2020	Karstic rockery	P. corallina Retz.			
		Gent	2010	2020	Paeoniarium	P. kavachensis Azn.			12
37	mascula (L.) Mill. subsp. hellenica Tzanoud.	Athens	2015	2020	Paeoniarium				51
38	mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood (HR)	Karlsruhe	2015	2020	Paeoniarium	P. mascula (L.) Mill. var. russoi (Biv.) Gürke			53
39	obovata Maxim.	Wuppertal	2010	2015	Nursery			Sect. Paeonia; Subsect. Foliatae	
		Nancy	2010	2020	Paeoniarium	P. japonica (Makino) Miyabe & Takeda			10
		Šiauliai	2015	2020	Nursery				
40	officinalis L. (HR)	Postojna-Nanos*	1964	2020	Alpinum			Sect. Paeonia; Subsect. Paeonia	
		Budapest*	1973	1994	Paeoniarium				
41	officinalis L. subsp. microcarpa Nyman	Graz	2010	2020	Paeoniarium	P. officinalis L. var. paradoxa (G.Anderson) Fiori & Paoletti	combination unknown to WFO (syn. P. paradoxa G.Anderson)		39
		Braunschweig	2015	2020	Paeoniarium	P. humilis Retz.			47

Tab. 1. Continued

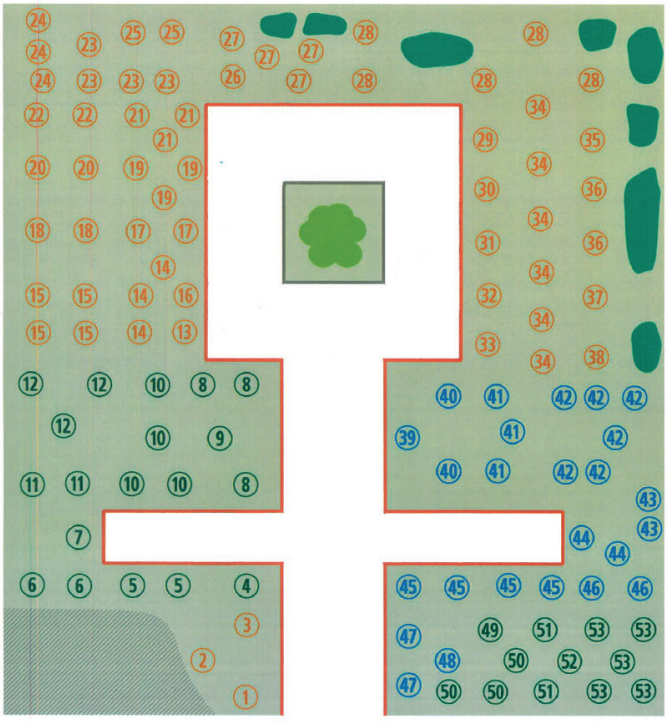
No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
42	ostii T.Hong & J.X.Zhang	Alpengarten Vienna	2012	2020	Arboretum		aff. 'Feng Dan Bai'	Sect. Moutan; Subsect. Vaginatae	
43	peregrina Mill. (HR)	Kosovo polje*	1965	2020	Sub-Mediterranean rockery	P. decora G. Anderson	planta viva	Sect. Paeonia; Subsect. Paeonia	
		Bucharest	1979	1986	Nursery	P. peregrina Mill. var. romanica (Brandza) A. Nyar.	under Ranunculaceae; name combination unknown to WFO: only P. romanica D. Brandza		
		Rijeka nursery	2004	2020	Flowerbeds		planta viva		
		Brno	2010	2020	Paeoniarium				41
		Alpengarten Vienna	2010	2020	Paeoniarium	P. officinalis L. subsp. villosa (Huth) Cullen & Heywood			46
		Halle	2010	2020	Paeoniarium	P. humilis Retz. var. villosa (Huth) Stern			45
		Bayreuth	2010	2020	Paeoniarium	P. peregrina Mill. var. romanica (Brandza) A. Nyar.			43
		Halle	2010	2020	Nursery	P. humilis Retz. var. villosa (Huth) Sten			
		Belvedere Vienna	2010	2020	Paeoniarium	P. officinalis L. var. villosa (Huth) Cullen & Heywood			40
		Lublin	2013	2020	Paeoniarium				42
44	Quand (F2) x Moonrise (F2)	Jibou	1997	2020	Paeoniarium	P. 'Quand x Moonrise' (misspelled: "P. Guard & Honnorise")	white-flowered individual	Herbaceous Hybrid	29
							dark-pink flowered individual		33
45	rockii (S.G.Haw & Laüner) T.Hong & J.J.Li ex D.Y.Hong	Braunschweig	2015	2020	Nursery	P. × suffruticosa subsp. rockii S.G.Haw & Laüner		Sect. Moutan; Subsect. Vaginatae	
		Vilnius	2016	2020	Nursery				
		Tübingen	2017	2020	Nursery				
46	rockii-group of hybrids ("Long Yuan Hong")	Weinheim	2015	2020	Nursery				

Tab. 1. Continued

No.	Paeonia taxon	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 1
47	(x) suffruticosa Andrews	nn	1965	2020	Arboretum	P. fruticosa Dum. Cours.; under Ranunculaceae	syn. P. arborea Donn; dark red	Sect. Moutan; Subsect. Vaginatae	
		nn	1965	2020	Arboretum	P. fruticosa Dum. Cours.; under Ranunculaceae	syn. P. arborea Donn; pink, full		
		Almaty	1969	1971	Nursery				
		Warsaw	1969	1970	Nursery				
		Stockholm	1982	1984	Nursery				
		Potsdam	1984	1986	Nursery				
		Sopron	1985	1989	Flowerbeds				
		Beijing	1986	1986	Nursery				
		Tartu	2010	2015	Paeoniarium				
		Alpengarten Vienna	2010	2020	Arboretum				
		Gift from mr. Igor Horvat	2016	2020	Arboretum	"Moutan-group"			
48	× suffruticosa var. papaveracea (Andrews) Kern	Teplice	2017	2020	Nursery				
49	tenuifolia L.	Deliblato Sands*	1965	1987	Sub-Mediterranean rockery		under Ranunculaceae; planta viva	Sect. Paeonia; Subsect. Paeonia	
		Deliblato Sands*	1978	2006	Sub-Mediterranean rockery				
50	wendelboi* x mlokosewitschii (F2)	Göteborg	2017	2020	Nursery		*P. wendelboi Ruksans & Zetterl.	Sect. Paeonia; Subsect. Foliatae	

Botanical Garden (Fig. 5b). They are deviating from the original descriptions, but we shall give them several years more to establish properly and then examine their morphological traits.

Based on the above, it is obvious that the exact number of peonies that went through our collection is ambiguous, because of the immense synonymy and many taxonomic changes. However, according to the recent nomenclature (Hong, 2010; accepted by the *World Flora Online*), through the Garden collections since 1951 went **50** taxa (out of which nearly are 40 grown during the last decade (2010–2020), since we started our Paeoniarium-project). In the post-WWII-times, first peonies grown were herbaceous *Paeonia lactiflora* cultivars (since 1951; Fig. 12) and woody *P. delavayi* (since 1958; Fig. 1). The oldest specimens growing in the Garden today are *P. officinalis* (since 1964; Fig. 6), *P. peregrina* (since 1965; Fig. 8a) and cultivars of *P.* × *suffruticosa* (since 1965; Fig. 2a).



Plan 1. *Paeoniarium* containing herbaceous peonies (Section Paeonia), initiated in Zagreb Faculty of Science Botanical Garden in 2015. Numbers are explained in Table 1.

St. John's Worts (*Hypericum*, Hypericaceae family)

In his inventory, Ettinger (1892) recorded *Hypericum androsaemum* L., *H. elatum* (probably *H.* × *elatum* Aiton, today a synonim of *H.* × *inodorum* Mill.), H. „inodorsum" (probably a typographic error of the recent *H.* × *inodorum*) and H. "proliferum" (probably incorrect synonym of *H. prolificum* L.). Heinz (1895–1896), again, elaborates on „many *Hypericum* species growing outside" (of the Guttiferae family), but without naming any.

Tab. 2. St. John's worts grown in Zagreb Faculty of Science Botanical Garden from 1959 to 2020 (acc. to *The World Flora Online*). "HR" - species of Croatian flora. Asterisk (*) marks the wild locality of material sampling. Affiliations to Sections and Subsections are acc. to Robson *et al.* (2020). Last column links taxon with number in the Plan 2 (*Hypericarium*).

No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
1	adenotrichum Spach (HR)	Wageningen	1985	2020	Nursery		from wild locality in Turkey; incorrect	Section: Crossophyllum	
2	androsaemum L. (HR)	nn	1962	1970	Arboretum		W&S Europe; W Asia	Section: Androsaemum	
		Pallanza	1963	1988	Nursery				
		Suhumi	1971	1973	Nursery				
		nn	1998	2020	Hypericarium				8
3	ascyron L.	Szeged	1983	2000	Alpinum		syn. H. pyramidatum Ait.; Asia & N America	Section: Roscyna	
		Riga	1983	1984	Cold glasshouse				
4	atomarium Boiss. var. degenii (Bournm.) Hayek	Sofia	1961	1976	Nursery	H. degenii Bornm. (ambiguous name, as well as H. atomarium Boiss.)	maybe belongs to taxon H. annulatum Moris?	Section: Adenosepalum	
5	balearicum L.	Sóller	2018	2020	Systematic fields		Balear endemic	Section: Psorophytum	
6	barbatum Jacq. (HR?)	Pelister*	1972	1989	Sub-Mediterranean rockery		Balkans, S Italy	Section: Drosocarpium	
		Skopje*	1967	1973	Sub-Mediterranean rockery				
		Pelister*	1973	1974	Sub-Mediterranean rockery				
		Jakupica*	1960	1964	Nursery		arrived as H. barbatum Jacq. var. trichanthum (Boiss. et Spruner) Boiss.		

Tab. 2. Continued

No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
7	bellum H.L.Li	Stuttgart	2015	2020	Hypericarium		**incorrect**; aff. H. kalmianum	Section: Ascyreia	6
8	calycinum L.	nn	1962	2000	Alpinum		Bulgaria, Turkey	Section: Ascyreia	
		nn	1965	1989	Arboretum				
		nn	1976	1977	Nursery				
		Uludağ*	1978	2020	Alpinum				7
		nn	1981	1988	Arboretum				
9	cerastioides (Spach) N. Robson	Sofia	1975	1975	Sub-Mediterranean rockery		arrived as H. rhodopaeum Friv. E Balkans	Section: Campylopus	
		Wisley	1972	1972	Nursery		entry without an author; SE Balkans		
		Basel	1977	1977	Nursery		from wild locality in Greece		
10	coris L.	Geneve	1959	1963	Nursery		W Mediterranean	Section: Coridium	
		Brno	1989	2011	Flower bed				
		Lausanne	2006	2008	Flower bed				
11	densiflorum Pursh	Tharandt	1995	2003	Nursery			Section: Myriandra	
12	elegans Stephan ex Willden. (HR?)	Regensburg	1985	1989	Nursery		**incorrect**; H.olympicum!	Section: Hypericum	
13	empetrifolium Willd.	Izmir	1971	1972	Nursery			Section: Coridium	
		Geneve	1973	1973	Nursery				
		Athens	1996	1998	Nursery				
14	forrestii (Chitt.) N. Robson	nn	1962	1962	Nursery	entry without an author, as "H. patulum forestii"	SW China	Section: Ascyreia	
15	frondosum Michx.	Pallanza	1962	2020	Arboretum		N America	Section: Myriandra; subsect. Centrosperma	4
		Pallanza	1963	1964	Nursery		**incorrect**; H. hircinum		
		Pallanza	1972	1975	Nursery				

Tab. 2. Continued

No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
16	haplophylloides Halacsy & Bald.	Jena	1969	1969	Nursery		S Albania	Section: Triadenoides	
17	hircinum L.	nn	1965	2020	Arboretum		Mediterranean	Section: Androsaemum	2
18	hirsutum L. (HR)	nn	1962	1989	Karstic rockery		Europe; Croatian	Section: Taeniocarpium	
		Biograd*	1963	1963	Mediterranean rockery				
19	hookerianum Wight & Arn.	Berlin-Dahlem	1970	1970	Nursery		syn. H. oblongifolium Hook.; Himalayas	Section: Ascyreia	
		Suhumi	1970	1973	Nursery				
20	hookerianum Wight & Arn. 'Hidcote'	Opeka	1974	2020	Alpinum	H. patulum subsp./var. hookerianum	H. x hidcoteense?	Section: Ascyreia	1
21	humifusum L. (HR)	Coimbra	1971	1975	Nursery		W & Central Europe	Section: Oligostema	
		Ljig*	1974	1974	Sub-Mediterranean rockery				
22	× inodorum Mill.	Chelsea	2001	2020	Flower bed		H. androsaemum x H. hircinum. **Incorrect**; aff. H. hircinum	Section: Inodora	
23	kalmianum L.	Pallanza	1962	1977	Nursery		N America	Section: Myriandra; subsect. Centrosperma	
		Pallanza	1963	1975	Nursery				
		Stuttgart	2015	2020	Flower bed				5
24	leschenaultii Choisy	Pallanza	1972	1976	Nursery	H. hookerianum Wight & Arn. var. lechenaultii (Choisy) Dyer.	Java	Section: Ascyreia	
25	maculatum Crantz (HR)	Geneve	1963	1964	Nursery		Europe	Section: Hypericum	
		Klagenfurt	1969	1983	Nursery				
		Klagenfurt	1972	1983	Alpinum				
		Peca*	1973	1982	Alpinum				

Tab. 2. Continued

No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
26	maculatum Crantz subsp. immaculatum (Murb.) A. Froehl.	Vranica*	1971	1973	Sub-Mediterranean rockery		Balkans	Section: Hypericum	
		Trebević*	1972	1973	Sub-Mediterranean rockery				
		Šar planina*	?	1989	Nursery		det. 1987		
27	montanum L. (HR)	Gornja Stubica*	1984	2020	Karstic rockery		Eurasia, North Africa	Section: Adenosepalum	
28	× moserianum Andre	nn	1963	1963	Nursery		(H. calycinum × H. patulum); unresolved name	Section: Ascyreia	
		Swansea	1969	1969	Nursery				
		Slepčany	1970	2020	Nursery				
		"Mlymany" (?)	1971	1989	Nursery		unknown locality		
		Wageningen	1971	1975	Nursery				
29	olympicum L.	nn	1963	1974	Nursery			Section: Olympia	
		Berlin-Dahlem	1967	1968	Flower bed				
		Kožuf*	1972	1973	Sub-Mediterranean rockery				
		Pelister*	1973	1974	Sub-Mediterranean rockery				
		Izmir*	1974	1975	Nursery				
		Skopje*	1974	1975	Sub-Mediterranean rockery				
		Izmir*	1981	2020	Hypericarium, Flower beds, Systematic fields				9
30	patulum Thunb.	nn	1965	2020	Arboretum		Far East	Section: Ascyreia	3

Tab. 2. Continued

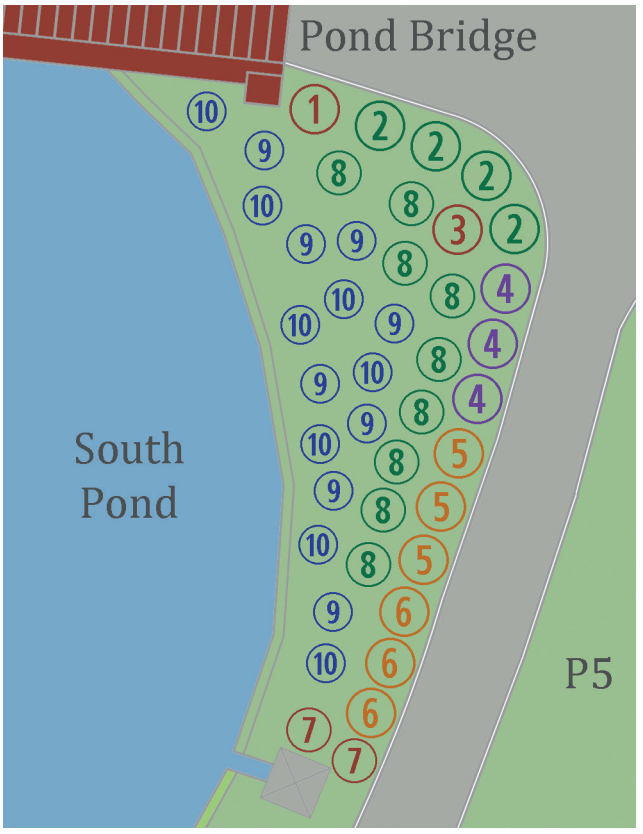
No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
		nn	1971	1976	Nursery				
		Opeka	1971	2020	Nursery				
		nn	1976	1984	Nursery				
31	patulum Thunb. 'Henryi'	Uppsala	1971	1984	Nursery		maybe H. patulum var. henryi? (val. syn. H. beanii N. Robson)	Section: Ascyreia	
32	perforatum L. (HR)	nn	?	2020	Karstic rockery, sporadically elsewhere		Europe; Croatian	Section: Hypericum	
		nn	1962	1963	Mediterranean rockery				
		Skradin*	1962	1963	Mediterranean rockery				
		Balj*	1973	1980	Sub-Mediterranean rockery				
		Goč*	1971	1993	Sub-Mediterranean rockery				
		Ljig*	1974	2020	Systematic fields				
		Vidova gora*	1978	1982	Sub-Mediterranean rockery				
		Žara*	1981	1982	Mediterranean rockery				
		Klisura, Pčinja*	1981	1985	Sub-Mediterranean rockery				
33	H. perforatum L. subsp. veronense (Schrank) H. Lindb. (HR)	Deliblato Sands*	1965	1966	Sub-Mediterranean rockery	H. perforatum L. var. veronense (Schrk.) A. Froehl.	S Europe	Section: Hypericum	

Tab. 2. Continued

No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
		nn	1971	1981	Mediterranean rockery				
		Doli*	1970	1979	Mediterranean rockery				
		Balj*	1973	1974	Sub-Mediterranean rockery				
		Pinjevca*	1978	1980	Nursery				
		Polače*	1979	1981	Nursery				
		Pinjevca*	1981	1981	Nursery				
		Prpić duliba*	1994	2001	Karstic rockery				
34	polyphyllum Boiss. & Balansa	Moorestown	1966	1968	Nursery	H. polyphyllum Boiss. et Heldreich.	Asia Minor	Section: Olympia	
35	polyphyllum Boiss. & Balansa 'Grandiflorum'	Chelsea	1995	2020	Hypericarium	entry without an author; H. grandiflorum	val. syn. for H. grandiflorum Salisb. is H. calycinum L. (not this plant!)	Section: Olympia	10
36	pseudohenryi N. Robson	Chelsea	2001	2004	Nursery		China	Section: Olympia	
37	richeri Vill. (HR)	Geneve	1965	1967	Nursery		S & Central Europe	Section: Drosocarpium	
38	richeri Vill. subsp. grisebachii (Boiss.) Nyman (HR)	Risnjak*	1965	1974	Sub-Mediterranean rockery		syn. H. alpinum W. K.	Section: Drosocarpium	
		Maglić*	1969	1978	Sub-Mediterranean rockery				
		Zavižan*	1973	1981	Nursery				
39	rumeliacum Boiss.	Skopje*	1965	1965	Nursery	H. rumelicum Bald.	Balkans	Section: Drosocarpium	
		Skopje	1970	1971	Nursery				
		Skopje	1971	1974	Nursery				
		Skopje (Vodno)	1978	1978	Nursery				

Tab. 2. Continued

No.	*Hypericum taxon*	Origin (botanical garden, city, nursery)	Year of obtaining	Last recorded	Collection	Arrived as	Notes in the original inventory-card	Affiliation	No. in Plan 2
		Ovče pole*	1982	1989	Sub-Mediterranean rockery				
40	scabrum L.	Moscow	1970	1979	Nursery			Section: Platyadenum	
41	tetrapterum Fr. (HR)	Ljuboten*	1962	1989	Nursery	H. acutum Mch.	W, S, Central Europe	Section: Hypericum	
		Treskavica*	1964	1993	Sub-Mediterranean rockery				
		Trebević*	1969	1969	Nursery				
		Strahinjčica*	1972	1974	Nursery				
		nn	1974	1978	Alpinum				
		Klagenfurt	1975	1977	Nursery				
		Strahinjčica*	1988	2020	Karstic rockery				
42	tomentosum L.	nn	1962	1963	Nursery		SW Europe	Section: Caprifolia	
43	undulatum Schousb. ex Willd.	Strasbourg	1985	1987	Nursery		SW Europe	Section: Hypericum	
44	Webbia floribunda (Aiton) Spach.	Latte	1994	2020	Nursery	entry without an author: Hypericum floribundum	"syn. H. canariense L."(?); **incorrect**; aff. H. hircinum	Section: Webbia	



Plan 2. *Hypericarium* established in Zagreb Faculty of Science Botanical Garden in 2019. Numbers are explained in Tab. 2.

After the WWII, first *Hypericum* species inventoried to the Garden collection was *H. coris* L. (Fig. 13) from Geneva Botanical Garden, obtained in 1959. However, it should be emphasized that Croatian native, widely distributed Common St. John's wort (*Hypericum perforatum*, Fig. 14) is growing scattered around the Garden "since forever", and its first entry in to our database is dateless (Tab. 2). Nevertheless, we can assume that it spreads sub-spontaneously for much longer than the early 1950-ies.

As Table 2 shows, since the WWII, according to the recent nomenclature, we grew at least **44** taxa of St. John's worts, belonging to 19 Sections, while today we have **14**. Around 40 of all specimens were grown from samples taken in the wild localities. Most of the samples arrived to the Garden via *Index Seminum*-network (Figs. 15–22), while several (out of 11 taxa; f.e. Fig. 23) were collected in the field as living specimens. Native species of Croatia and today neighbouring countries were (and still are) grown in our biogeographical rockeries.

All species of St. John's worts that we hold today, unfortunately, are not named: *H. adenotrichum* Spach, *H. bellum* H.L.Li, *H.* × *inodorum* and *Webbia floribunda* are misdetermined, or at least lack some of the features important for determination.

The oldest specimens growing in the Garden today are *Hypericum frondosum* (Fig. 15, since 1962) and *H. hircinum* (Fig. 16, since 1965).

Small collection of 10 species, hybrids and cultivars of non-native origin was recently (November 2019) revised and replanted from around the Garden to the little "Hypericarium" (Plan 2, Fig. 24) by the ponds, where they could also be further observed. Growing side-by-side, there is much better chance to separate the taxa, which are hard to trace during the vegetative season, scattered around the grounds. Also, there is a space for this small collection to increase, by adding new taxa to the group.

SOME FINAL REMARKS, FROM THE BOTANIC GARDEN POINT OF VIEW

Peonies

Comprehensive revision of Paeoniaceae (Hong, 2010) led by the renown peony-specialist De-Yuan Hong (1936–) provoked an avalanche of reactions, especially among horticulturists used to the long-established terminology (f.e. Hudson, 2010). Prominent Chinese academician and vice-president of the "Flora of China" project, Professor Hong revised the genus thoroughly and cut-down drastically. For example, he reduced the famous group of diploid and tetraploid "Dauricae" from seven species to a single one. As a result, valuable horticultural "species" – with all their subspecies, natural and cultivated varieties, hybrids and forms – became just meek subspecies of a single scientifically recognized (mega-)taxon: *Paeonia daurica* Andrews (formerly also *P. corallina* Retz. var. *triternata* Boiss. and *P. mascula* (L.) Mill. subsp. *triternata* (Boiss.) Stearn & P.H.Davis). It seems that astonishingly polymorphic traits of this large and widely distributed lineage can be attributed to the reticulate evolution of the Caucasian peonies and their subspecies on the Balkan Peninsula, Asia Minor and Iran, during the Ice Ages. In our collection, for some peonies of that group we are not even sure how they should look like: f.e. the garden hybrid (Tab. 2, last entry) "*Paeonia wendelboi* × *P. mlokosewitschii*", that we gained from our colleagues from Gothenburg Botanical Garden (Sweden), consists of the questionable parents. Recently described from Iran, yellow-flowering P. wendelboi Ruksans & Zetterl. (Ruksans & Zetterlund, 2014), is not recognized by the World Flora Online. The second parent, *P. mlokosewitschii* Lomakin, is also a disputed one: acc. to Hong (2010), despite its famously bright yellow flowers, it also belongs to the range of *P. daurica*, as subsp. *mlokosewitschii* (Lomakin) D.Y.Hong. Therefore, it seems that (acc. to the *World Flora Online*, at least) both parents of the "*P. wendelboi* × *P. mlokosewitschii*" hybrid belong to the same taxon: *Paeonia daurica* (Hong, 2010). Our young plants have not flowered yet and it will be interesting to see how they will look like.

Furthermore, Hong took similar revisions of *P. delavayi* Franch. (Hong *et al*., 1998; Fig. 1), *P. obovata* Maxim. (Hong, *et al*., 2001) and *P. anomala* L. (Hong & Pan, 2004) groups, while various other authors restricted many "little taxa" of South East European distribution (Balkan Peninsula, Romania, Aegean coast of Asia Minor) to *P. peregrina* Mill. (Tab. 1, column 6). All that revisions taxonomically "impoverished" many collections of peonies around the world: even our little *Paeoniarium* "diminished" (see sixth column "Arrived as" in Tab. 1).

However, most of the Garden-visitors does not care much about the taxonomy, synonymy and nomenclature: beauty is all they ask for, and with the peonies it is easy to oblige.

St. John's Worts

Genus *Hypericum* is unusually well "covered" with regularly updated on-line world-wide taxonomic monograph '*The* Hypericum *online – A site dedicated to* Hypericum, *The St John's Worts'*, maintained by the famous *Hypericum*-expert and author of many "names", English specialist Dr. Norman Robson (1928–) and his associates (Robson *et al*., 2020).

Revising St. John's worts in our Garden collection for the first time after almost 30 years, we were surprised how little "names" from our database "matched" the remaining plants. F.e., a group of six woody *Hypericum*-species, planted during mid-1960-ies in one of the fields in our arboretum, meanwhile overgrew with other shrubbery and lost their identification plates, together with flowering ability. The group was "lost" for decades, and "found" again during this revision. Out of the species stated in the inventory cards as planted there, we found only three, among them two which were not grown by their correct names. *Hypericum hircinum* L. (Fig. 18) took over most of the crowded space, followed by *H. frondosum* Michx. (Fig. 15) and *H.* (aff.) *patulum* Thunb.. Also, several woody specimens were planted in various places in the Garden without proper names ("*Hypericum* cult.") and several were incorrect: f.e., *H. kalmianum* Vahl (Fig. 16) took over *H. bellum*, and *H. hircinum* took over both *H. inodorum* Mill. And *H. canariense* Webb & Berthel.. All aforementioned species were grown from seed, which is in this genus very small and easily transferred (unintentionally mixed with others), if the specimens of various species were grown close to each other.

Although not so spectacular while in blossom as the peonies (not much plants are!), St. John's worts are flowering much longer, and – as many species are evergreen – look pleasantly during the whole season, some even in winter, while all peonies are fast asleep.

CONCLUSION

Since the establishment of our Garden in 1889, we grew at least **50** ***Paeonia*** and **44** ***Hypericum*** **taxa** – indigenous plants collected in the native localities, or species, cultivars and hybrids gained via *Index Seminum*-network. Our recent collection of peonies holds **46** wild taxa, cultivars and hybrids of peonies, and **14** of St. John's worts.

Received March 3, 2020

REFERENCES

American Peony Society. Available from: https://americanpeonysociety.org/. *[accessed January 2020].*

Budisavljević, A. & Kovačić, S. /in this issue/: *Getting out of Quicksand* (1): Revision of Plant Recording System in the Botanical Garden of the Faculty of Science, University of Zagreb. (*Izlazak iz živog pijeska* (1): Revizija sustava bilježenja biljnih vrsta u Botaničkom vrtu Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu). Natura Croatica **29**(1), 173-184.

Christenhusz, M. J. M. & Byng, J. W., 2016: The number of known plants species in the world and its annual increase. Phytotaxa **261**(3): 201-217.

EASIN (European Alien Species Information Network), 2012. Available from: http://alien.jrc.ec.europa.eu/SpeciesMapper *[accessed January 2020].*

Ettinger, J., 1892: Botanički vrt kr. sveučilišta Franje Josipa I. u Zagrebu. Šumarski list **9-10**, 409-422.

Flora Croatica Database – Red List. Available from: https://hirc.botanic.hr/fcd/CrvenaKnjiga/ *[accessed February 2020].*

Flora Croatica Database. Available from: https://hirc.botanic.hr/fcd/ *[accessed February 2020].*

Govaerts, R., 2016: World Checklist of Hypericaceae (*Hypericum* genus). Facilitated by the Royal Botanic Gardens, Kew. Available from: http://apps.kew.org/wcsp/. *[accessed January 2020].*

Heinz, A., 1895–1896: Kr. Botanički vrt u Zagrebu. Glasnik Hrvatskoga naravoslovnoga društva, **8**(1-6), 1-54. Available from: http://kgzdzb.arhivpro.hr/?kdoc=11012907

Hong D.-Y. & Pan, K.-Y., 2004: Taxonomic revision of the *Paeonia anomala* complex (Paeoniaceae). Annals of the Missouri Botanical Garden **91**: 87-98.

Hong, D.-Y., 2010: Peonies of the world: Taxonomy and Phytogeography. Kew Publishing/Missouri Botanical Garden; Kew/St. Louis.

Hong, D.-Y., Pan, K.-Y., Rao, G.-Y., 2001: Cytogeography and taxonomy of the *Paeonia obovata* polyploidy complex (Paeoniaceae). Plant Systematic and Evolution **227**(3-4): 123-136.

Hong, D.-Y., Yu, P.-Y. & Hong, Y., 1998: Taxonomy of the *Paeonia delavayi* complex (Paeoniaceae). Annals of the Missouri Botanical Garden **85**(4): 554-564.

Hudson, J., 2010. Review of Hong De-Yuan, "Peonies of the World, Taxonomy and Phytogeography", published by Kew Publishing, London and Missouri Botanic Garden, St. Louis, 2010. *The Peony Group of the Hardy Plant Society* Newsletter, autumn 2010. Available from: https://www.hardy-plant.org.uk/docs/specialists/reviewofpeonies.pdf

IUCN Red List of Threatened Species, 2020. Version 2020-1. Available from: https://www.iucnredlist.org. *[accessed January 2020].*

Ji, L.J., Wang, Q., Teixeira da Silva, J.A. & Yu, X.N., 2012: The genetic diversity of *Paeonia* L. Scientia Horticulturae **143**: 62-74.

Kovačić, S., 2015: *Plethora of plants* – Collections of the Botanical Garden, Faculty of Science, University of Zagreb (1): Temperate glasshouse exotics – historic overview. Natura Croatica **24**(2): 361-428 (397*).

Kovačić, S., 2019: *Plethora of plants* – Collections of the Botanical Garden, Faculty of Science, University of Zagreb (3): *Iris* (Iridaceae) Collection. Natura Croatica **28**(2): 483-514.

Kovačić, S., Sandev, D., Mihelj, D. & Stamenković, V., 2014: *Win some, lose some* - statutorily strictly protected indigenous plant species in the Botanical Garden of the Faculty of Science (University of Zagreb, Croatia). Natura Croatica **23**(2): 415-432.

Nürk, N.M. & Blattner, F.R., 2010: Cladistic analysis of morphological characters in *Hypericum* (Hypericaceae). Taxon **59**(5): 1495-1507.

Pravilnik o strogo zaštićenim vrstama (NN **144**/13, **73/16**). (*Ordinance of strictly protected species*). In Croatian. *Official Gazette* (OG) 73/2016. Available from: http://www.propisi.hr/print.php?id=12728. *[accessed January 2020].*

Robson, N., Carine, M., Pattinson, D., Nürk, N., Crockett, S., Wajer, J. & Eyres, A. (eds.), 2020: The *Hypericum* online – A site dedicated to *Hypericum*, the St John's Worts. Available from: http://hypericum.myspecies.info/. *[accessed February 2020].*

Ruksans, J. & Zetterlund, H., 2014: *Paeonia wendelboi*, an Iranian peony to honour Per Wendelbo. The Alpine Gardener **82**(2): 230-237.

Sandev, D., Mihelj, D. & Kovačić, S., 2018: *Plethora of Plants* – Collections of the Botanical Garden, Faculty of Science, University of Zagreb (2): Glasshouse succulents. Natura Croatica **27**(2): 407-430.

Stamenković, V. & Kovačić, S. (eds.), 2014: *Fifty sights at the Botanical Garden for Passers-by, Strollers and Real Enthusiasts* – a Guide to the Botanical Garden, Faculty of Science, University of Zagreb. Faculty of Science, Zagreb. Available from: https://www.researchgate.net/publication/286933393

World Flora Online, Published on the Internet. Available from: http://www.worldfloraonline.org/. *[accessed January 2020].*

AUTHORSHIP:

All photographs in Photo-tables 1, 2 and 3 are originals, taken between 1999 and 2020 in the collections of the Botanical Garden of the Faculty of Science (University of Zagreb) by Mirna Kirin (MK), member of the "Friends of Botanical Garden" group, and Dr Sanja Kovačić (SK), senior Garden curator.

Plans of *Paeoniarium* and *Hypericarium* were designed, drawn and digitalized by Dr Vanja Stamenković, senior Garden curator.

SAŽETAK

Obilje bilja – zbirke Botaničkoga vrta Prirodoslovno-matematičkog fakulteta Sveučilišta u Zagrebu (4): Zbirke božura (*Paeonia*, Paeoniaceae) i pljuskavica (*Hypericum*, Hypericaceae)

V. Stamenković & S. Kovačić

Nakon analiza zbirki toplog staklenika (Kovačić, 2015), kaktusa i drugih mesnatica (Sandev *et al*., 2018) te perunika (Kovačić, 2019) proučene su zbirke drvenastih i zeljastih božura (rod *Paeonia*, porodica Paeoniaceae) te pljuskavica (rod *Hypericum*, porodica Hypericaceae).

Za ovaj članak sastavili smo popise drvenastih i zeljastih svojta božura (rod *Paeonia*, Paeoniaceae) i pljuskavica (rod *Hypericum*, Hypericaceae) uzgajanih u Botaničkom vrtu zagrebačkog Prirodoslovno-matematičkog fakulteta između 1892. i 2020. godine. Uredili smo sinonimiku i nomenklaturu te istražili podrijetlo biljnog materijala.

Rezultati pokazuju da je tijekom 128 godina kroz zbirke našeg Botaničkog vrta prošlo najmanje 50 divljih i uzgojnih svojta božura. Međutim, do prije desetak godina u Vrtu smo imali jedva desetak različitih božura, dok danas uzgajamo njih 46: četrdesetak svojti uzgojeno je tijekom posljednjeg desetljeća (2010–2020), kad smo pokrenuli projekt malog *peonijarija* (zbirke zeljastih svojti božura) te dopunili zbirku drvenastih svojti božura u perivoju Vrta.

Naprotiv, s ukupno najmanje 44 svojte pljuskavica, koliko ih je prošlo kroz naše zbirke od 1892., danas ih imamo samo 14. Stoga smo u studenom 2019. osnovali i mali *hiperikarij* (zbirku pljuskavica), koju ćemo s vremenom obogaćivati novim vrstama, kako bismo se barem približili nekadašnjem bogatstvu.

Dio zbirke drvenastih božura sekcije Moutan, proljeća 2020 (SK). / Part of the woody peonies collection of the Section Moutan, Spring 2020 (SK).

1) *Paeonia delavayi*, in its different forms, is cultivated in the Garden since 1958. In this photo is *P. potaninii*, today included within this taxon. (MK)

2a) Oldest living tree peonies in the Garden, *Paeonia* × *suffruticosa* (red - left, and pink - right), are growing in this spot since 1965. (MK)

2b) *Paeonia* × *suffruticosa* f. *rosea* (since 1965) (MK).

2c) *Paeonia* × *suffruticosa* f. *rubra* (since 1965). (SK)

3) *Paeonia ostii* 'Feng Dan Bai', grown from the seed in 2015. (SK)

4) *Paeonia ludlowii* (*P. lutea* var. *ludlowii*), grown from the seed in 2010. (SK)

Phototable 1. Tree peonies (Section Moutan) are grown in the arboretum of Zagreb Botanical Garden of the Faculty of Science since the late 19th century. Authors: Mirna Kirin (MK) and Sanja Kovačić (SK).

5a) *Paeoniarium* edged with brick curb, March 2019. The herbaceous peonies are mostly still hibernating (SK).

5b) *Paeoniarum* in bloom, May 2019 (with author's daughter Dora): hybrids of *Paeonia* × *lactiflora* from Kaunas Botanical Garden, all grown from seed (SK).

6) *Paeonia officinalis* in the Garden's nursery, grown from the seed collected in the wild during Yugoslavian times (Postojna, today Republic of Slovenia), grows here since 1964 (MK).

7) *Paeonia tenuifolia* in the Garden's Sub-Mediterranean rockery, grown from the seed collected in the wild during Yugoslavian times (Deliblato Sands, today Republic of Serbia) (MK).

8a) *Paeonia peregrina* in the Garden's Sub-Mediterranean rockery, grown from the seed collected in the wild during Yugoslavian times (Kosovo polje, today Republic of Kosovo) (MK).

8b) *Peonia humilis* var. *villosa* grown from seed: valid name for this taxon today is *P. peregrina* (SK).

9a) *Paeonia mascula* in the Garden's Karstic rockery, grown from the seed collected in Croatian habitat (MK).

9b) Lovely form of peony grown from seed arrived as *Paeonia kavachensis* (valid *P. mascula*). (SK)

10) *Paeonia* 'Quand' (F2) × 'Moonrise' (F2) in white and pink form, grown from the same seed stock (MK).

11) Most of the species in our collection is grown from the seed, obtaining via *Index Seminum* network (SK).

12) Three forms of robust, herbaceous *Paeonia* × *lactiflora*, grown in the Garden since its establishment, showing significant morphological differences in shape and size of leaves, flowers and fruit, as well as in blooming time: a) forma *rosea* ('Rosea') left, b) forma *alba* ('Albiflora') in the middle, c) forma *rubra* ('Rubriflora') right (all MK).

Phototable 2. Herbaceous peonies (Section Paeonia) are grown in the Botanical Garden of Zagreb Faculty of Science since the late 19th century, mostly indigenous species collected in the wild. In 2015 *Paeoniarium* was established, to exhibit the representatives of various natural and cultivated groups. Authors: Mirna Kirin (MK) and Sanja Kovačić (SK).

13) *Hypericum coris* (Sect. Coridium)

14) *Hypericum perforatum* (Sect. Hypericum)

15) *Hypericum frondosum* in fruit (Sect. Myriandra)

16) *Hypericum kalmianum* (Sect. Myriandra)

17) *Hypericum androsaemum* (Sect. Androsaemum)

18) *Hypericum hircinum* (Sect. Androsaemum)

19) *Hypericum calycinum* (Sect. Ascyreia)

20) *Hypericum* × *moserianum* (Sect. Ascyreia)

21) *Hypericum olympicum* (Sect. Olympia)

22) *Hypericum polyphyllum* 'Grandiflorum' (Sect. Olympia)

23) *Hypericum montanum* (Sect. Adenosepalum)

24) Planting of *Hypericarium*, November 2019

Phototable 3. St. John's worts (*Hypericum* spp.) are grown in the Botanical Garden of Zagreb Faculty of Science since the late 19th century. In 2019 *Hypericarium* was established to exhibit species, cultivars and hybrids of various sections. Author: Sanja Kovačić.