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

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 pannassica* 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 (Paeania, Paeoniaceae family)

In his perfunctory list of Botanical Garden trees and shrubs, Ettinger (1892) recorded only “Poeonia arborea”, most probably misspelled Paeania arborea Donn (or P. × arborea C.C.Gmel., today a synonym of P. × suffruticosa). Several years later, Heinz (1895–1896) pointed out that „many Paeania-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 indigenious plant collections. Other samples of that time, listed in Table 1, were grown predominantly from the seeds obtained via Index Seminum publications. Also, various Paeania-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 “Poeonia 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 Paeania; 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. | Gdanski                                 | 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             |
| No. | Paeonia taxon | Origin (botanical garden, city, nursery) | Year of obtaining | Last recorded | Collection | Arrived as | Notes in the original inventory-card | Affiliation | Sect., Subsect., Affiliation |
|-----|---------------|-----------------------------------------|------------------|--------------|------------|-----------|-------------------------------------|------------|---------------------------|
| 8   | *P. delavayi* Franch. | Halle | 1958 | 1989 | Flowerbeds | m | | | under Ranunculaceae |
| 9   | *P. lutea* Franch. | Graz | 1959 | 1989 | Flowerbeds | m | | | under Ranunculaceae |
| 10  | *P. mascula* subsp. *tomentosa* (Lomakin) | Nancy | 1960 | 1993 | Nursery | m | | | under Ranunculaceae; incorrect |
| 11  | *P. mlokosewitschii* (D.Y.Hong) | Nancy | 1960 | 1993 | Nursery | m | | | under Ranunculaceae |
| 12  | *P. paradoxa* G. Anderson | Nancy | 1960 | 1993 | Nursery | m | | | under Ranunculaceae; incorrect |
| 13  | *P. potaninii* Kom. var. *trollioides* (Stapf. ex Stern) Stern | Leiden | 1961 | 1993 | Nursery | m | | | under Ranunculaceae |
| 14  | *P. potaninii* Kom. var. *trollioides* (Stapf. ex Stern) Stern | Warsaw | 1961 | 1993 | Nursery | m | | | under Ranunculaceae |

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            |
| 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 |
|-----|---------------|----------------------------------------|------------------|--------------|------------|------------|---------------------------------------|-------------|-------------|
| 17  | lactiflora Pall. ‘Alba’ | Graz | 2010 | 2020 | Paeoniarium | P. lactiflora Pall. var. trichocarpa (Bunge) Stern | planta viva | 23 |
| 18  | lactiflora Pall. ‘Danute’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 2 plants stolen! | 21 |
| 19  | lactiflora Pall. ‘Elena’ | Kaunas | 2010 | 2014 | Nursery | stolen! | 20 |
| 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 | planta viva | 17 |
| 23  | lactiflora Pall. ‘Kastys’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 13 |
| 24  | lactiflora Pall. ‘Maironis’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 22 |
| 25  | lactiflora Pall. ‘Ona’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 15 |
| 26  | lactiflora Pall. ‘Ramunis’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 14 |
| 27  | lactiflora Pall. ‘Regina’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 18 |
| 28  | lactiflora Pall. ‘Rosea’ | | | | | | | |
| 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 | planta viva | 20 |
| 32  | lactiflora Pall. ‘Virgilijus’ | Kaunas | 2010 | 2020 | Paeoniarium | planta viva | 19 |
| 33  | lactiflora Pall. ‘Žilvinas’ | Kaunas | 2010 | 2012 | Nursery | planta viva | 16 |
| 34  | ludlowii (Stern & G.Taylor) | Nancy | 2010 | 2020 | Arboretum | P. lutea Delavay ex Franch. var. ludlowii Stern & G.Taylor | Sect. Moutan; Subsect. Delavayanae | 34 |
|     |                | München | 2015 | 2020 | Arboretum | P. lutea Delavay ex Franch. var. ludlowii Stern & G.Taylor | Sect. Moutan; Subsect. Delavayanae | 34 |
| 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 |
|-----|--------------|-----------------------------------------|-------------------|--------------|------------|-----------|---------------------------------|---------|-------------|
| 35  | mairei H.Lev. | Göteborg                                | 2015              | 2020         | Arboretum  | P. lutea Delavay ex Franch. var. ludlowii Stern & G.Taylor | Sect. Paonia; Subsect. Foliatae | 9          |
| 36  | mascula (L.) Mill. (HR) | St. Andrews | 2010              | 2020         | Paeoniarium | P. corallina Retz. | under Ranunculaceae | Sect. Paonia; Subsect. Foliatae | 52         |
|     |              | Medvednica*                             | 1974              | 1984         | Nursery    | P. corallina Retz. | Croatian locality               |           |             |
|     |              | Žeden*                                  | 1982              | 2001         | Sub-Mediterranean rockery | P. corallina Retz. |           |         |
|     |              | Velebit*                                | 1995              | 2020         | Karstic rockery | P. corallina Retz. |           |         |
|     |              | Gent                                    | 2010              | 2020         | Paeoniarium | P. mascula (L.) Mill. subsp. helenaica Tzanoud. |           |             |
| 37  | mascula (L.) Mill. subsp. helenaica Tzanoud. | Athens | 2015              | 2020         | Paeoniarium |                |           |             |
| 38  | mascula (L.) Mill. subsp. russoi (Biv.) Cullen & Heywood (HR) | Karlsruhe | 2015              | 2020         | Paeoniarium | P. mascula (L.) Mill. var. russoi (Biv.) |           |             |
|     |              | Nancy                                   | 2010              | 2015         | Nursery    | P. japonica (Makino) Miyabe & Takeda |           |             |
|     |              | Šiauliai                                | 2015              | 2020         | Nursery    |                |           |             |
| 40  | officinalis L. (HR) | Postojna-Nanos* | 1964              | 2020         | Alpinum    |                |           |             |
| 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. |           |             |

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. Paonia; Subsect. Paonia |              |
|     |                                     | Bucharest                              | 1979              | 1986         | Nursery    | P. peregrina Mill. var. romanica (Brandza) A. Nyar.                                                | under Ranunculaceae; name combination unknown to WFO: only P. romanica D. Brandza |              |
| 44  | (F2) x Moonrise                     | Brno                                   | 2010              | 2020         | Paeoniarium | P. officinalis L. subsp. villosa (Huth) Cullen & Heywood                          | planta viva                |              |
| 45  | rockii (S.G.Haw & Laiñer)           | Halle                                  | 2010              | 2020         | Paeoniarium | P. humilis Retz. var. villosa (Huth) Stern                                                          |                          |              |
|     | T.Hong & J.J.Li ex D.Y.Hong         | Bayreuth                               | 2010              | 2020         | Paeoniarium | P. peregrina Mill. var. romanica (Brandza) A. Nyar.                                                |                          |              |
|     |                                     | Halle                                  | 2010              | 2020         | Nursery    | P. humilis Retz. var. villosa (Huth) Sten                                                          |                          |              |
|     |                                     | Belvedere Vienna                       | 2010              | 2020         | Paeoniarium | P. officinalis L. var. villosa (Huth) Cullen & Heywood                          | planta viva                |              |
|     |                                     | Lublin                                 | 2013              | 2020         | Paeoniarium | P. ‘Quand x Moonrise’ (mis-spelled: “P. Guard & Honnorise”)                                 | Herbaceous Hybrid          |              |
| 46  | rockii-group of hybrids             | Jibou                                  | 1997              | 2020         | Paeoniarium | P. rockii-group of hybrids (“Long Yuan Hong”)                                           | white-flowered individual | 29           |
|     | (“Long Yuan Hong”)                  |                                        |                   |              |            | dark-pink flowered individual                                                                   | dark-pink flowered individual | 33           |
|     | rockii-group of hybrids             | Braunschweig                           | 2015              | 2020         | Nursery    | P. × suffruticosap subsp. rockii S.G.Haw & Laiñer                                                | Sect. Moutan; Subsect. Vaginatae |              |
|     | (“Long Yuan Hong”)                  | Vilnius                                | 2016              | 2020         | Nursery    |                                                                                           |                          |              |
|     |                                     | Tübingen                               | 2017              | 2020         | Nursery    |                                                                                           |                          |              |
| 46  | rockii-group of hybrids             | Weinheim                               | 2015              | 2020         | Nursery    |                                                                                           |                          |              |
| 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. Paeania; Subsect. Paeania | | |
|     |               | Deliblato Sands* | 1978 | 2006 | Sub-Mediterranean rockery | | | |
| 50  | wendelboi* x mlokose-witschii (F2) | Göteborg | 2017 | 2020 | Nursery | | “P. wendelboi Ruksans & Zetterl.” | Sect. Paeania; 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 synonym of *H. × inodorum* Mill.), *H. „inodorum“* (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: Cossophyllum |
| 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 | | |
| 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 (Bourm.) 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. | |
| 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   |                                        |                   |               |
|     | Uludağ*                             | 1978                                     | 2020              |              | Alpinum     |                                        |                   | 7             |
| 9   | cerastioides (Spach) N. Robson      | Sofia                                    | 1975              | 1975         | Sub-Mediterranean rockery              | arrived as H. rhodopeum 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 Wilden. (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     |                                        |                   |               |
|     |                                     | Pallanza                                 | 1972              | 1975         | Nursery     | incorrect: H. hircinum                 |                   |               |
## 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 |
| 19  | hookerianum Wight & Arn. | Berlin-Dahlem | 1970 | 1970 | Nursery | syn. H. oblongifolium Hook.; Himalayas | Section: Ascyreia |
| 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 |
| 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 |
| 24  | lechenaultii 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 |
| 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 |          |          |                                     |
| 30  | patulum Thunb. | nn | 1965 | 2020 | Arboretum | Far East | Section: Ascyreia | 3 |
| 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 |
|-----|----------------|----------------------------------------|------------------|--------------|------------|------------|--------------------------------------|-------------|--------------|
| 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 |
| 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. | Europe | Section: Hypericum |
| 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 |
|-----|----------------|-----------------------------------------|------------------|--------------|------------|-----------|----------------------------------|-------------|--------------|
| 34  | polyphyllum Boiss. & Balansa | Norwich | 1966 | 1968 | Nursery | H. polyphyllum Boiss. et Heldreich. | Asia Minor | Section: Olympia | |
| 35  | polyphyllum Boiss. & Balansa 'Grandiflorum' | Chelsea | 1995 | 2000 | Hypericarium | entry without an author; H. grandiflorum | val. syn. for H. grandiflorum Salisb. is H. calycinum L. (not this plant!) | Section: Olympia | |
| 36  | pseudoheiyi 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 | |
| 39  | rumeliacum Boiss. | Skopje* | 1965 | 1965 | Nursery | H. rumeliacum Bald. | Balkans | Section: Drosocarpium | |
| 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 Wild. | 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 |

**Tab. 2. Continued**
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 worldwide 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.msycpecies.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.
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 zeljaštih božura (rod Paeonia, porodica Paeoniaceae) te pljuskavica (rod Hypericum, porodica Hypericaceae).

Za ovaj članak sastavili smo popise drvenastih i zeljaštih svojta božura (rod Paeonia, Paeoniaceae) i pljuskavica (rod Hypericum, Hypericaceae) uzgajanih u Botaničkom vrtu zagrebačkog Prirodoslovno-matematičkog fakulteta između 1892. i 2020. godine. Uređili 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 uzgajani je tijekom posljednjeg desetljeća (2010–2020), kad smo pokrenuli projekt malog peonijarija (zbirke zeljaštih 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) *Paeonia 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 *Paoniarium* 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)
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.
