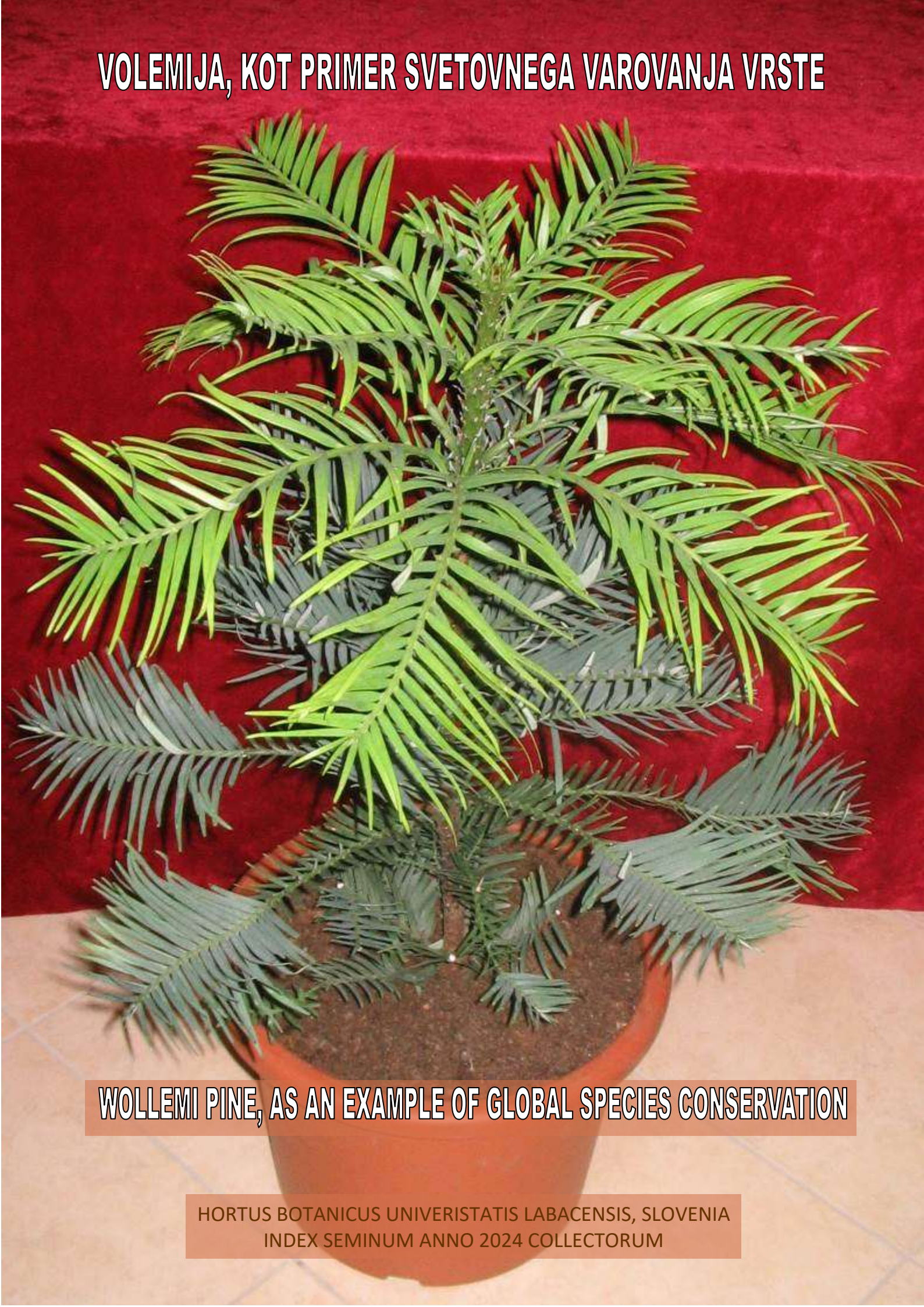
VOLEMIJA, KOT PRIMER SVETOVNEGA VAROVANJA VRSTE



WOLLEMI PINE, AS AN EXAMPLE OF GLOBAL SPECIES CONSERVATION

HORTUS BOTANICUS UNIVERISTATIS LABACENSIS, SLOVENIA
INDEX SEMINUM ANNO 2024 COLLECTORUM

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WOLLEMI PINE, AS AN EXAMPLE OF GLOBAL SPECIES CONSERVATION

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Rastlina iz dobe dinozavrov – *Wollemia nobilis*

Jože Bavcon, Blanka Ravnjak

Uvod

Če se v dobi vesoljske tehnike, informatike in računalništva pojavi rastlina, ki je takšna kot so bili njeni predniki v dobi dinozavrov, potem je to res novica, ki obnori svet. Leta 1994 se je to zgodilo v Avstraliji. Vendar kako ohraniti zanimanje za to neverjetno odkritje dobrih 30 let, je druga umetnost. Pa vendar je Avstralcem tudi to zelo dobro uspelo. Prestolnice v Evropi, ki so bile sprva zelo redke. Prvič so jo javno v celinski Evropi predstavili na Dunaju in to šele 2. novembra 2004. Ker so se z njeno javno predstavitvijo ukvarjale kronane glave, visoki politiki, zunanji, okoljski in kmetijski ministri, je bilo medijske pozornosti še več. Je s tem kaj narobe? Vsekakor ne, saj je prav, da je kdaj lahko tudi rastlina medijska zvezda, nenazadnje smo od rastlin še kako odvisni.

Dunaj je že nekajkrat v zgodovini odigral pomembno vlogo pri prenosu rastlin v Evropo. Tulipani, ki so danes simbol Nizozemske, so prišli v Evropo preko Dunaja. Že davnega 1560 leta so iz Turčije v Habsburško monarhijo poslali prvih nekaj rastlin. Leta 1593 je Avstrijski botanik Carl Clusius prenesel nekaj čebulic iz Dunaja v Leiden, kjer je leta 1594 ustanovil botanični vrt in postal njegov direktor. Ta isti Carl Clusius je botaniziral tudi po delu današnje vzhodne Slovenije (Clusius 1583).

Slika 1 / Figure 1: Slovesna predstavitev vrste *Wollemia nobilis* v Univerzitetnem botaničnem vrtu na Dunaju. / Ceremonial presentation of *Wollemia nobilis* at University botanic gardens Vienna. (Foto / Photo: J. Bavcon)

Dunajčani so botanični vrt dobili 160 let kasneje leta1754. Ob njegovi 250 letnici se je zgodbica s prenosom rastlin preko Dunaja v Evropo ponovila kot že nekajkrat doslej. Prav v čast 250 letnici je namreč avstralska ambasadorka na Dunaju, gospa Deborah Stokes 2. 11. 2004, podarila dunajskemu botaničnemu vrtu eno do takrat najbolj varovanih in zanimivih rastlin: volemijo (*Wollemia nobilis*). Okrog metra velika rastlina je bila tako v Dunajskem botaničnem vrtu prvič v Evropi javno predstavljena (Bavcon 2004)

Zgodba o njenem odkritju

Volemija (*Wollemia nobilis*) velja za botanično odkritje 20. stoletja (Nobel 1994, Jones et al 1995). Rastlina je veljala za izumrlo že več milijonov let. Pred 200 milijoni let, ko se je družina aravkarijevk (*Araucariaceae*), kamor novi rod spada, pojavila, naj bi bila širše razširjena na tedaj skupnem kontinentu južne poloble Gondwani. Do odkritja je prišlo povsem naključno. David Noble, čuvaj v Wollemia narodnem parku, je na enem izmed svojih obhodov po parku, ki se razteza kar na 496.000 hektarjih površine, leta 1994 našel skupino njemu še neznanih dreves. V svojo torbo je dal nekaj vejic in odšel (Nobel 1994, Woodford 2005). Wyn Jones, kateremu je dele rastlin pokazal, je že dolgo študiral vse redke drevesne vrste teh predelov. Ni se mogel prav odločiti za katero vrsto bi šlo. Kolebal je med cikasi (*Cycas*) ali celo praprotmi. Odšel je h Ken Hillu (1948 - 2010), starosti botanikov v Botaničnem vrtu v Sydneju (https://www.anbg.gov.au/biography/hill-ken.html). Ta se je nagibal k ideji, da naj bi rastlina bila tisovnik (*Cephalotaxus*), kitajski iglavec. Wyn Jones temu ni verjel. Sledila je naslednja odprava. Ob ponovnem obisku sta David Noble in Wyn Jones naštela 40 odraslih dreves in do 200 sejančkov, najvišje drevo je segalo do 40 m visoko in imelo več kot meter premera. Tudi tokrat določitev neznanega drevesa ni bila nič lažja. Ob obisku rastišča je spoznal, da gre za nekaj povsem drugega (Ravnjak Bavcon in pres 2025). Morda za nov rod? Kakršnekoli rastlinske dele najdenih rastlin so iskali povsod, po herbarijih, zbirkah in botaničnih vrtovih. Za mnenje se je obrnil še na novozelandsko botaničarko Jan Allen. Ta je postavila precej drzno hipotezo. Po njenem mnenju naj bi šlo za plevel, ki so ga tja zanesli ptiči. Vsekakor tovrstna teza ni naletela na odobravanje zato se je pričel pravi lov na dokaze, da temu ni tako (Woodford 2005). Pravi detektivski lov je potekal po vseh parkih in vrtovih. Le kje bi raslo kaj podobnega kar so našli

Slika 2 / Figure 2: *W. nobilis* rastoča v Bedbury National Pinetum. / *W. nobilis* growing at Bedbury National Pinetum. (Foto / Photo: J Bavcon)

v soteski? Z iskanjem so bili neuspešni! Zaradi česar so nato lahko pričeli z resno analizo najdenih primerkov. Šele kasnejše primerjave z fosilnimi ostanki so pokazale, da gre za do tedaj le fosilno poznano obliko drevesa. Predstavniki te vrste so živeli pred 200 milijoni let na južni, tedaj še skupni, celini Gondwani. Drevo iz dobe dinozavrov torej. Rezultat raziskav je bil opis popolnoma novega rodu *Wollemia* in seveda nato tudi vrste *Wollemia nobilis.* Rod so uvrstili v družino aravkarijevk, kamor spadata že *Araucaria* in *Agathis*, oba iz južne poloble. Za rodovno ime sta nove rastlinske vrste so izbrali ime parka Wollemi, za vrstno (vrstni pridevek) pa nekoliko spremenjeno ime odkritelja (Noble), zato *nobilis*.

Kasnejše raziskave so pokazale, da gre za drevesa, ki so lahko stara do 1000 let. Vsa odrasla drevesa v najdeni populaciji so kloni ene same rastline. Vendar so presenečenja še sledila. Komaj dva kilometra stran so kasneje našli še nekaj dreves. Že po letu 2000 pa še eno manjšo kolonijo dreves, zopet oddvojeno od prvotne populacije (Woodford 2005). Prve genetske raziskave so pokazale, da so vsa odrasla drevesa genetsko enaka, da gre najverjetneje za klon enega samega primerka ali pa za izredno dolgo dobo izolacije zelo majhnega števila primerkov. Še podrobnejše molekularne raziskave so dale enake rezultate. Zato so se vse bolj nagibali k temu, da gre dejansko za klone. Obstajata dve možnosti, da je rastlina nagnjena k temu, da odganja iz korenin, druga možnost pa je, da je matično drevo nekdo posekal ali ga je uničil požar in je bil to potem vzrok, da so rastline odgnale iz zelo razširjenega koreninskega sistema. Prevladalo je tudi mnenje, da gre najverjetneje za nekoč skupno populacijo rastlin v soteski, kjer je mestoma prišlo do premikov ali zasutja, ki so populacijo razdelili. Ali gre res bodisi za kloniranje bodisi za genetski drift, je še vedno vprašanje?

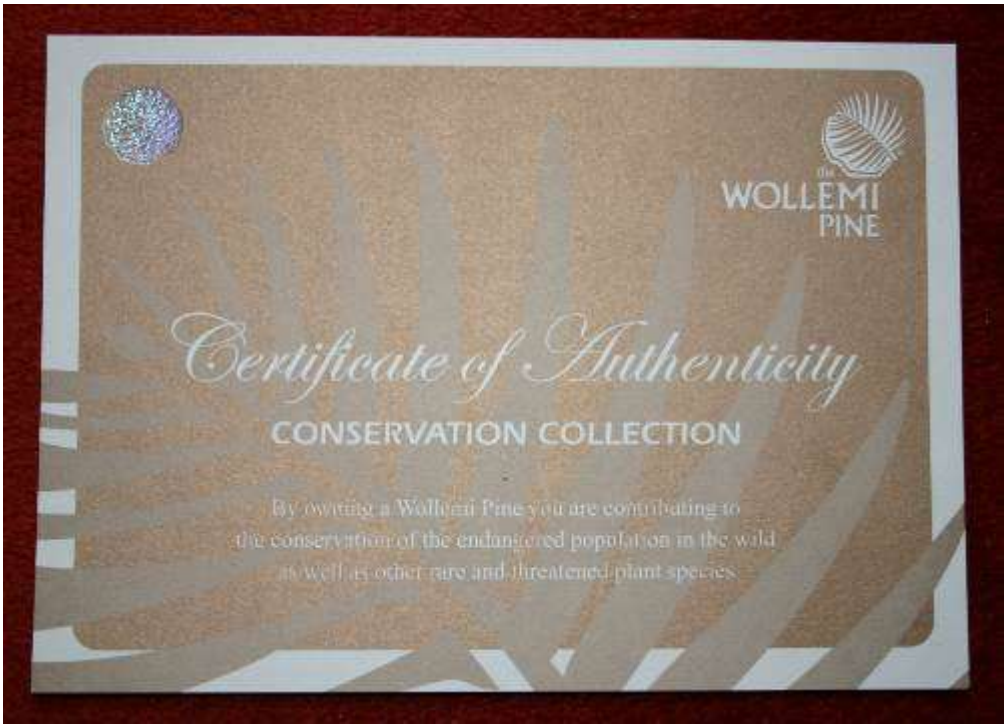
Novo odkritje je bilo seveda prava senzacija. Zgodila se je v eni najrazvitejših držav južne poloble z velikim raziskovalnim potencialom in botanično tradicijo. Nihče ne bi do tedaj pričakoval, da bodo tukaj našli povsem novo vrsto in za povrhu še drevesno. Pred njenim odkritjem so bili znanstveniki mnenja, da je rastlina izumrla že pred 20 ali 30 milijoni let. Takoj se je zastavilo vprašanje, zakaj je preživela samo v tej soteski deževnega pragozda, saj je v Avstraliji še veliko podobnih okolij. Nekateri so mnenja, da je bila volemija specialist in nikoli ni bila razširjena v velikih množinah. Morda ji je prav vzhodno vlažno avstralsko podnebje najbolj ustrezalo (Woodford 2005)

Slika 3 / Figure 3: Ženski storž *W. nobilis*. / Female cone of *W. nobilis*. (Foto / Photo: J. Bavcon)

Kljub temu, da soteska za širšo javnost še vedno ostaja skrivnost, pa so sprejeli za marsikoga kar pregrešno rešitev. Avstralci so ustanovili posebno organizacijo *Wollemi Pine international*, ki je začela rastlino razmnoževati za komercialno prodajo (https://www.wollemipine.com/). Sprva so rastlino razmnoževali samo iz poganjkov in to dokaj uspešno. Vendar to za raznolikost osebkov ni najboljše. Želeli so dobiti semena. Helikoptersko obiranje, z obiralcem visečim na vrvi, je pomenilo veliko tveganje. Semena pa so zelo slabo kalila (Ravnjak, Bavcon 2025 in press). Šele preprosta metoda lovljenja semen z mrežami na tleh, je rezultat presenetljivo izboljšala. Kalivost tako nabranih semen je bila skoraj 100 %. Pravo nasprotje tistih v naravi, kjer je ta bistveno manjša. Kalice pa nato v naravi zaradi pomanjkanja svetlobe večinoma propadejo. Domnevajo, da vršnji storži verjetno niso imeli najbolj živo seme, na mreže pa je padlo seme tudi iz sredine krošenj in niže. Od leta 1999 naprej, ko so nalovili dovolj semen, tako na leto vzgojijo od 100 do 1000 sejančkov. Mlade rastline v kulturi zelo hitro rastejo. V naslednjih letih namreč glavni poganjek v manj kot mesecu dni zraste do 50 cm visoko in šele nato požene stranske veje. Ta del je svetlo zelen, medtem ko so lanskoletni poganjki povsem temno zeleni. Ob tem je potrebno dodati, da rastline vzgojene s semen seveda pomagajo tudi k temu, da bo raznolikost primerkov kljub vsemu nekoliko večja, kot pa, če bi rastlino samo klonirali. Ker je drevo lepo, z ozko in visoko krošnjo, so že kmalu začeli ugotavljati njegovo hortikulturno uporabnost.

Varovanje vrste *Wollemia nobilis*

Botanični vrtovi so že od nekdaj predstavljali mesta za *ex-situ* varovanje rastlinskih vrst. Zato ni presenetljivo, da so volemijo, to novo botanično odkritje 20. stoletja, kmalu v svojih zbirkah želeli številni botanični vrtovi. Tudi Botanični vrt Univerze v Ljubljani je že leta 1995 prosil Botanični vrt v Sydneyu za semena ali celo mlade rastline vrste *Wollemia nobilis*. Kajti Ljubljanski botanični vrt ima že več desetletij izmenjavo z botanični vrtom v Sydneyu (Index 1970). Najprej na prošnjo ni bilo odgovora, na naslednja pisma pa je le prišel odgovor, da bodo o naši prošnji še razpravljali. Kmalu je nato prišlo do že omenjene odločitve o zaščiti in komercialni prodaji v naravovarstvene namene. A prvi primerek vrste *Wollemia nobilis* je v Botanični vrt Univerze v Ljubljani le prišel leta 2006 iz Kew Gardna s certifikatom *Wollemi pine international*. Sprva je bila volemija v železni kletki. Vsi primerki volemije, ki so prišli v Evropo so namreč morali v botaničnih vrtovih najprej biti v kletkah, zato da ni bilo možnosti odtujitve delov rastline in s tem možnosti nedovoljenega razmnoževanja s potaknjenci (Bavcon 2006 a, b c). Takrat je v javnosti vzbudila veliko zanimanje, pa čeprav smo takrat v Botaničnem vrtu Univerze v Ljubljani imeli le en sam rastlinjak in še ta ni bil odprt za najširšo javnost. Bili so mogoči le skupinski ogledi, a tudi to je bilo dovolj za zanimanje. Leta 2017 nam je volemija prvič zacvetela, resda samo z moškimi cvetovi in zopet se je zanimanje zanjo povečalo (Bavcon 2017).



Slika 4 / **Figure 4:** Certifikat o izvoru vrste. / Certificate of species origin. (Foto / Photo: J. Bavcon)

Leta 2017 pa je volemija v Botaničnem vrtu Univerze v Ljubljani dobila prav poseben, nenapovedan obisk. Nekega ponedeljkovega jutra nas je namreč pričakalo sporočilo, na katerem je pisalo, da bi morda bilo dobro volemijo prestaviti malce bolj na sončno mesto. Pod sporočilom pa je bil podpisan sam avtor vrste Wyn Jones! Nemalo smo bili presenečeni in navdušeni, da je prišel pogledat našo volemijo. Na našo srečo je bil še vedno v Sloveniji, zato smo takoj z njim navezali stik in se dogovorili za srečanje na Bledu. V veliko čast nam je bilo spoznati enega izmed avtorjev vrste! Wyn Jones je izžareval prijaznost in energijo pravega raziskovalca. Z žarom nam je opisal prve občutke, ki so ga prevzeli, ko je ugotovil, da v rokah drži vrsto, ki naj bi že izumrla. Svoje občutke je opisal takole: "Šlo je za mešanico vznemirjenja in ponižnosti. Ljudje smo vedno vznemirjeni, če najdemo nekaj novega, posebnega in skupaj z Jane smo bili prvi." Odprtih ust smo ga poslušali, ko nam je pripovedoval o tem, kako je moral z volemije odrezati prvi storž: "Nismo vedeli, da gre za nov rod dokler nisem nabral ženskega storža z vrha drevesa. Dobiti sem ga moral s pomočjo helikopterja tako, da sem uporabil palico s škarjami na koncu in jo molil ven iz helikopterja ter poskusil odrezati storž, med tem, ko se je nad mano vrtel propeler. Bilo je precej nevarno. Predstavljajte si, odrezati sem moral storž velik od 5 do 10 cm, ga potegniti v helikopter in ga nato predati Davidu Noblu. To so trenutki, ki jih nikoli ne pozabiš!" Glede na to, da smo imeli priložnost druženja s tako slavnim odkriteljem smo z njim poklepetali tudi o njegovem delu naravovarstvenika. Z nami je delil svoj moto, ki ga lahko zagotovo ponotranji vsakdo, ki je raziskovalec po duši: "Če greš skozi življenje v ravni črti in ves čas gledaš pred seboj le svoje korake, vidiš bolj malo. Če pa hodiš cikcak, vidiš vse! Moraš se zavedati vsega okrog sebe, obrneš se nazaj in okrog sebe, vsak korak je drugačen, vsak naslednji korak je nato unikaten." Pogovor z Wyn Jonesom je bil navdihujoč in veseli smo, da je obiskal volemijo v našem botaničnem vrtu.

Projekt Wollemi pine Metacollection

Kljub temu, da je soteska, kjer je volemija naravno prisotna, dobro varovana, se je izkazalo, da lahko žal tudi naravni pojavi ogrožajo obstoj vrste. V letih 2019 -2020 je v vzhodni Avstraliji pustošil požar, ki je uničil več kot 10 milijonov hektarjev, vključno z delom naravne populacije bora Wollemi Pine (Mackenzie et al. 2021). Čeprav je znano, da se ta vrsta po požaru uspešno regenerira, obstaja velika nevarnost, da pogosti požari to vrsto popolnoma iztrebijo (MacKenzie et al. 2022). Prav ti požari so bili vzrok za razmišljanje o prvi metakolekciji kot *ex-situ* varovanju genetskih različic volemije, razpršenih po svetu kot meta zbirka. 31. oktobra 2023 so v Bedgebury National Pinetum and Forest v Anglji, kjer domuje tudi njihova gozdarska organizacija, predstavili torej enega izmed največjih projektov ohranjanja rastlinskih vrst na svetu: Wollemia meta collection. K sodelovanju pri varovanju tega avstralskega endemita je bilo povabljenih 38 partnerjev iz vsega sveta. V Botaničnem vrtu Univerze v Ljubljani smo bili zelo počaščeni, ko so nas spomladi leta 2023 vprašali, če pristopimo k temu svetovnemu naravovarstvenemu projektu varovanja volemije v *ex-situ* pogojih. Z velikim veseljem smo se tega lotili. Rastline so prispele do nas iz Sydneya preko Anglije - Bedgebury arboretuma, kjer so bile dolgo v karanteni. Rastline smo po mnogo dogovorih in izpolnitvi kopice dokumentov prejeli konec junija 2023. Projekt je ostajal skrivnost vse do slovesne razglasitve v Angliji. Embargo na poročanje o rastlinah in samem projektu je veljal vse do slovesne razglasitve začetka projekta 31. oktobra 2023 v Badgeburyu v Angliji. Udeležili smo se slovesne razglasitve projekta, malo kasneje pa smo projekt predstavili tudi slovenski javnosti (Bavcon 2023; Šašek 2023).

Slika 5/ Figure 5: John Siemon, direktor Horticulture & Living Collections in Dr Cathy Offord, vodja Australian PlantBank Research v Botanic Gardens of Sydney pri sajenju primerka wolemije za projekt Wollmi pine Mettacolction v Bedgebury National Pinetum ob slovesnosti začetka projekta./ John Siemon, Director of Horticulture & Living Collections and Dr Cathy Offord, Head of Australian PlantBank Research at Botanic Gardens of Sydney, by planting Wollemi pine specimens for Wollemi pine Mettacolection at the Bedgebury National Pinetum on the project opening ceremony. (Foto / Photo: B. ravnjak)

Glavni izvršni direktor je ob prvi obletnici projekta v pismu poslanem partnerjem zapisal:

»31. oktobra 2023 sta se Botaničnemu vrtu v Sydneyju pridružila Botanic Gardens Conservation International (BGCI) in Forestry England, da bi uradno začela pilotni program metazbirke Global *Wollemia nobilis* (Wollemi Pine) v Bedgebury National Pinetum and Forest. Skupaj z 38 botaničnimi vrtovi in arboretumi po vsej Avstraliji, Združenem kraljestvu, Evropi in Združenih državah Amerike smo proslavili razdelitev 240 genetsko raznolikih primerkov volemije. Veselimo se praznovanja prihajajoče prve obletnice tega razburljivega globalnega projekta njenega ohranjanja. Upamo, da si boste vsi vzeli trenutek in 31. oktobra razmislili o prispevku, ki ga dajete za zaščito prihodnosti ene najbolj ikoničnih rastlin na svetu.
Lep pozdrav
Simon Duffy AM
Glavni izvršni direktor
Botanični vrtovi v Sydneyju
V imenu Botaničnih vrtov v Sydneyju, Botanic Gardens Conservation International in Forestry England.«

V Botaničnem vrtu Univerze v Ljubljani tako že več kot leto dni skrbimo in opazujemo šest osebkov štirih različnih genotipov *Wollemia nobilis,* izvajamo na njih različne meritve in podatke beležimo v podatkovno bazo. V Botaničnem vrtu Univerze v Ljubljani jih imamo tekom leta zunaj na prostem, pozimi pa jih prestavimo v rastlinjak. Tudi kadar so na prostem jih tekom vročega poletja, kadar je sevanje precej močno, postavimo v polsenčni del. Volemija v naših klimatih v osrednjem delu Slovenije zaenkrat zime ne preživi na prostem, saj po do sedaj znanih raziskavah zdrži le temperature do – 5 C. Ob prejetju šestih osebkov volemije je največja med njimi merila v višino 63 cm, najmanjša pa 47 cm. Po enem letu je njihov prirast znašal od 16 do 25 cm. Kar pomeni, da so nekatere iz med njih v enem letu zrasle skoraj za polovico ali pa vsaj tretjino svoje prvotne višine.

Rastline v našem Botaničnem vrtu lepo uspevajo in so na ogled tudi javnosti. Seveda pa zaradi potrebe po varovanju teh unikatnih primerkov niso popolnoma dosegljive obiskovalcem. Upamo lahko, da bo volemiji tudi nadaljnja usoda tako prizanesljiva, kot je bila v njenem dosedanjem, več kot 200 milijonov let trajajočem, razvoju.

Plant from the age of dinosaurs – *Wollemia nobilis*

Jože Bavcon, Blanka Ravnjak

Introduction

If, in the age of space technology, information technology, and computing, a plant had appeared that resembled its ancestors from the age of dinosaurs, then this would truly have been a news that would drive the world crazy. In 1994, this happened in Australia. However, maintaining interest in this incredible discovery for over 30 years is another art. And yet, the Australians managed to do so and very well too. Across capitals in Europe, where they initially appeared very rarely. In continental Europe it was first publicly presented in Vienna, as late as 2 November 2004. Because its public presentation was before attended by crowned heads, senior politicians, foreign, environmental and agricultural ministers, there was even more media attention. Is there something wrong with that? Certainly not, because it is only right that a plant can sometimes be a media star; after all, we are so dependent on plants.

Vienna has played an important role in the transfer of plants to Europe several times in history. Tulips, which are today a symbol of the Netherlands, came to Europe through Vienna. As early as 1560, the first few plants were sent from Turkey to the Habsburg Monarchy. In 1593, Austrian botanist Carl Clusius transferred some bulbs from Vienna to Leiden, where he founded a botanic garden in 1594 and became its director. The same Carl Clusius also botanised across a part of present-day eastern Slovenia (Clusius 1583).

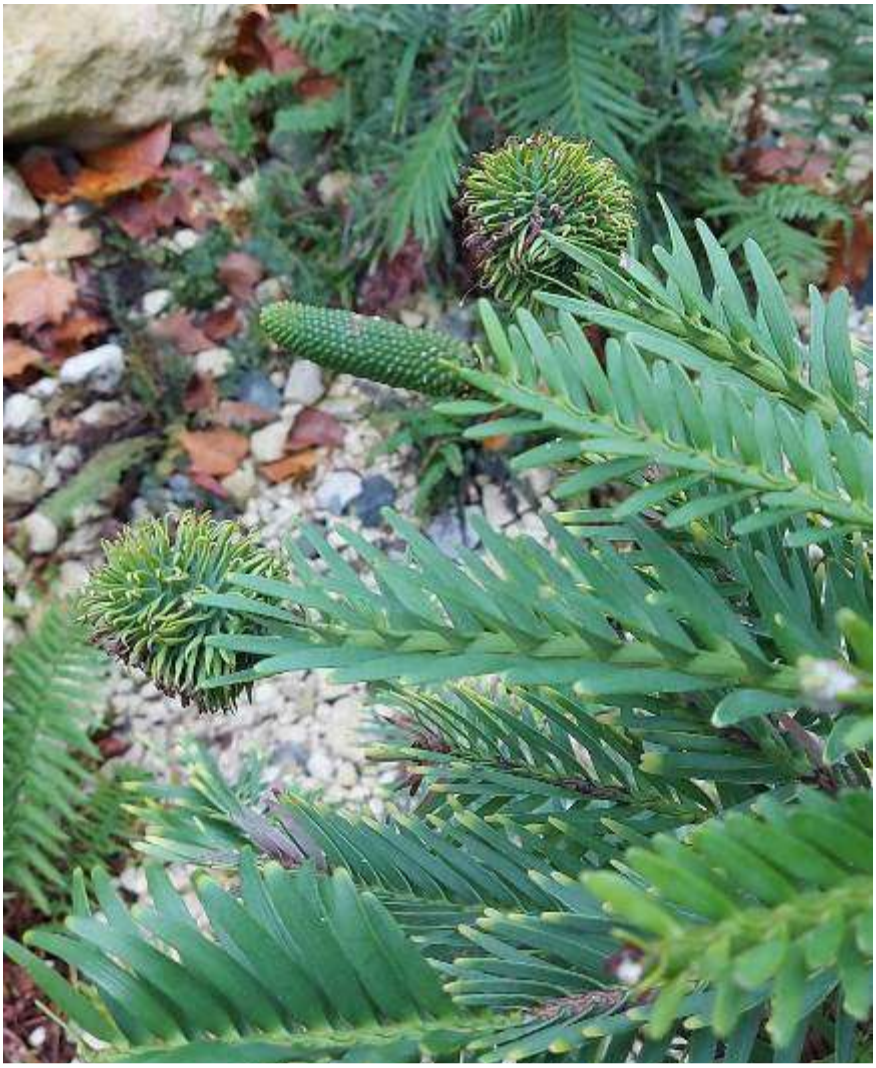
Slika 7 / Figure 7: Njena exelenca avstralska veleposlanica na Dunaju Deborah Stokes in prof. dr. Karin Vetschera, vodja Oddelka za botaniko Univerze na Dunaju ob slovesni predaji *W. nobilis* Botaničnemu vrtu na Dunaju. / Her Excellency the Australian Ambassador on Vienna Deborah Stokes and Prof. Dr. Karin Vetschera,

Head of the Department of Botany of the University of Vienna at the ceremonial handover of *W. nobilis* to the Botanic Gardens Vienna. (Foto / Photo: J. Bavcon)

The Viennese got their botanic garden 160 years later, in 1754. On its 250th anniversary, the story of the transfer of plants trough Vienna to Europe was repeated. In honour of the 250th anniversary, the Australian Ambassador to Vienna, Ms Deborah Stokes, donated one of the most protected and interesting plants to the Botanical Garden of the University of Vienna on 2 November 2004: a Wollemi pine (*Wollemia nobilis*). The approximately one-meter-tall plant was thus presented publicly in Europe for the first time in the Botanical Garden of the University of Vienna (Bavcon 2004).

The story of its discovery

The Wollemi pine (*Wollemia nobilis*) is considered the greatest botanical discovery of the 20th century (Nobel 1994, Jones et al. 1995). This species was thought to be extinct for millions of years. When the Araucariaceae family, which the new genus *Wollemia* belongs to, emerged 200 million years ago, it was thought to have been more widely distributed on the then-common continent of Gondwana in the southern hemisphere. The discovery came about completely by chance. In 1994 David Noble, a ranger at the Wollemi National Park, found a group of trees unknown to him during one of his patrols of the park, which spans 496,000 hectares. He put a few twigs in his bag and left (Nobel 1994, Woodford 2005). Wyn Jones, whom he showed parts of the plants, had long studied all the rare tree species of the area. He could not quite decide which species it was. He could not decide between cycads (*Cycas*) and even ferns. He went to Ken Hill (1948–2010), a senior botanist at the Botanic Gardens of Sydney (https://www.anbg.gov.au/biography/hill-ken.html). Hill leaned towards the idea that the plant was a plum yew (*Cephalotaxus*), a Chinese conifer. Wyn Jones did not believe that. New expedition followed. On a return visit, Noble and Jones counted 40 adult trees and up to 200 saplings, with the tallest tree reaching up to 40 metres high and having a trunk diameter of over a metre. Identifying the unknown tree was no easier this time. Upon visiting the site, Jones realised that it was something completely different (Ravnjak & Bavcon 2025, in press). Maybe for a new genus? They searched everywhere for any plant parts of the plants discovered, in herbaria, collections, and botanic gardens. He also turned to New Zealand botanist Jan Allen for advice. She made a rather bold hypothesis. In her opinion, it was a weed carried there by birds. Of course, this kind of hypothesis did not meet with approval, and so began a real hunt for evidence that this was not the case (Woodford 2005). A real detective search took place throughout all parks and gardens. Where else would something like what they found in the gorge grow? But their search was unsuccessful! And this led them to begin a serious analysis of the specimens found. Only later comparisons with fossil remains showed that this was a species of tree that had previously only been known from fossils. Representatives of this species lived 200 million years ago on the southern, then still conjoined, continent of Gondwana. A tree from the age of dinosaurs, then. The result of the research was the description of a completely new genus *Wollemia* and, of course, the species *Wollemia nobilis*. The genus was categorised in the Araucariaceae family, which also includes *Araucaria* and *Agathis*, both from the Southern Hemisphere. The name of the Wollemi Park was chosen as the generic name for the new plant species, and the slightly modified name of the discoverer (Noble) was chosen as the specific name (specific epithet), hence *nobilis*.



Slika 8 / Figure 8: Ženska storža in moški cvet *W. nobilis.* / Female cones and male flower of *W. nobilis*. (Foto / Photo: B. Ravnjak)

Later research has shown that these trees can live up to 1000 years. All adult trees in the found population are clones of a single plant. However, surprises still followed. They later found a few more trees barely two kilometres away. And after year 2000, they found another smaller colony of trees, again separated from the original population (Woodford 2005). Initial genetic research has shown that all adult trees are genetically identical, that they are most likely clones of a single specimen or the result of an extremely long period of isolation of a very small number of specimens. Even more detailed molecular research yielded the same results. Therefore, they were increasingly more inclined to believe that they were actually clones. There were two possibilities: the plant is either prone to rooting or the parent tree was cut down or destroyed by fire, and this then caused the plants to root from their widespread root system. The prevailing opinion was that this was most likely a once common population of plants in the gorge, where ground movements or fills divided the population in some places. Whether it is really cloning or genetic drift is still the question.

The new discovery was, of course, truly sensational. It took place in one of the most developed countries in the Southern Hemisphere with great research potential and botanical tradition. No one would have expected to find a completely new species there, and a tree one at that. Before its discovery, scientists believed the plant had become extinct 20 or 30 million years ago. The immediate question was why it had survived only in this rainforest gorge, given that there are many similar environments in Australia. Some believe that Wollemi pine was a specialist and was never widespread. Perhaps the humid eastern Australian climate suited it best (Woodford 2005).

Slika 9 / Slika 9: Mladi poganjki *W. nobilis*. / Young shoots of *W. nobilis.* (Foto / Photo: B. Ravnjak)

Even though the gorge still remains a secret to the general public, they have adopted a solution that is, for many, almost blasphemous. Australians founded a special organisation, Wollemi Pine International, which began propagating the plant for commercial sales (https://www.wollemipine.com). Initially, the plant was propagated only from shoots, which was quite successful. However, this is not the best approach for diversity of individuals. They wanted to grow seeds. Harvesting by helicopter, with the harvester hanging on a rope, was a great risk. These seeds, however, germinated very poorly (Ravnjak & Bavcon 2025, in press). It was the simple method of catching seeds with nets on the ground that surprisingly improved the result. The germination rate of seeds collected in this manner was almost 100%. The exact opposite of those in nature, where it is significantly smaller. In nature, sprouts mostly die due to lack of light. It was assumed that the top cones probably did not have the most viable seeds, and that seeds from the middle of the crowns and lower down also fell onto the nets. Since 1999, when they have collected enough seeds, they have been growing 100 to 1,000 seedlings per year. Young plants in culture grow very quickly. In the next years, the main shoot grows to 50 cm in height in less than a month, and only then sprouts side branches. This part is light green, while last year's shoots are completely dark green. It should be added that plants grown from seeds also help to ensure that the diversity of specimens is somewhat greater than if the plant were simply cloned. Because the tree is beautiful, with a narrow and tall crown, people soon began to recognize its horticultural usefulness.

Conservation of the *Wollemia nobilis* species

Botanic gardens have always been places for *ex situ* conservation of plant species. It is therefore not surprising that Wollemi pine, this new botanical discovery of the 20th century, was soon desired by many botanic gardens for their collections. The University Botanic

Gardens Ljubljana had also requested seeds or even young plants of the *Wollemia nobilis* species from the Botanic Gardens of Sydney as early as 1995, based on several decades long seed exchange between the two (Index 1970). At first, there was no response to the request, but subsequent letters finally yielded a response that our request would be further discussed. Soon after, the aforementioned decision was made regarding protection and commercial sale for nature conservation purposes. But the first specimen of *Wollemia nobilis* only arrived at the University Botanic Gardens Ljubljana in 2006 from Kew Gardens (GB) with a Wollemi Pine International certificate. At first, the plant was kept in an iron cage, as all Wollemi pine specimens that arrived to European botanic gardens had to be kept at first, so that there was no possibility of theft of plant parts and thus the possibility of unauthorised propagation by cuttings (Bavcon 2006 a, b, c). It aroused great public interest, even though at the time we only had one greenhouse at the University Botanic Gardens Ljubljana, that was not yet open to the general public. Only group tours were possible, but even that was enough to generate interest. In 2017 for the first time, the Wollemi pine bloomed with male flower, and interest in it increased again (Bavcon 2017).

Slika 10 / Figure 10: Prvi osebek *W. nobilis* v Botaničnem vrtu Univerze v Ljubljani (2006). / First specimen of *W. nobilis* at University Botanic Gardens Ljubljana (2006). (Foto / Photo: J. Bavcon)

In 2017, the Wollemi pine at the University Botanic Gardens Ljubljana received a very special, unannounced visit. One Monday morning, we found a message saying that it might be a good idea to move the Wollemi pine to a sunnier spot. And the message was signed by the author of the species, Wyn Jones himself! We were quite surprised and excited that he came to check our Wollemi pine. Fortunately for us, he was still in Slovenia, so we immediately contacted him and arranged to meet in Bled. It was a great honour for us to meet one of the authors of the species! Wyn Jones exuded the friendliness and energy of a true explorer. He enthusiastically described the first feelings that overwhelmed him when he realised that he was holding a species that was thought to be extinct. He described his feelings as follows: “It

was a mixture of excitement and humility. People always feel excitement when we find something new, special, and together with Jane, we were the first." We listened to him with open mouths as he told us about how he had to cut the first cone from the Wollemi pine: "We didn't know it was a new genus until I picked the female cone from the top of the tree." I had to get it with the help of a helicopter, by using a pole with scissors on the end, and waving it out of the helicopter and trying to cut off the cone while the propeller was spinning above me. It was quite dangerous. Just imagine, I had to cut off a 5 to 10-centimetre cone, pull it into the helicopter, and then hand it over to David Noble. These are moments you never forget!" Given that we had the opportunity to spend time with such a famous discoverer, we also chatted with him about his work as a conservationist. He shared his motto, which anyone who is an explorer at heart can certainly internalise: "If you go through life in a straight line and look at all times only at your own steps in front of you, you see little. But if you walk in a zigzag pattern, you can see everything! You have to be aware of everything around you, look back and around, every step is different, every next step is then unique." The conversation with Wyn Jones was inspiring and we are glad that he visited the Wollemi pine in our botanic gardens.

Wollemi pine meta-collection project

Although the gorge where the Wollemi pine is naturally present is well protected, it has unfortunately become apparent that natural phenomena can also threaten the existence of the species. In 2019–2020, a wildfire ravaged eastern Australia, destroying more than 10 million hectares, including part of the natural population of Wollemi pine (Mackenzie et al. 2021). Although this species is known to regenerate successfully after fire, there is a high risk that frequent fires will completely extirpate this species (MacKenzie et al. 2022). It was these fires that led to the idea of the first meta-collection as an *ex situ* preservation of genetic varieties of Wollemi pine, scattered around the world as a meta-collection. On 31 October 2023, at the Bedgebury National Pinetum and Forest in England, where their forestry organisation is also located, they presented one of the largest plant species conservation projects in the world: the Wollemi Pine meta-collection. Thirty-eight partners from around the world were invited to collaborate in protecting this Australian endemic. At the University Botanic Gardens Ljubljana, we were extremely honoured when we were asked in the spring of 2023 to join this global conservation project to protect the Wollemi pine in *ex situ* conditions. We took on this task with great pleasure. The plants arrived at our gardens from Sydney via England – Bedgebury arboretum, where they were quarantined for a long time. After concluding many agreements and filling out a bunch of documents, we received the plants at the end of June 2023. The project remained a secret until its official announcement in England. The embargo on reporting on the plants and the project itself was in place until the project's official launch on 31 October 2023 in Bedgebury, England. We attended the project's official announcement, and a little later we presented the project to the Slovenian public (Bavcon 2023, Šašek 2023).

Slika 11 / **Figure 11***: Ex-situ* nasad *W. nobilis* v Australian Botanic Garden Mount Annan Nursery. / *Ex-situ* Wollemi Pine population at Australian Botanic Garden Mount Annan Nursery. (Vir / Source: Wollemi Pine Mettacolection Project)

In a letter to partners on the project's first anniversary, the chief executive wrote:

"On 31 October 2023, the Botanic Gardens of Sydney were joined by Botanic Gardens Conservation International (BGCI) and Forestry England to officially launch the Global *Wollemia nobilis* (Wollemi Pine) meta-collection pilot programme at Bedgebury National Pinetum and Forest. Together with 38 botanic gardens and arboretums across Australia, the United Kingdom, Europe and the United States, we celebrated the distribution of 240 genetically diverse specimens of Wollemi pine. We look forward to celebrating the upcoming first anniversary of this exciting global conservation project. We hope you will all take a moment on 31 October to consider the contribution you are making to protecting the future of one of the world's most iconic plants.
Best regards
Simon Duffy AM
Chief Executive
Botanic Gardens of Sydney
On behalf of the Botanic Gardens of Sydney, Botanic Gardens Conservation International and Forestry England."

At the University Botanic Gardens Ljubljana, we have been caring for and observing six specimens of four different *Wollemia nobilis* genotypes for more than a year, performing various measurements on them and recording the data in a database. At the University Botanic Gardens Ljubljana, we keep them outdoors during warm months, and move them into a

greenhouse during winter. Even when they are outdoors, during the hot summer, when the radiation is quite strong, we place them in a semi-shaded area. In our climate in the central part of Slovenia, Wollemi pine does not survive the winter outdoors for now, as, according to existing research, it can only withstand temperatures down to -5 °C. Upon receiving six Wollemi pine specimens, the largest of them measured 63 cm in height, and the smallest 47 cm. After one year, their growth rate ranged from 16 to 25 cm. This means that some of them have grown by almost one half or at least a third of their original height in one year.

Slika 12 / **Figure 12**: Predstavitev šestih osebkov *W. nobilis* projekta Wollemi pine Mettacolection v Botaničnem vrtu Univerze v Ljubljani, na tiskovni konferenci. / Presentation of six specimens *W. nobilis* of Wollemi pine Mettacolection project at University Botanic Gardens Ljubljana, on the press conference. (Foto / Photo: B. Ravnjak)

The plants in our Botanical Garden are thriving and are on display to the public. Of course, due to the need to protect these unique specimens, they are not fully accessible to visitors. We can hope that the future fate of Wollemi pine will be as kind as it has been in its development so far, which has lasted more than 200 million years.

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Interview with Wyn Jones – 30 years since the scientific description of the living fossil – Wollemi pine

Blanka Ravnjak, Jože Bavcon and Wyn Jones

In 1994, David Nobel, a ranger in Wollemi Park, located about 150 km from Sydney, discovered a group of unknown trees in one of the gorges by chance. This sparked a real detective story. A group of researchers worked hard to determine what this species actually is. On 23 December of the same year, they submitted an article (Manuscript received 23 December 1994 and Manuscript accepted 30 March 1995) with a scientific description of the new species to their journal (*Telopea*, named after an Australian genus). One of the authors also visited Slovenia and gave his business card to the student at the reception of the University Botanic Gardens Ljubljana, including a short note, without stating that he was a co-author of the new species, Wollemi pine. And so a new story began to unfold here too.

That Monday, 18th of September 2017, would have been a perfectly normal day if there hadn't been a tiny piece of paper with brief instructions on Wollemi pine, signed by Wyn Jones, on the table outside the office door at the University Botanic Gardens Ljubljana. Is this even possible? That Monday morning brought a completely different challenge. We immediately browsed the Kew Gardens plant species list, which contains the names of the plants and their authors. We just confirmed what we had already suspected. Of course, the note was left at our door by one of the authors of the scientific name for the living fossil of Wollemi pine (*Wollemia nobilis*)! We did not waste any time, we immediately sent him a message asking if he was still in Slovenia. We soon received an answer. He was still in Slovenia, but no longer in Ljubljana. Next came our question of when and where we could meet up or at least talk. We were very happy to receive his reply that he was in Bled and that we could meet there. So we met up, which led to very interesting interview with Wyn Jones, showing the simplicity and greatness of an explorer from the southern hemisphere, Australia. When we first wrote to Sydney in 1995, it did not seem likely that we would be chosen to protect the Wollemi pine after almost 30 years of its discovery. And yet, out of 3,700 botanic gardens in the world, only 38 botanic gardens were selected to participate in the Wollemi Pine meta-collection project, and among them is the University Botanic Gardens Ljubljana. If a vision is strong enough, it will eventually be realised. We only need to believe in it!

Slika 13 / **Figure 13**: Wyn Jones ob intervjuju na Bledu. / Wyn Jones at the interview in Bled. (Foto / Photo: J. Bavcon)

1. **How did you feel when you realised you had something special in front of you?**

I caught my breath ... I had previously worked with rare species and their endangered populations that were almost lost and I rediscovered them. When Wollemi pine was found in the Wollemi National Park, and when I realised that it was not only a new species, but a new genus, I felt something special. It was a mixture of excitement and humility. People always feel excitement when we find something new, special, and together with Jane **(J. M. Allen the co-author of description)**, we were the first.

2. **What is your primary education? When you were young, did you think you would be doing what you are doing today?**

I have always been a curious person. Even as a child, I loved getting my hands dirty. It's a family tradition. I inherited the desire to raise plants and animals from my grandfather and father. Then I earned my degree in agricultural sciences at the University of Sydney. But I always knew there had to be more to it than just growing plants in fields and production. Very soon after graduation, everything came together and my profession changed to ecologist, and then I started studying these things in more detail. One of my first studies was the relationship between the animals and the forest, namely possums in Australia. Specifically, the role of old trees with hollows in relation to possums.

3. **We learned that you had already been working with rare species before the discovery of Wollemi pine: with how many, and for how many did you perhaps also discover new locations or participate in their protection?**

So how did I become interested in endangered species, especially in the Blue Mountains? In the 80s and 90s, I was tasked with reviewing surveys of all animals and plants in the area. When we reviewed the surveys and maps, we realised that we knew very little, but we did find that there are areas within the Blue Mountains region with quite a few rare and endangered plant species. There were also large gaps in the data elsewhere. So I suggested that these species be reviewed; as a result, even before the discovery of Wollemi pine in

Wollemi Park, I rediscovered several species that had already been lost to science. They were always there, in nature, some even close to cities, just a few kilometres away. People must have been walking by, and when I found them again by chance, one of them is a beautiful species named yellow starflower (*Calitryx angulata*), and another belongs to a group of species that tolerate fires and that, according to the surveys, was also already lost. Together with my friends, we found it again. These are all endangered plant species. We have plants that are very special, there are records about them. So where are they or where are there more of them? I wanted to study them in more detail, especially how they respond to fire.

4. **Sounds like a pretty exciting job?**

Oh, very! Particularly in the Blue Mountains with their large sandstone cliffs. These rare plant species are usually closely associated with these sandstone cliffs, which have very complicated lines, so we are always looking for small habitat types or micro-habitats for these plants. These micro-habitats protect plants from destructive fires. However, they represent quite dangerous areas for people, there are precipices and rocks are sometimes very slippery. So we are actually in great danger when exploring the plants on top of these cliffs and below them, in waterfall areas.

5. **Does that mean that you always do your work and job in nature? Did you work as some kind of ranger in a national park?**

Actually, no, I was working as a senior naturalist at the time. Or you could say a curious naturalist. I really like the term naturalist, because humans are naturally curious about animals and plants. Some of these plants are fragrant; well, even Wollemi pine is fragrant. This job involved assessing the situation and research work. Part of my job also involved providing information to rangers in national parks, the people who take care of these areas and protect them from fires and people. At the same time, they then interpret and convey this information to people.

6. **So you have also been and are still involved in various nature conservation projects related to plants?**

Yes, of course! Because most of my thirty years of work has been related to endangered plant species. It continued into the 21st century with numerous species, including, for example, one or two species of shrubs, the beautifully flowering bottlebrushes (*Callistemon*) from the valley where I live. These have a very limited distribution. By limited, I mean that their populations consist of only a few hundred individuals growing in areas of only up to 4–5 km^2. One of these is a very large tree for which I made a complete survey, as the largest population of this species of tree in nature is located near my home. It is Camden white gum – *Eucalyptus benthamii*. The reason for protecting this species were wild boars, which cause significant environmental disturbances in this region. They destroy the trees' root systems and the seedlings cannot regenerate. The result of damage is an attack or invasion of fungi and other microorganisms, which then leads to the death of the tree. So we protected this population about three, four years ago. We know that population size and tree size are important forestry parameters.

7. **Why did you decide to visit Slovenia?**

That's a nice question! *(Laughs.)* Some of my close hiking friends came to Slovenia last year. They took a seven-day hiking tour in Slovenia, and went to Triglav and the surrounding mountains. They didn't make it to the top, but they showed me photos and it looked very nice. They told me that they liked Ljubljana and I also like travelling to beautiful places, whether they are mountains, forests, or pleasant cities. Since I also wanted to see these places, what makes them so special, I said to myself, well, let's go. *(Laughs.)* I wanted to visit the Slovenian countryside, smaller towns ... They told me you can go here and there, because Slovenia is small, and that it's shaped like a chicken. *(Laughs.)* So I made my decision: I came here and signed up for a hiking tour through the Slovenian mountains. So I first came to

Ljubljana and swam in the rain. *(Laughs.)* But I had a wonderful time. You Slovenians are very pleasant people.

8. **After the discovery of Wollemi pine, how did further events unfold regarding the newly determined plant, which you knew was different from those known so far? How did you continue to be involved in this story?**

It was actually three phases. The first phase encompassed the time when we realised that we were not just dealing with a new species but actually a new genus. This part was very interesting. It all happened in my small bedroom. So the story didn't take place at some scientific table. Of course, it's not the scientific table that matters, but the scientific mind, and this was the story of Jane and me, and David Nobel, who brought the plant leaves and placed them on the table. The shoot was only about 40 centimetres long. It looked like a cycad or even a fern. This was followed by quite a bit of detective work, so to speak. We went to the site to see the specimen and it was quite a tall tree, larger than the rest of the surrounding rainforest. Well, I should also mention one more story that took place 10 years before this event during the rainforest survey. If I had turned right instead of left at that time, I would have come across a plant with another very dear friend, botanist Alex Floyd, an important botanist who works with rainforests. When we determined that it was a new species and a new genus, I sent him a photo and wrote "Alex, we almost found this 10 years ago!" But almost, of course, is not enough. As Jane and I sat there, I realised it was almost like a detective story. I found out that it was not a plant that was planted and then spread from there with the help of some animals. When I looked at it, it seemed most similar to *Araucaria*. But I knew it wasn't an *Araucaria*. I later realised that my first instinct was correct. But I didn't know that until we looked at the details of the plant. We didn't know it was a new genus until I picked the female cone from the top of the tree. I had to get it with the help of a helicopter, by using a pole with scissors on the end, and waving it out of the helicopter and trying to cut off the cone while the propeller was spinning above me. It was quite dangerous. Just imagine, I had to cut off a 5 to 10-centimetre cone, pull it into the helicopter, and then hand it over to David Noble. These are moments you never forget! In the end, you think: "We got it!" When Jan and I brought it back, we looked at it like it was the Holy Grail. It's more than that, this plant has been here and evolving in Australia for over 70 million years. A very long time ago. So we had a female cone and we knew we would have to cut it with a sharp blade. It was like conducting a symphony to its finale. So is it or isn't it? We cut it open, looked inside at the arrangement of the bracts, and said to ourselves, we've never seen anything like it, this is something completely new, a new genus! My instinct was telling me that it wasn't like an *Araucaria*, but that it was a new genus. It really is like the Holy Grail! It was new information, not just trivial, it was not just a new species but a completely new genus. It represented a new topic for science. Many scientists were then part of the story, in the lab or in the field, some of them were palaeobotanists. The second and third phases of this story took place over two years. We conducted ecological studies and measurements of plants at the site. Some other sites were then found and others continued the work behind us in the area of field ecology. The third phase was carried out by the Botanic Gardens of Sydney and was about propagation. It focused on finding the most efficient way to propagate it and create a population of propagated plants. To create a global *ex situ* population. I think it was an extremely successful story in all phases. Jan and I concluded with a proposal for its protection. It was a complete management plan covering endangered plants in the wild in the Wollemi Park. It was to be carried out by field rangers and also some scientists.

9. **When you look back now and look at the present, it's a unique story about a plant. How do you feel about this? With its worldwide fame?**

Well, I think it's about the fame of nature. In some respects, there is a side story here. This is a very large plant, a 45-metre-tall tree, completely different from anything else and at the

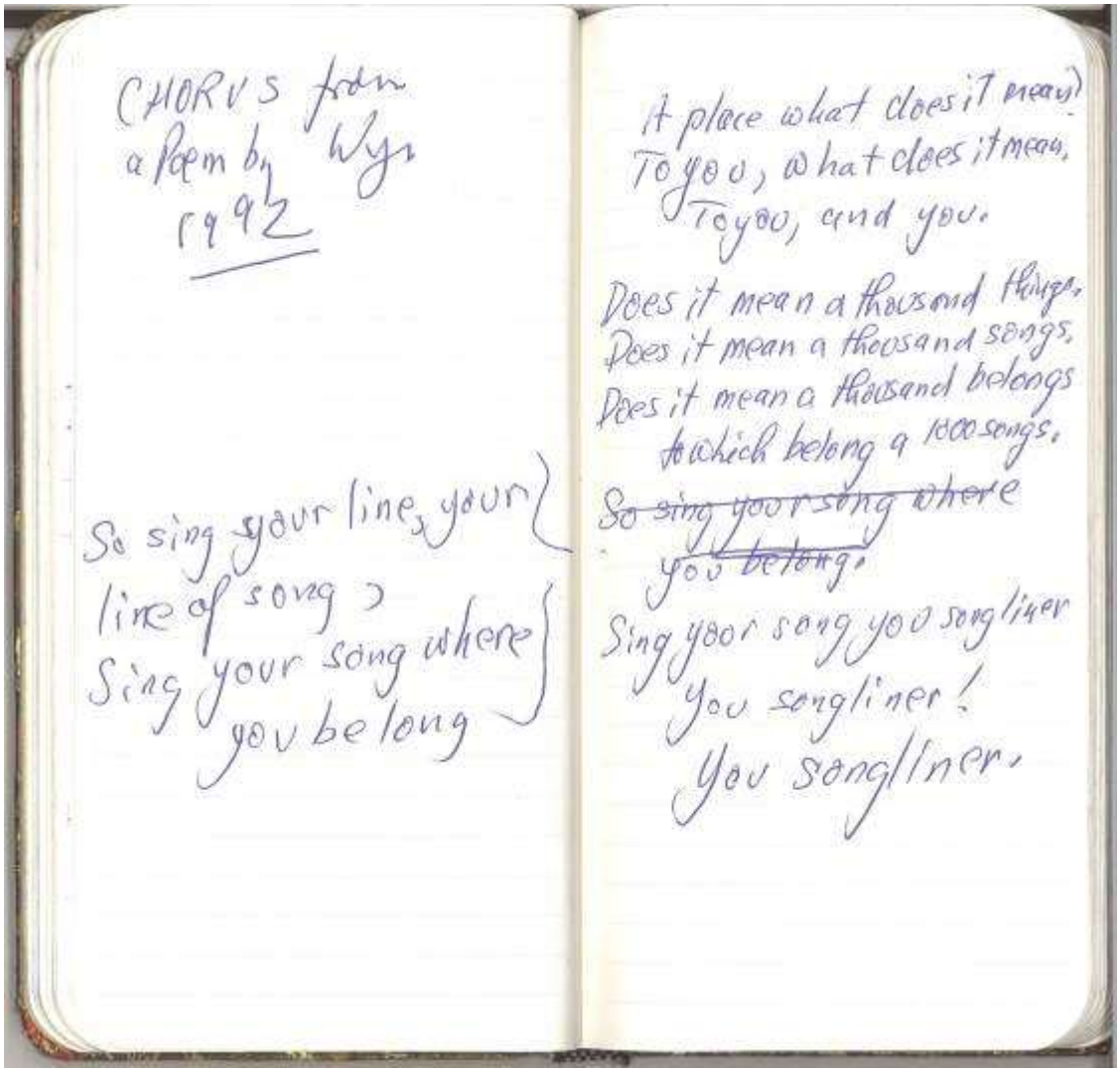
same time quite resilient. But there are many other plants that are smaller and deserve the same attention, which we sometimes unfortunately cannot give them because it costs a lot of money. But they really deserve more attention. Like, for example, a relative of the Wollemi pine in the Blue Mountains called the Blue Mountains pine (*Pherosphaera fitzgeraldii*). *It grows by the waterfalls not far from where I live. No one grows it from seeds, they only grow it from cuttings. And no one has analysed its genetic structure, which is disappointing. Wollemi pine is a large tree that looks like a Christmas tree – unfortunately!* (Laughs.) *And we invest a lot of resources in its research (DNA and the like), which is correct, but species* Pherosphaera fitzgeraldii *also has a similar distribution area in nature (approximately 6 km^2) and only a few hundred individuals, but we do not know its genetics. I think that would be necessary to do this and then we could say that it is a story about a Blue Mountains pine –* Pherosphaera fitzgeraldii. *But this is just one of the smaller plants that we should dedicate our attention to. I don't think we should always say that it's too expensive to do this and that, we could do more of what we're already doing for some other species. Because this is the diversity of life and we must not allow diversity to diminish, as it is already in decline. We are already losing plant and animal species faster than ever before in the history of the Earth. We really need to try to preserve as many species as we can, especially in their natural habitat. Botanic gardens, for example, are excellent places, institutions that can maintain great diversity in an alternative habitat, and they also play an important role in educating the public about the diversity of life. However, if we do not have diversity, we cannot tell the public anything.*

10. **It is certainly interesting that, just like a 'movie star', a star can also be a plant, an animal, or some other organism ...**

It's true, a plant like this could be called a 'star'. Usually, such stars are big things, gigantic plants, large mammals ... But they are also said to carry the stories of other organisms that we must not forget. At the end of the day, microbes are also extremely important. Large organisms only reflect the events hidden behind them. The umbrella species of carnivores are also extremely important in nature. As an ecologist, I see the wheel of nature spinning from the stratosphere to the ground, through the atmosphere and clouds. Everything is interconnected. Many times things are hidden in the background, such as processes that take place in nature. We usually don't see them, unless we observe rainfall, growth of a stem ... but there is much more going on in the background that we can hear and see. So this is the story we need to tell everyone else. About cycles in nature, such as the nutrient cycle, the carbon cycle ... Many people are now aware of processes in nature, especially climate change, because their lives depend on these processes.

11. **With your excellent knowledge of nature, ecology, and ecosystems, do you also teach, perhaps giving lectures to the general public?**

    For a very long time, I was involved in the activities of universities and the Global Study Organization, where I taught students from all over the world, I taught nature guides about natural science, so that they were able to guides people in nature, tell them something about it and its protection, and not just take them on a cliff-jumping adventure. *(Laughs.)*



Slika 14 / Figure 14: Pesem Wyn Jonesa. / Poem by Wyn Jones.

So that it wasn't just an adventure for tourist. I should also somehow include my life motto: "If you go through life in a straight line and look at all times only at your own steps in front of you, you see little. But if you walk in a zigzag pattern, you can see everything!" You have to be aware of everything around you, look back and around, every step is different, every next step is then unique. We are also unique in this place, at this time. As soon as we step through the door, everything changes again. I so love to put my hands in the air and feel the cycles of nature flowing through my body. I would like everyone to be aware of this feeling, because through it we gain intellectual satisfaction and also scientific understanding.

12. **Did you encounter any problems when you realised you had discovered a new genus? Either from botanists or the general public?**

Well *(laughs)*, that's the almost hidden side of the story. You know, when you're a member of a very small community and you're actually kind of an outsider to the traditional scientific establishment, you do things slightly differently than the rest of them, and you are basically an outsider. And when you find something, tell a story, some people think you've "stolen their

thunder". But that's not the case, the story of the Wollemi pine is really important, it's not just a discovery but something that also belongs to the local community. And when I saw that community members really embraced this discovery, it was like raising a flag in honour of nature. We, the community members, found the plant, not an institution, so the discovery cannot simply be taken away from the community. So we told the story that is not just a story about the Wollemi pine but about the entire local community. I do not think that we should take away the authority of the scientific community in this regard. I am a strong advocate of museums and botanic gardens as scientific engines and drivers of knowledge, and I am also a strong critic of governments that deny financial support to these institutions so that they can conduct quality scientific research and tell stories about nature. But at the same time, I think it's right that in such a case, the local community gains ownership of the discovery, the environment, and the connection to it. It is about their connection with the local environment, whether through farming or through the sustainable use of nature. All of this is important to them.

13. **I guess that probably, if the local community is involved in such a discovery, it is aware of its importance, perceives it as its treasure, and therefore actively participates in its protection?**

I agree! I live at the top of the Blue Mountains in Blackheath, which is a small town with 5,000 inhabitants. From the edge of the town, we can almost see the entire valley with 65 to almost 70-metre-high *Eucalyptus deanei* trees, which have been protected. Many people don't realize the importance of this, so we're trying to tell the story. This is a very special forest and these are very special trees, endangered and we must therefore take care of them. We must protect them from fire, and by protecting them, we saved them from being cut down in 1943. It is a beautiful place with 'tree cathedrals'. More and more, the local community is now becoming aware of the importance of the value of nature. Every town in the Blue Mountains could have a specific floral emblem or plant emblem, such as the eucalyptus or New South Wales waratah (*Telopea speciosissima*), which is endemic and native to our area. It is not endangered, but still. Every town could therefore have its own plant emblem. It would bring about a change in people if they realised that they had something of their own as a symbol.

14. **Because if institutions and the government tell people what they must protect, they often feel forced into such action, which is why people immediately resist. However, if they feel connected to an organism, they will accept it as their own and will participate in its protection.**

Of course, I agree completely. There are, for example, countries that have animals as their symbols that are already extinct and are unfortunately only symbols. Or some have floristic symbols whose true representatives may become extinct. That's why we should take care of them.

15. **How did you find the University Botanic Gardens Ljubljana and the Wollemi pine in them? Our Wollemi pine isn't exactly a big tree yet.**

(Laughs.) No, it's certainly not a big tree yet! It was fun, as I walked quite a bit of Ljubljana in the rain. It took me a day and a half to find the sun. I knew I was somewhere near the gardens, but somehow I went in the wrong direction, and this happened to me every day. I was completely desperate, I have to get to the garden somehow, I have to! It might be only 2 hectares big, but it is probably full of surprises! Wherever I go, I usually always visit the local botanic garden. I love walking through gardens and parks in every city, because that's how I see how the locals take care of things and gardens. I like to look at their structure, their plants ... So on the very last day, when it was raining again, I said, I really have to get to the gardens regardless of rain, thunder, or lightning! So I came to the gardens on my last day in Ljubljana. I went to the reception desk in the gardens, spoke to the young lady there, and went to see the tropical greenhouse. I was curious to see if there were any Australian plant species in it that I

could recognise. Then I asked the young lady if you also had a Wollemi pine. She looked at me surprised and unsure, and I realised she was a student; so I said I really wanted to know if you had it and see it for myself. I also introduced myself and wrote down my name. *(Laughs.)* So I went to the greenhouse, saw some Australian plants there, and when I came out she told me you had it. Apparently, she asked one of the gardeners or looked in the database. *(Laughs mischievously.)* But she said she didn't know where in the gardens it was located, and I found that interesting, because 2 hectares is not a large area ... Then it stopped raining and I said to myself, I'll go out and look for it myself. I had noticed your beautiful collection of potted plants earlier and headed there, walking among the larger and smaller trees. I told myself, if it's a big tree, I'll definitely notice it. I walked and walked, even got to the service area, turned around, then realised that there was one area with a collection of potted plants that I hadn't looked at yet, and there it was. I looked at her and exclaimed, "I found it!" I took some pictures of it and then marked it with a cross on your garden map, and took it back to the young lady at the greenhouse reception and showed her where you had it. *(Laughs.)* I didn't mean anything bad by that, at least now she knows where it is in the gardens. The young lady was very cooperative and willing to pass on my information. Then I was very happy when you contacted me and were willing to meet with me. Well, maybe we can come up with some joint products. So that's how I found the Wollemi pine, on the last rainy day in Ljubljana.

You could say that the plant called to you. Of course, certainly!

When we received a message from the student at the reception, we immediately knew who it was, that it was one of the discoverers and determiners of the species. As soon as the news of the new species was announced, I wrote a letter to the Botanic Gardens of Sydney requesting a Wollemi pine specimen. Then I wrote some articles for our newspapers when it came to Europe. But I never thought I would have the opportunity to meet in person the man who actually worked on the discovery of the Wollemi pine, this amazing plant. So I am truly grateful that you left us a message.

It was really nice to see your quick and enthusiastic response and to meet you today! It would be really nice if we could also talk to Jan, as the third author (Noble) died a few years ago. ***Yes, and indeed we also connected with Jan via Skype. Even though we spoke and met each other for the first time, it seemed like we were old acquaintances, the conversation was so nice and full of jokes.***

Slika 15 /Figure 15: Sporočilo Wyn Jonesa. / Wyn Jones's note.

16. You mentioned you mainly work with larger plants – trees, but I was surprised that you also have cyclamen and snowdrops in your garden. Are you interested in these plants, too?

Yes, these are in my garden because I grew up around gardeners and some of the plants in my home garden were daffodils, snowdrops, and cyclamen. They are always in my garden, I also grow daffodils and callas. I love callas and other unusual plants. I also grew orchids. On a walk after lunch, I noticed an orchid that I couldn't identify, and I also saw a lady's-slipper orchid. I only saw their leaves. It is very important that wherever you go, you also have information about nature. A friendly guide told me a story about a spruce tree, and on the way we saw bear, marmot, and ibex tracks. We had a great time, but apparently I was here in the wrong season to see flowering plants. I also almost fell off the trail when I wanted to take a photo of one of the plants high up among the rocks.

17. What do you think about the nature in Slovenia?

It is a very green country and it is great that your capital has received the title of European Green Capital. You really try hard to be sustainable and greener, more than we do in Australia. But I miss areas that are mostly or more or less untouched, such as a rainforest. I completely understand that in past centuries the tree species of your forests were used primarily for Venice and were then replaced by planting spruce. Of course, greenery is always welcome, but I missed a primary forest on my journey through Slovenia. As far as I know, such areas with remnants of primary forests are located in the south-east? ***Yes, there are remnants of primary forests in the Kočevje region and in Dolenjska, where there is a plain with oak forests; it is primarily a floodplain forest.*** Oh, I would love to visit those areas! Mainly because I am involved in a project where we search for and catalogue large old trees. These old trees, with all their history, are very important, they are a symbol of nature and a

reminder of what we are doing to nature. I wish I could stay in Slovenia for another week or so and visit these areas with remnants of primary forests. I don't think there are many cities in Europe with old trees. Considering that I saw large areas with noticeable spruce monoculture, I would suggest that the forests be managed in the future in a way that allows growth of different tree species, thereby increasing the biodiversity of both plants and animals. Which is also important from the perspective of sustainable forest management. It is also important for production and the economy that different tree species in different developmental stages are present in the stand, and that selective logging is then carried out in the forests. Slovenians can be proud of the natural state of ecosystems in your country, of your sustainability.

Questions were prepared and asked by: Assoc Prof Dr Blanka Ravnjak and Scientific Advisor Dr Jože Bavcon of the University Botanic Gardens Ljubljana, Biotechnical Faculty

Index seminum anno 2024 collectorum

Jože Bavcon, Janja Makše, Blanka Ravnjak

Abstract

The 2024 Index seminum includes the seeds of 328 species collected in the University Botanic Gardens Ljubljana. All are arranged per families and these are listed in alphabetic order. The alphabetic principles is followed also in listing species within families. The index of the seeds harvested in nature contain 117 units. The total number of units from the year 's Index amounts 505

Key words: Index seminum, anno 2024 collectorum

Material and methods

Seeds begin to be harvested from the garden plants at the end of April or beginning of May, depending on weather conditions. From then on single species in various parts of the Garden are regularly monitored and their seeds collected in due course. Each species is assigned a suitable label stating the date of harvesting and the name. The seeds of the same species are harvested several times as they mature, more than one bag of seeds of the same species is collected. We try to observe the rule to have minimally five plants of the same species in the Garden. The seeds are then left to dry in a dry room. They are dried with regard to their specific nature. Juicy fruit seeds are spread apart and arranged over newspaper sheets. The seeds requiring constant moisture are stored in fine sand immediately after harvesting.

The harvesting of seeds in nature likewise starts in spring and lasts till autumn and even winter. Seeds are collected in different parts of Slovenia. We always take care to remove them from a larger number of specimens, from five specimens of a species in the same habitat. Seeds from a particular habitat are stored in one bag. The habitat and the species, if already known, are put down; if the species is not identified, the whole plant is removed and the species subsequently determined in the Botanic Garden. The non- determined species are photographed on their growing site: plant as a whole and single details, flower, leaves. The bags used to store seeds are made of paper.

Immediately after being brought to the Garden all seeds collected in nature are examined, the non-determined species are determined according to the keys as known from literature or by comparing them with the collection of seed samples. Otherwise the bags are merely left open and put in a dry and naturally aired place. During winter the seeds are cleansed, determinations are reexamined, this time also by using the seed determination keys, and finally by comparing them with the reference collection.

Harvesting seeds in nature is an exacting task. One has to be familiar with the time single plants form mature seeds because some fall off very quickly, so it is difficult to get them at exactly the right moment. A particularly powerful factor in Slovenian Istria, Goriško and Vipavsko is the strong wind typical of those parts of Slovenia. It is essential to be familiar with the habitats of single plant species because numerous plants are well recognizable and

visible during their blossoming period whereas they are later overgrown with other plants and are much harder to find and in consequence also more difficult to determine. It is therefore best to visit single habitats several times a year, which makes the harvesting easier and more reliable.

Index seminum annis 2024 collectorum

Jože Bavcon, Janja Makše, Blanka Ravnjak

CONIFEROPHYTINA
(Gymnospermae)

Cupressaceae

1. *Juniperus communis* L. XX-0-LJU-G-555-681
2. *Metasequoia glyptostroboides* Hu & W.C.Cheng XX-0-LJU-G-555-511

Pinaceae

3. *Picea abies* (L.) Karsten XX-0-LJU-G-555-996
4. *Pinus mugo* Turra SI-0-LJU-G-555-546
5. *Tsuga canadensis* (L.) Carriere XX-0-LJU-G-555-744

Taxaceae

6. *Taxus baccata* L. XX-1-LJU-G-555-1016

MAGNOLIOPHYTINA
(Angiospermae)

Acanthaceae

7. *Acanthus hungaricus* (Borbás) Baen. XX-0-LJU-G-555-289
8. *Ruellia strepens* L. XX-0-TUEB-1707

Aceraceae

9. *Acer palmatum* Thunb. XX-0-LJU-G-555-1224
10. *Acer pseudoplatanus* L. XX-O-LJU-G-555-634
11. *Acer tataricum* L. SI-1-LJU-G-844-293

Actinidiaceae

12. *Actinidia melanandra* Franch. XX-0-LJU-G-555-636

Aizoaceae

13. *Tetragonia tetragonioides* (Pall.) O.Kuntze XX-O-LJU-G-999-550

Alismataceae

14. *Alisma plantago-aquatica* L. SI-0-LJU-G-555-303

Alliaceae

15. *Allium angulosum* L. SI-1-LJU-G-555-304
16. *Allium ericetorum* Thore XX-0-LJU-G-555-638
17. *Allium tuberosum* Rottler ex Spreng. XX-0-LJU-G-999-308
18. *Allium ursinum* L. SI-0-LJU-G-555-309

Amaranthaceae

19. *Celosia argentea* L. var. *spicata* XX-0-MJG-19-37440
20. *Gomphrena globosa* L. XX-0-MJG-19-37470
21. *Pleuropetalum darwinii* Hook.f. AT-0-LJU-G-555-2282

Amaryllidaceae

22. *Galanthus nivalis* L. SI-1-LJU-G-555-426
23. *Leucojum vernum* L. XX-1-LJU-G-555-685

Anacardiaceae

24. *Schinus lentiscifolius* Marchand XX-0-LJU-G-555-1645
25. *Schinus polygama* (Cav.) Cabrera XX-GZU-YY-110232
26. *Toxicodendron vernicifluum* (Stokes) F.A.Barkley XX-0-LJU-G-555-283

Apiaceae

27. *Athamanta turbith* Brot. subsp. *haynaldii* (Borbás & Uechtr.) Tutin XX-0-LJU-G-555-645
28. *Conium maculatum* L. SI-1-LJU-G-555-268
29. *Eryngium amethystinum* L. SI-0-LJU-G-000-413
30. *Hacquetia epipactis* (Scop.) DC. SI-0-LJU-G-555-448
31. *Peucedanum cervaria* (L.) Lapeyr SI-0-LJU-N-017-193
32. *Peucedanum schotii* Besser SI-0-LJU-G-555-544
33. *Smyrnium perfoliatum* L. SI-0-LJU-G-555-599
34. *Torilis japonica* DC. XX-O-LJU-G-999-551

Apocynaceae

35. *Amsonia tabernaemontana* Walt. XX-0-LJU-G-555-317

Araceae

36. *Arum italicum* Mill. SI-0-LJU-G-555-327
37. *Arum maculatum* L. SI-0-LJU-G-555-954

38. *Calla palustris* L. SI-1-LJU-G-555-959

Arecaceae

39. *Livinstonia australis* (R.Br.) Mart. XX-O-LJU-G-999-545

Aristolochiaceae

40. *Aristolochia clematitis* L. XX-0-LJU-G-555-324

Asparagaceae

41. *Asparagus tenuifolius* Lam. SI-0-LJU-G-555-955

Asphodelaceae

42. *Aloe microstigma* subsp. *microstigma* Salm-Dyck XX-O-LJU-G-999-536
43. *Anthericum ramosum* L. SI-0-LJU-G-555-323
44. *Asphodeline liburnica* Rchb. SI-0-LJU-G-997-261
45. *Asphodeline lutea* (L.) Reichenb. SI-0-LJU-G-997-261

Asteraceae

46. *Anthemis tinctoria* L. RS-0-LJU-G-555-322
47. *Arctium lappa* L. SI-0-LJU-G-555-952
48. *Aster amellus* L. SI-0-LJU-G-002-329
49. *Bellis perennis* L. XX-0-LJU-G-555-262
50. *Buphthalmum salicifolium* L. XX-0-LJU-G-555-649
51. *Calendula officinalis* L. XX-0-LJU-G-555-344
52. *Carduus nutans* L. SI-0-LJU-G-001-354
53. *Carlina vulgaris* L. subsp. *brevibracteata* (Andrae) K. Werner SI-0-LJU-G-555-652
54. *Carthamus lanatus* L. XX-0-LJU-G-555-1620
55. *Centaurea cyanus* L. XX-1-LJU-G-555-360
56. *Chamomilla recutita* (L.) Rauschert XX-0-LJU-G-555-365
57. *Chrysanthemum coronarium* Schousb. XX-O-LJU-G-999-540
58. *Cirsium eriophorum* (L.) Scop. SI-0-LJU-G-555-371
59. *Cirsium pannonicum* (L. f.) Link SI-0-LJU-G-555-962
60. *Coreopsis grandiflora* Hogg ex Sweet XX-0-LJU-G-555-378
61. *Cosmos sulphureus* Cav. XX-0-LJU-G-555-383
62. *Echinops exaltatus* Schrader XX-0-LJU-G-555-2272
63. *Echinops sphaerocephalus* L. XX-0-LJU-G-555-1625
64. *Eupatorium cannabinum* L. SI-0-LJU-G-555-418
65. *Euthamia graminifolia* (L.) Nutt. XX-0-LJU-G-555-601
66. *Hieracium tomentosum* L. XX-0-LJU-G-555-459
67. *Inula ensifolia* L. SI-0-LJU-G-555-470
68. *Inula helenium* L. XX-0-LJU-G-555-471
69. *Inula hirta* L. SI-0-LJU-G-984-472
70. *Inula magnifica* Lipsky XX-0-LJU-G-555-473
71. *Leucanthemum ircutianum* (Turcz.) DC. SI-0-LJU-G-001-684

72. *Silphium integrifolium* Michx. XX-0-LJU-G-555-594
73. *Silphium perfoliatum* L. XX-0-LJU-G-555-595
74. *Silybum marianum* (L.) Gaertner XX-0-LJU-G-555-596
75. *Stemmacantha rhapontica* (L.) Dittrich SI-1-LJU-6-997-568
76. *Tagetes erecta* L. XX-0-LJU-G-555-286
77. *Tagetes tenuifolia* Cav. XX-0-LJU-G-555-608
78. *Tithonia tagetiflora* Desf. SI-0-LJU-G-003-743
79. *Verbesina helianthoides* Michx. XX-0-LJU-G-555-2058
80. *Xeranthemum cylindraceum* Sibth. & Smith XX-1-LJU-G-555-630
81. *Zinnia elegans* Jacq. XX-0-LJU-G-555-631

Betulaceae

82. *Alnus glutinosa* (L.) Gaertn. XX-0-LJU-G-555-640
83. *Alnus incana* (L.) Moench SI-0-LJU-G-016-1227
84. *Betula pubescens* Ehrh. SI-0-LJU-G-555-339

Boraginaceae

85. *Cerinthe minor* L. SI-0-LJU-G-019-1622
86. *Echium vulgare* L. SI-0-LJU-G-001-409
87. *Lithospermum officinale* L. SI-0-LJU-G-002-497
88. *Nonea lutea* DC. XX-0-LJU-G-555-989

Brassicaceae

89. *Alyssum montanum* L. subsp. *pluscanescens* (Raimann ex J. Baumg.) Trpin SI-1-LJU-G-000-316
90. *Alyssum ovirense* A. Kerner XX-0-LJU-G-555-2263
91. *Arabis caucasica* Willd. XX-O-LJU-G-999-556
92. *Arabis glabra* (L.) Bernh. XX-0-LJU-G-555-1618
93. *Aurinia sinuata* (L.) Griseb. XX-0-LJU-G-555-313
94. *Barbarea vulgaris* L. XX-0-LJU-G-555-957
95. *Berteroa incana* (L.) DC. XX-O-LJU-G-999-537
96. *Fibigia clypeata* (L.) Medik. HR-0-LJU-G-555-420
97. *Isatis tinctoria* L. XX-0-LJU-G-555-481
98. *Lunaria rediviva* L. SI-0-LJU-G-555-500
99. *Nasturtium officinale* R. Br. in Aiton XX-0-LJU-G-555-1635

Bromeliaceae

100. *Puya mirabilis* (Mez) L.B.Sm. XX-0-LJU-G-555-1641

Calycanthaceae

101. *Calycanthus chinensis* (W.C. Cheng & S.Y. Chang) W.C. Cheng & S.Y. Chang ex P.T.Li XX-0-LJU-G-555-597

Campanulaceae

102. *Campanula justiniana* Witasek SI-0-LJU-G-555-347
103. *Campanula patula* L. SI-0-LJU-G-555-348
104. *Campanula poscharskyana* Degen HR-0-LJU-G-555-350
105. *Campanula thyrsoides* L. SI-0-LJU-G-009-2035
106. *Campanula trachelium* L. SI-0-LJU-G-555-352
107. *Lobelia siphilitica* L. XX-0-LJU-G-555-498

Cannabaceae

108. *Cannabis sativa* L. DE-0-TUEB-11038

Caprifoliaceae

109. *Valeriana locusta* L. XX-0-LJU-G-555-620

Carpinaceae

110. *Carpinus orientalis* Mill. XX-0-LJU-G-555-653

Caryophyllaceae

111. *Agrostemma githago* L. XX-1-LJU-G-555-300
112. *Cerastium tomentosum* L. XX-0-LJU-G-555-1621
113. *Dianthus armeria* L. SI-1-LJU-G-000-395
114. *Dianthus balbisii* Ser. IT-0-LJU-G-555-2042
115. *Dianthus barbatus* L. XX-0-LJU-G-555-663
116. *Gypsophila paniculata* L. XX-0-LJU-G-555-978
117. *Lychnis coronaria* (L.) Desr. XX-0-LJU-G-555-691
118. *Lychnis flos-cuculi* L. SI-0-LJU-G-555-501
119. *Saponaria ocymoides* L. XX-0-LJU-G-555-2053
120. *Saponaria officinalis* L. XX-0-LJU-G-555-578
121. *Silene baccifera* Roth SI-1-LJU-6-997-565
122. *Vaccaria hispanica* (Mill.) Rauschert XX-0-BREMR-XXXX/4428

Celastraceae

123. *Celastrus orbiculatus* Thunb. XX-0-LJU-G-555-265
124. *Euonymus europaeus* L. SI-0-LJU-G-555-417

Cichoriaceae

125. *Hieracium aurantiacum* L. XX-0-LJU-G-555-457
126. *Hieracium pilosella* L. SI-0-LJU-G-001-460
127. *Leontodon hispidus* L. subsp. *brumatii* (Schiede ex Reichenb.) T. Wraber SI-0-LJU-G-555-488
128. *Leontodon hispidus* L. subsp. *danubialis* (Jacq). Simonkai SI-0-LJU-G-010-489

129. *Scorzonera austriaca* Willd. SI-0-LJU-N-017-235
130. *Tragopogon balcanicus* Velen. RS-0-LJU-G-998-615
131. *Tragopogon pratensis* L. SI-0-LJU-G-555-1019
132. *Tragopogon pterodes* Pančić RS-0-LJU-G-998-616

Cistaceae

133. *Helianthemum nummularium* (L.) Mill. XX-0-LJU-G-555-451

Colchicaceae

134. *Colchicum autumnale* L. SI-1-LJU-6-997-563

Convallariaceae

135. *Convallaria majalis* L. SI-1-LJU-G-555-377
136. *Polygonatum latifolium* (Jacq.) Desf. XX-1-LJU-G-555-549

Convolvulaceae

137. *Ipomoea purpurea* Roth XX-0-LJU-G-002-475

Cornaceae

138. *Cornus mas* L. SI-0-LJU-G-555-380

Costaceae

*139. *Costus dubius* (Afzel.) K.Schum. RO-0-LJU-G-009-1623

Crassulaceae

140. *Sedum maximum* (L.) Hoffm. SI-1-LJU-G-555-587
141. *Sedum sexangulare* L. SI-0-LJU-G-555-588

Cucurbitaceae

142. *Bryonia dioica* Jacq. XX-0-LJU-G-555-2266
143. *Ecballium elaterium* (L.) Rich. XX-1-LJU-G-555-406

Cyperaceae

144. *Carex limosa* L. SI-1-LJU-G-555-355
145. *Scirpus sylvaticus* L. SI-1-LJU-6-997-565

Datiscaceae

146. *Datisca cannabina* L. XX-0-LJU-G-555-390

Dioscoreaceae

147. *Dioscorea balcanica* Košanin SI-0-LJU-G-555-402

Dipsacaceae

148. *Cephalaria gigantea* (Ledeb.) Bobrov XX-0-LJU-G-555-361
149. *Dipsacus fullonum* L. SI-0-LJU-G-555-403
150. *Scabiosa graminifolia* L. SI-0-LJU-G-555-582
151. *Scabiosa lucida* Vill. SI-0-LJU-G-555-583
152. *Scabiosa ochroleuca* L. XX-O-LJU-G-999-552
153. *Succisa pratensis* Moench XX-0-LJU-G-555-2296
154. *Succisella inflexa* (Kluk) G.Beck SI-1-LJU-G-020-1647

Elaeagnaceae

155. *Elaeagnus multiflora* Thunb. XX-0-LJU-G-555-667

Euphorbiaceae

156. *Manihot palmata* Mull. Arg. XX-0-LJU-G-555-1633
157. *Ricinus communis* L. XX-0-LJU-G-555-724

Fabaceae

158. *Coronilla scorpioides* (L.) Koch SI-1-LJU-6-997-564
159. *Desmodium canadense* (L.) DC. XX-0-LJU-G-555-271
160. *Laburnum anagyroides* Medik. SI-0-LJU-G-555-484
161. *Trigonella caerulea* (L.)Ser. XX-O-LJU-G-999-553
162. *Trigonella gladiata* Stev. XX-O-LJU-G-999-552

Fumariaceae

163. *Corydalis cava* (L.) Schweigger & Koerte SI-0-LJU-G-555-381
164. *Corydalis solida* (L.) Clairv. SI-0-LJU-G-555-382

Gentianaceae

165. *Centaurium erythraea* Rafn XX-0-LJU-G-555-657

Geraniaceae

166. *Erodium cicutarium* (L.) L'Her. SI-0-LJU-G-555-971
167. *Geranium macrorrhizum* L. SI-0-LJU-G-555-433
168. *Geranium phaeum* L. SI-0-LJU-G-555-434
169. *Geranium pratense* L. XX-0-LJU-G-555-2274

170. *Geranium robertianum* L. SI-0-LJU-G-555-436

Globulariaceae

171. *Globularia punctata* Lapeyr. SI-0-LJU-G-003-442

Hamamelidaceae

172. *Hamamelis virginiana* L. XX-0-LJU-G-555-275

Hyacinthaceae

173. *Belllevalia romana* (L.) Reichenb. SI-1-LJU-G-555-335
174. *Bowiea volubilis* Harv. ex T.Moore & Mast. XX-0-LJU-G-555-341
175. *Muscari botryoides* (L.) Miller SI-1-LJU-G-555-988
176. *Muscari comosum* (L.) Miller SI-1-LJU-G-555-519
177. *Muscari neglectum* Guss. ex Ten. XX-1-LJU-G-555-520

Hydrophyllaceae

178. *Nemophila maculata* Benth. ex Lindl. XX-0-LJU-G-555-523

Hypericaceae

179. *Hypericum kalmianum* L. XX-0-LJU-G-555-463
180. *Hypericum olympicum* L. XX-0-LJU-G-555-464
181. *Hypericum perforatum* L. SI-0-LJU-G-555-465
182. *Hypericum tetrapterum* Fries SI-0-LJU-G-555-466

Iridaceae

183. *Crocus tommasinianus* Herb. XX-O-LJU-G-999-541
184. *Crocus vernus* (L.) Hill SI-0-LJU-G-555-387
185. *Crocus weldenii* Hoppe & Fürnr. IT-0-LJU-G-001-388
186. *Iris pallida* Lam. SI-0-LJU-G-555-477
187. *Iris sibirica* L. subsp. *erirrhiza* (Pospichal) T. Wraber SI-1-LJU-G-555-479
188. *Sisyrinchium bermudiana* L. SI-0-LJU-G-555-598

Juglandaceae

189. *Carya cordiformis* (Wangenh.) K.Koch XX-0-LJU-G-555-654
190. *Juglans cinerea* L. XX-0-LJU-G-555-679
191. *Juglans nigra* L. XX-0-LJU-G-555-680
192. *Pterocarya fraxinifolia* (Lam.) Spach XX-O-LJU-G-555-557

Lamiaceae

193. *Agastache mexicana* (Kunth) Lint & Epling XX-O-LJU-G-999-535
194. *Ballota rupestris* (Biv.) Vis. XX-1-LJU-G-555-334

195. *Betonica officinalis* L. SI-0-LJU-G-555-336
196. *Betonica officinalis* L. subsp. *serotina* (Host) Hayek SI-0-LJU-G-555-337
197. *Callicarpa giraldii* Hesse ex Rehder XX-0-LJU-G-555-345
198. *Clinopodium dalmaticum* (Benth.) Bräuchler & Heubl XX-0-LJU-G-000-512
199. *Clinopodium vulgare* L. XX-0-LJU-G-555-2268
200. *Horminum pyrenaicum* L. XX-1-LJU-G-555-675
201. *Lavandula angustifolia* Mill. SI-0-LJU-G-555-487
202. *Lycopus europaeus* L. SI-0-LJU-G-555-503
203. *Melissa officinalis* L. SI-0-LJU-G-555-278
204. *Mentha aquatica* L. XX-0-LJU-G-555-695
205. *Mentha pulegium* L. SI-0-LJU-G-555-510
206. *Nepeta nuda* L. subsp. *nuda* SI-0-LJU-G-555-524
207. *Origanum vulgare* L. SI-0-LJU-G-555-991
208. *Phlomis fruticosa* L. XX-0-TUEB-660
209. *Phlomis tuberosa* L. XX-0-LJU-G-555-545
210. *Salvia verticillata* L. SI-0-LJU-G-555-577
211. *Scutellaria altissima* L. SI-1-LJU-G-555-586
212. *Teucrium arduini* L. XX-0-LJU-G-555-612
213. *Teucrium chamaedrys* L. SI-0-LJU-G-555-613
214. *Teucrium scorodonia* L. SI-1-LJU-6-997-569

Liliaceae

215. *Hosta ventricosa* Stearn XX-0-LJU-G-555-981

Linaceae

216. *Linum usitatissimum* L. SI-0-LJU-G-555-276

Lythraceae

217. *Lythrum salicaria* L. SI-0-LJU-G-555-505

Malvaceae

*218. *Gossypium arboreum* L. XX-0-LJU-G-555-446
*219. *Gossypium hirsutum* L. XX-0-LJU-G-555-445
220. *Hibiscus coccineus* Walter XX-0-LJU-G-555-455
221. *Hibiscus sabdariffa* L. XX-0-LJU-G-555-674
222. *Lagunaria patersonia* (Andrews) G.Don XX-GZU-83-110127
*223. *Pavonia spinifex* Cav. XX-0-LJU-G-555-541

Martyniaceae

224. *Proboscidea louisianica* (Mill.) Thell. XX-0-LJU-G-555-720

Melanthiaceae

225. *Veratrum album* L. XX-0-LJU-G-555-746

Meliaceae

226. *Melia azedarach* L. XX-0-LJU-G-555-509

Mimosaceae

227. *Leucaena leucocephala* (Lam.) de Wit XX-GZU-YY-110257
*228. *Mimosa pudica* L. XX-0-LJU-G-555-513

Moraceae

229. *Maclura pomifera* (Rafin.) C.K. Schneider XX-0-LJU-G-555-692

Myrtaceae

230. *Callistemon citrinus* (Curtis) Skeels XX-0-LJU-G-555-1619

Nyctaginaceae

231. *Mirabilis jalapa* L. XX-0-LJU-G-555-514
232. *Oxybaphus nyctagineus* (Michx.) Sweet XX-0-LJU-G-555-515

Oleaceae

233. *Fraxinus ornus* L. SI-0-LJU-G-555-423

Onagraceae

234. *Circaea lutetiana* L. XX-0-LJU-G-555-2267
235. *Oenothera biennis* L. XX-0-LJU-G-555-990
236. *Oenothera gaura* W.L. Wagner& Hoch XX-0-LJU-G-555-432

Paeoniaceae

237. *Paeonia daurica* Andrews subsp. *wittmanniana* (Hartwiss ex Lindl.) D.Y. Hong XX-0-LJU-G-555-707
238. *Paeonia romanica* Brandz. XX-0-LJU-G-555-536

Papaveraceae

239. *Eschscholzia californica* Cham. XX-0-LJU-G-555-416
240. *Glaucium flavum* Crantz XX-0-MJG-19-69540
241. *Papaver rhoeas* L. SI-0-LJU-G-555-537

Phytolaccaceae

*242. *Rivina humilis* L. XX-0-LJU-G-555-725

*243. *Trichostigma peruvianum* (Moq.) H. Walter XX-O-LJU-G-999-550

Plantaginaceae

244. *Plantago lanceolata* L. SI-0-LJU-G-001-997

Plumbaginaceae

245. *Limonium coriarium* H. Arnaud XX-0-LJU-G-555-985

Poaceae

246. *Achnatherum calamagrostis* (L.) P.Beauv XX-0-LJU-G-555-635
247. *Andropogon gerardii* Vitman US-0-NGOET-337
248. *Brachypodium sylvaticum* (Huds.) P. Beauv. SI-0-LJU-G-555-342
249. *Briza maxima* L. XX-O-LJU-G-999-538
250. *Deschampsia caespitosa* (L.) P. Beauv. SI-0-LJU-G-002-1242
251. *Holcus lanatus* L. AT-0-SEU-2016-630
252. *Melica ciliata* L. SI-0-LJU-G-555-987
253. *Melica uniflora* Retz. XX-O-LJU-G-999-547
254. *Molinia caerulea* (L.) Moench SI-1-LJU-6-997-563
255. *Sesleria autumnalis* (Scop.) F.W.Schultz SI-0-LJU-G-009-590
256. *Sesleria wettsteinii* Dörfl. & Hayek XX-O-LJU-G-999-557

Portulacaceae

257. *Calandrinia compressa* Schrad. ex DC. AT-0-LJU-G-555-958

Primulaceae

258. *Anagalis arvensis* L. XX-0-LJU-G-555-318
259. *Hottonia palustris* L. SI-1-LJU-G-555-1627
260. *Lysimachia vulgaris* L. XX-0-LJU-G-555-504
261. *Primula vulgaris* Hudson SI-0-LJU-G-555-1003

Ranunculaceae

262. *Actaea spicata* L. SI-0-LJU-G-019-2261
263. *Anemone apennina* L. XX-0-LJU-G-555-1229
264. *Anemone ranunculoides* L. SI-0-LJU-G-555-320
265. *Caltha palustris* L. SI-0-LJU-G-555-346
266. *Clematis integrifolia* L. XX-0-LJU-G-555-1238
267. *Clematis recta* L. SI-0-LJU-G-555-374
268. *Consolida ajacis* (L.) Schur XX-0-LJU-G-555-2037
269. *Eranthis hyemalis* (L.) Salisb. SI-1-LJU-G-555-411
270. *Eriocapitella hupehensis* (Lemoine) Christenh. & Byng XX-0-LJU-G-555-319
271. *Helleborus niger* L. SI-1-LJU-N-017-139-142

272. *Helleborus odorus* Waldst. & Kit. XX-1-LJU-G-998-2046
273. *Nigella damascena* L. XX-0-LJU-G-555-701
274. *Pulsatilla nigricans* Ströck. XX-1-LJU-G-555-2285
275. *Ranunculus millefoliatus* Vahl XX-0-LJU-G-555-564
276. *Thalictrum minus* L. SI-0-LJU-G-555-1017

Rosaceae

277. *Agrimonia eupatoria* L. SI-0-LJU-G-009-299
278. *Cotoneaster affinis* Lindl. XX-0-LJU-G-555-2039
279. *Cotoneaster bullatus* Bois. XX-0-LJU-G-555-384
280. *Crataegus laevigata* (Poir.) DC XX-0-LJU-G-555-1240
281. *Crataegus monogyna* Jacq. XX-0-LJU-G-555-966
282. *Crataegus pedicellata* Sarg. XX-0-LJU-G-555-385
283. *Filipendula vulgaris* Moench SI-0-LJU-N-019-1098
284. *Fragaria vesca* L. SI-0-LJU-G-555-422
285. *Neillia tanakae* (Franch. & Sav.) Franch. & Sav. ex S.H.Oh XX-0-LJU-G-555-605
286. *Potentilla rupestris* L. XX-0-LJU-G-555-552
287. *Prunus mahaleb* L. SI-1-LJU-6-997-564
288. *Prunus tenella* Batsch XX-0-LJU-G-555-554
289. *Pyrus nivalis* Jacq. XX-1-LJU-G-555-1263
290. *Rhaphiolepis umbellata* (Thunb.) Makino XX-GZU-YY-110258
291. *Rhodotypos scandens* (Thunb.) Makino XX-0-LJU-G-555-565
292. *Rosa canina* L. SI-0-LJU-G-013-2287
293. *Rosa glauca* Pourr. non Vill. SI-0-LJU-G-555-568
294. *Rosa pendulina* L. SI-0-LJU-G-555-569
295. *Rosa sempervirens* L. SI-0-LJU-G-555-572

Rubiaceae

296. *Sherardia arvensis* L. SI-1-LJU-6-997-567

Rutaceae

297. *Citrus trifoliata* L. XX-0-LJU-G-555-550
298. *Phellodendron amurense* Rupr. XX-0-LJU-G-555-280
299. *Ruta graveolens* L. XX-0-LJU-G-555-1643
300. *Zanthoxylum americanum* Mill. XX-0-LJU-G-555-2059
301. *Zanthoxylum simulans* Hance XX-0-LJU-G-555-287

Scrophulariaceae

302. *Digitalis grandiflora* Miller XX-0-LJU-G-555-401
303. *Digitalis laevigata* Waldst. & Kit. XX-0-LJU-G-555-2270
304. *Digitalis lanata* Ehrh. XX-O-LJU-G-999-542
305. *Digitalis lutea* L. RU-0-LJU-G-022-2271
306. *Digitalis purpurea* L. XX-O-BHU-2022-0230
307. *Erinus alpinus* L. XX-0-LJU-G-555-412
308. *Misopates orontium* (L.) Rafin. XX-0-LJU-G-555-516

309. *Penstemon barbatus* (Cav.) Roth XX-O-LJU-G-999-549
310. *Penstemon hirsutus* (L.) Willd. XX-O-LJU-G-999-548
311. *Verbascum nigrum* L. XX-O-LJU-G-999-554
312. *Verbascum phlomoides* L. XX-O-LJU-G-999- 555
313. *Veronica spicata* L. subsp. *spicata* IT-0-JENA-7043337-10
314. *Veronica teucrium* L. DE-O-NGOET-3950
315. *Veronicastrum virginicum* (L.) Farw. XX-0-LJU-G-555-625

Solanaceae

316. *Atropa bella-donna* L. XX-0-LJU-G-555-646
317. *Datura metel* L. f. *inermis* XX-0-LJU-G-555-392
318. *Nicandra physalodes* (L.) Gaertn. XX-0-LJU-G-555-525
319. *Nicotiana rustica* L. SI-0-LJU-G-003-526
320. *Nicotiana tabacum* L. XX-0-LJU-G-555-527
321. *Physalis ixocarpa* Brot. Ex Hornem XX-0-LJU-G-555-995

Staphyleaceae

322. *Staphylea pinnata* L. SI-0-LJU-G-555-604

Ulmaceae

323. *Celtis occidentalis* L. XX-0-LJU-G-555-656
324. *Zelkova carpinifolia* (Pall.) Dippel XX-0-LJU-G-555-288

Urticaceae

325. *Parietaria officinalis* L. XX-0-LJU-G-555-538

Valerianaceae

326. *Valeriana officinalis* L. XX-0-LJU-G-555-745

Verbenaceae

327. *Lantana camara* L. XX-0-LJU-G-555-485
328. *Vitex agnus-castus* L. XX-1-LJU-G-555-629

* Semina plantarum in caladariis cultarum.

Horti praefectus: dr. Jože Bavcon
Seminum Curator, hortulana: Janja Makše
Plantae Curator: dr. Blanka Ravnjak

Semina e plantis spontaneis in loco natali anno 2024

Jože Bavcon, Janja Makše, Blanka Ravnjak, Igor Dakskobler, Ljudmila Dakskobler

329. *Achnatherum calamagrostis* (L.) PB. - Vrsno, 2024, L. D., I. D., SI-1-LJU-6 -997-570
330. *Acinosalpinus* (L.) Moench - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-571
331. *Allium carinatum* L. subsp. *pulchellum* Bonnier & Layens - Gorenja Trebuša Travno brdo, 2024, L. D., I. D., SI-1-LJU-6-997-574
332. *Allium ericetorum* Thore - Kavčiče, 2024, J. B., B. R., SI-1-LJU-6-997-572
333. *Allium senescens* L. - Kavčiče, 2024, J. B., B. R., SI-1-LJU-6-997-573
334. *Anacamptis pyramidalis* (L.) Rich. - Ocizla, 2024, L. D., I. D., SI-1-LJU-6-997-575
335. *Anemone nemorosa* L. - Šmartinsko jezero, 2024, B. R., SI-1-LJU-6-997-576
336. *Anthericum ramosum* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-577
337. *Anthericum ramosum* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-578
338. *Anthyllis vulneraria* L. - Mačkovec, 2024, J. M., SI-1-LJU-6-997-579
339. *Anthyllis vulneraria* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-580
340. *Arabis glabra* (L.) Bernh. - Ruska jama, 2024, J. B., B. R., SI-1-LJU-6-997-581
341. *Arabis pauciflora* (Grimm) Gracke - Črna prst, 2024, I. D., L. D., SI-1-LJU-6-997-679
342. *Arabis sagittata* (Bertol.) DC. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-583
343. *Arabis sagittata* (Bertol.) DC. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-584
344. *Arabis turrita* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-582
345. *Arthrocnemum macrostachyum* (Moric.) Moris f. *chenopodiaceae* - Koper, 2024, J. B., SI-1-LJU-6-997-585
346. *Aster alpinus* L. - Plaski Kuk, 2024, L. D., I. D., SI-1-LJU-6-997-586
347. *Aster tripolium* L. - Koper, 2024, J. B., SI-1-LJU-6-997-587
348. *Astragalus carniolicus* A.Kern. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-588
349. *Astrantia major* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-589
350. *Betonica alopecuros* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-591
351. *Betonica officinalis* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-590
352. *Buglossoides purpureocaerulea* I. M. Johnst. - Dragonja, 2024, J. B., B. R., SI-1-LJU-6-997-592
353. *Buphthalmum salicifolium* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-593
354. *Calamagrostis epigejos* (L.) Roth - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-594
355. *Carduus nutans* L. - Ruska jama, 2024, J. B., B. R., SI-1-LJU-6-997-595
356. *Carex capillaris* L. - Plazijanski Vršac, 2024, L. D., I. D., SI-1-LJU-6-997-596
357. *Carlina acaulis* L. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-598
358. *Carlina vulgaris* L. subsp. *brevibracteata* (Andrae) K. Werner - Dragonja, 2024, J. B., B. R., SI-1-LJU-6-997-597
359. *Centaurea scabiosa* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-599
360. *Centaurium erythraea* Rafn - Ocizla, 2024, L. D., I. D. SI-1-LJU-6-997-600
361. *Cephalaria leucantha* (L.) Roemer & Schultes - Štivan, 2024, L. D., I. D., SI-1-LJU-6-997-601

362. *Cirsium arvense* (L.) Scop. - Kucelj, 2024, J. B., B. R.,SI-1-LJU-6-997-603
363. *Cirsium eriophorum* (L.) Scop. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-604
364. *Cirsium pannonicum* (L. f.) Link - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-602
365. *Clematis flammula* L. - Štivan, 2024, L. D., I. D., SI-1-LJU-6-997-606
366. *Clematis vitalba* L. - Strma Reber, 2024, J. B., B. R., SI-1-LJU-6-997-605
367. *Colchicum autumnale* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-607
368. *Colutea arborescens* L. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-608
369. *Colutea arborescens* L. - Beka - Trenka, 2024, L. D., I. D., SI-1-LJU-6-997-609
370. *Cotinus coggygria* Scop. - Piran, 2024, J. K., SI-1-LJU-6-997-610
371. *Cotinus cogyggria* Scop. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-611
372. *Daucus carota* L. - Lijak, 2024, J. B., SI-1-LJU-6-997-612
373. *Dianthus sanguineus* Vis. - Ocizla, 2024, L. D., I. D., SI-1-LJU-6-997-615
374. *Dianthus tergestinus* (Rchb.) Kerner - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-613
375. *Dianthus tergestinus* (Rchb.) Kerner - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-614
376. *Dianthus tergestinus* (Rchb.) Kerner - Beka, Griža, 2024, L. D., I. D., SI-1-LJU-6-997-616
377. *Digitalis grandiflora* Miller - Kavčiče, 2024, J. B., B. R., SI-1-LJU-6-997-617
378. *Doronicum austriacum* Jacq. - Poljane pri Mirni Peči, 2024, J. M., SI-1-LJU-6-997-618
379. *Dorycnium germanicum* (Gremli) Rikli - Ruska jama, 2024, J. B., B. R., SI-1-LJU-6-997-619
380. *Epimedium alpinum* L. - Poljane pri Mirni Peči, 2024, J. M., SI-1-LJU-6-997-620
381. *Epipactis atrorubens* (Hoffm.ex Bernh.) Besser - Kucelj, Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-622
382. *Epipactis palustris* (L.) Crantz - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-621
383. *Epipactis palustris* (L.) Crantz - Gorenja Trebuša, Ostrožnik, 2024, L. D., I. D. SI-1-LJU-6-997-623
384. *Eryngium amethystinum* L. - Sela nad Podmelcem, 2024, L. D., I. D., SI-1-LJU-6-997-624
385. *Erythronium dens-canis* L. - Korada, 2024, J. M., SI-1-LJU-6-997-625
386. *Eupatorium cannabinum* L. - Čaven, Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-626
387. *Filipendula vulgaris* Moench. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-627
388. *Fraxinus ornus* L. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-628
389. *Fritillaria meleagris* L. - Ljubljansko barje, 2024, J. M., SI-1-LJU-6-997-629
390. *Galeopsis pubescens* Besser - Podsreda; južno vznožje hriba Bukovica, 2024, A. P., SI-1-LJU-6-997-630
391. *Galium verum* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-631
392. *Genista tinctoria* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-632
393. *Gentiana clusii* Perr. & Song. - Plazijanski Vršac, 2024, L. D., I. D. SI-1-LJU-6-997-633
394. *Geranium phaeum* L. - Poljane pri Mirni Peči, 2024, J. M., SI-1-LJU-6-997-634
395. *Gladiolus illyricus* Koch - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-635
396. *Gladiolus illyricus* Koch - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-636
397. *Gladiolus illyricus* Koch - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-637
398. *Globularia cordifolia* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-639
399. *Globularia cordifolia* L. - Plazijanski Vršac, 2024, L. D., I. D., SI-1-LJU-6-997-642
400. *Globularia cordifolia* L. - Kavčiče, Rakitovec 2024, J. B., B. R., SI-1-LJU-6-997-643
401. *Globularia nudicaulis* L. - Plazijanski Vršac, 2024, L. D., I. D., SI-1-LJU-6-997-641

402. *Globularia punctata* Lapeyr. - Brege, 2024, J. B., B. R., SI-1-LJU-6-997-638
403. *Globularia punctata* Lapeyr. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-640
404. *Globularia punctata* Lapeyr. - Rakitovec, 2024, J. B., B. R., SI-1-LJU-6-997-644
405. *Gymnadenia conopsea* (L.) R. Br. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-645
406. *Gymnadenia conopsea* (L.) R. Br. - Roje, 2024, K. M., J. K., SI-1-LJU-6-997-744
407. *Gymnadenia conopsea* (L.) R. Br. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-646
408. *Gymnadenia conopsea* (L.) R. Br. - Strunjan, 2024, L. D., I. D., SI-1-LJU-6-997-647
409. *Helianthemum nummularium* (L.) Mill. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-648
410. *Helleborus atrorubens* Waldst. & Kit. - Poljane pri Mirni Peči, 2024, J. M., SI-1-LJU-6-997-650
411. *Helleborus niger* L. - Rodne, 2024, J. B., B. R., SI-1-LJU-6-997-649
412. *Hemerocallis lilioasphodelus* L. - Gorenja Trebuša, Ostrožnik, 2024, L. D., I. D., SI-1-LJU-6-997-651
413. *Himantoglossum adriaticum* H. Baumann - Strunjan, 2024, L. D., I. D., SI-1-LJU-6-997-652
414. *Hypericum perforatum* L. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-653
415. *Hypochoeris maculata* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-654
416. *Inula conyza* L. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-656
417. *Inula conyza* L. - Rakitovec, 2024, J. B., B. R., SI-1-LJU-6-997-659
418. *Inula ensifolia* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-655
419. *Inula ensifolia* L. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-658
420. *Inula spiraeifolia* L. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-657
421. *Iris sibirica* L. subsp. *erirrhiza* (Pospichal) T. Wraber - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-660
422. *Iris sibirica* L. subsp. *erirrhiza* (Pospichal) T. Wraber - Jalovnik, 2024, L. D., I. D., SI-1-LJU-6-997-661
423. *Juniperus oxycedrus* L. - Dragonja, 2024, J. B., B. R., SI-1-LJU-6-997-662
424. *Lamium purpureum* L. - Šentjurij na Dolenjskem, 2024, J. M., SI-1-LJU-6-997-663
425. *Laserpitium latifolium* L. - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-664
426. *Laserpitium latifolium* L. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-666
427. *Laserpitium peucedanoides* L. - Plazijanski Vršac, 2024, L. D., I. D., SI-1-LJU-6-997-665
428. *Leontopodium alpinum* Cass. - Bavški Grintavec, 2024, L. D., I. D., SI-1-LJU-6-997-667
429. *Leucojum vernum* L. - Šmartinsko jezero, 2024, B. R., SI-1-LJU-6-997-668
430. *Ligusticum sequieri* (Jacq.) Koch - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-669
431. *Ligusticum sequieri* (Jacq.) Koch - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-670
432. *Linum tenuifolium* L. - Preloke, Kolpa, 2024, J. B., B. R., SI-1-LJU-6-997-672
433. *Linum viscosum* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-671
434. *Linum viscosum* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-673
435. *Lunaria rediviva* L. - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-674
436. *Marrubium incanum* Desr. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-675
437. *Melica ciliata* L. - Ruska jama, 2024, J. B., B. R., SI-1-LJU-6-997-676
438. *Mycelis muralis* H. Baumann - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-677
439. *Ophrysapifera* Huds. – Škocjan 2024, J. B., SI-1-LJU-6-997-745
440. *Orchis militaris* L. - Roje - Vižmarje, 2024, K. M., J. K., SI-1-LJU-6-997-743
441. *Orchis morio* L. - Brege, 2024, J. B., B. R., SI-1-LJU-6-997-742

442. *Orchis purpurea* Huds. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-678
443. *Orchis purpurea* Huds. - Strunjan, 2024, L. D., I. D., SI-1-LJU-6-997-679
444. *Origanum vulgare* L. - Strma Reber, 2024, J. B., B. R., SI-1-LJU-6-997-680
445. *Ornithogalum pyrenaicum* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-681
446. *Ornithogalum pyrenaicum* L. - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-682
447. *Ornithogalum pyrenaicum* L. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-683
448. *Paederota lutea* Scop. - Plazijanski Vršac, 2024, L. D., I. D., SI-1-LJU-6-997-684
449. *Paeonia officinalis* L. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-685
450. *Paliurus spina-christi* Mill. - Štivan, 2024, L. D., I. D., SI-1-LJU-6-997-686
451. *Pedicularis hacquetii* Graf ex Hoppe - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-687
452. *Peucedanum oreoselinum* (L.) Moench - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-688
453. *Plantago holosteum* Scop. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-690
454. *Plantago maritima* L. - Piran, 2024, J. K., SI-1-LJU-6-997-689
455. *Polygonatum multiflorum* (L.) All. - Šmartinsko jezero, 2024, B. R., SI-1-LJU-6-997-691
456. *Populus nigra* L. - Ljubljana-Moste, ob Ljubljanici 2024, J. M., SI-1-LJU-6-997-692
457. *Primula auricula* L. - Plešivec nad Trento, 2024, L. D., I. D., SI-1-LJU-6-997-693
458. *Prospero elisae* Speta - Dragonja, 2024, J. B., SI-1-LJU-6-997-694
459. *Prunella laciniata* (L.) L. - Ruska jama, 2024, J. B., B. R., SI-1-LJU-6-997-696
460. *Prunella vulgaris* L. - Roje, 2024, J. B., B. R., SI-1-LJU-6-997-695
461. *Pulsatilla nigricans* Ströck. - Žadovinek, 2024, J. B., SI-1-LJU-6-997-697
462. *Pulsatilla nigricans* Ströck. - Brege, 2024, J. B., SI-1-LJU-6-997-698
463. *Quercus cerris* L. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-699
464. *Rhododendron ferrugineum* L. - Plešivec nad Trento, 2024, L. D., I. D., SI-1-LJU-6-997-700
465. *Rhododendron hirsutum* L. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-701
466. *Rhodothamnus chamaecistus* (L.) Reichenb. - Plazijanski Vršac, 2024, L. D., I. D., SI-1-LJU-6-997-702
467. *Rosa pimpinellifolia* L. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-703
468. *Rosa rubiginosa* L. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-704
469. *Ruscus aculeatus* L. - Lijak, 2024, J. B., SI-1-LJU-6-997-705
470. *Ruta divaricata* Ten. - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-706
471. *Ruta divaricata* Ten. - Beka,Griža, 2024, L. D., I. D., SI-1-LJU-6-997-707
472. *Salvia pratensis* L. - Poljane pri Mirni Peči, 2024, J. M., SI-1-LJU-6-997-708
473. *Salvia pratensis* L. - Hmeljčič, 2024, J. M., SI-1-LJU-6-997-709
474. *Satureja montana* L. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-710
475. *Satureja subspicata* Bartl. ex Vis. subsp. *liburnica* Šilić. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-711
476. *Saxifraga crustata* Vest - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-712
477. *Scabiosa graminifolia* L. - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-713
478. *Scrophularia juratensis* Schleicher - Sočerga, 2024, J. B., B. R., SI-1-LJU-6-997-714
479. *Scrophularia juratensis* Schleicher - Plazijanske Lope, 2024, L. D., I. D., SI-1-LJU-6-997-715
480. *Sempervivum tectorum* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-716
481. *Serratula lycopifolia* (Vill.) A. Kerner - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-717
482. *Serratula tinctoria* L. - Porezen, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-718
483. *Serratula tinctoria* L. - pobočje Vel. Špice nad vasjo Pečice, 2024, A. P., SI-1-LJU-6-

997-719

484. *Sesleria autumnalis* (Scop.) F. W. Schultz - Strma Reber, 2024, J. B., B. R., SI-1-LJU-6-997-720
485. *Silene hayekiana* Hand.-Mazz & Janchen - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-721
486. *Smilax aspera* L. - Dragonja, 2024, J. B., B. R., SI-1-LJU-6-997-722
487. *Smyrnium perfoliatum* L. - Rakitovec, 2024, J. B., B. R., K. M., SI-1-LJU-6-997-723
488. *Smyrnium perfoliatum* L. - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-724
489. *Sparganium neglectum* Beeby - Beka, 2024, L. D., I. D., SI-1-LJU-6-997-725
490. *Spiranthes spiralis* (L.) Chevall. - Beka, 2024, L. D. I. D., SI-1-LJU-6-997-726
491. *Stachys recta* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-727
492. *Stachys sylvatica* L. - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-728
493. *Tamus communis* L. - Dragonja, 2024, J. B., B. R., SI-1-LJU-6-997-729
494. *Thalictrum aquilegiifolium* L. - Čaven, Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-731
495. *Thalictrum aquilegiifolium* L. - Kavčiče, 2024, J. B., B. R., SI-1-LJU-6-997-732
496. *Thalictrum lucidum* L. - Podsreda, 2024, A. P., SI-1-LJU-6-997-733
497. *Thalictrum minus* L. - Kucelj, 2024, J. B., B. R., SI-1-LJU-6-997-730
498. *Tragopogon dubius* Scop. - Padovo, Osilnica, 2024, J. B., B. R., SI-1-LJU-6-997-734
499. *Trifolium aureum* Pollich - Podbrdo, Rajhova, 2024, L. D., I. D., SI-1-LJU-6-997-735
500. *Trifolium rubens* L. - Rakitovec, 2024, J. B., B. R., SI-1-LJU-6-997-736
501. *Tussilago farfara* L. - Rodne, 2024, J. B., B. R., SI-1-LJU-6-997-737
502. *Ulmus laevis* Pallas U. effusa Willd. - Ljubljana-Kodeljevo, ob Ljubljanici, 2024, J. M., SI-1-LJU-6-997-738
503. *Verbascum blattaria* L. - Ocizla, 2024, L. D., I. D., SI-1-LJU-6-997-739
504. *Veronica barrelieri* Schott ex Roem. & Schult. - Arbišče (Dabler - Zakraj), 2024, L. D., I. D., SI-1-LJU-6-997-741
505. *Veronica jacquinii* Baumg. - Čaven, 2024, J. B., B. R., SI-1-LJU-6-997-740

Collectors of the wild seeds:
dr. Jože Bavcon (J. B.)
dr. Igor Dakskobler (I. D.)
Ljudmila Dakskobler (L. D.)
Janja Makše (J. M.)
dr. Blanka Ravnjak (B. R.)

A few seed species are collected by:
Jure Kališnik (J. K.)
Katja Malovrh (K. M.)
Andrej Podobnik (A. P.)

Semina in horto alpino Juliana Museum historiae naturalis Sloveniae anno 2024 lecta

Špela Pungaršek, Monika Poklukar in Klemen Završnik

506. *Adenophora liliifolia* (L.) A. DC.
507. *Alchemilla vulgaris* agg.
508. *Allium lusitanicum* Lam.
509. *Angelica sylvestris* L.
510. *Anthericum ramosum* L.
511. *Aquilegia nigricans* Baumg.
512. *Aquilegia vulgaris* L.
513. *Aruncus dioicus* (Walter) Fernald
514. *Astrantia major* subsp. *major* L.
515. *Betonica alopecuros* L.
516. *Buphthalmum salicifolium* L.
517. *Campanula glomerata* L.
518. *Carlina acaulis* L.
519. *Centaurea alpina* L. (syn. *Rhaponticoides alpina* (L.) M.V.Agab. & Greuter)
520. *Centaurea scabiosa* subsp. *scabiosa* L.
521. *Cephalaria leucantha* (L.) Schrad.
522. *Crepis slovenica* Holub (syn. *Crepis froelichiana* subsp. *dinarica* (Beck) Gutermann)
523. *Dianthus barbatus* subsp. *barbatus* L.
524. *Dianthus carthusianorum* subsp. *carthusianorum* L.
525. *Dianthus sternbergii* Sieber
526. *Digitalis grandiflora* Mill.
527. *Echinops ritro* subsp. *ruthenicus* (M.Bieb.) Nyman
528. *Erigeron acris* L.
529. *Eryngium alpinum* L.
530. *Eupatorium cannabinum* L.
531. *Gentiana asclepiadea* L.
532. *Gentiana lutea* subsp. *symphyandra* Murb.
533. *Geum rivale* L.
534. *Gladiolus illyricus* W.D.J.Koch
535. *Hemerocallis lilioasphodelus* L.
536. *Hypericum perforatum* L.
537. *Iris sibirica* subsp. *sibirica* L.
538. *Laserpitium archangelica* Wulfen
539. *Laserpitium latifolium* L.
540. *Lathyrus occidentalis* var. *montanus* (Scop.) Fritsch (syn. *Lathyrus laevigatus* subsp. *occidentalis* (Fisch. & C.A.Mey.) Breistr.)
541. *Lathyrus vernus* (L.) Bernh.
542. *Leontodon hispidus* L.
543. *Libanotis sibirica* (L.) C. A. Meyer subsp. *montana* (Crantz) P. W. Ball *(Seseli*

libanotis W.D.J.Koch)
544. *Ligusticum lucidum* Mill.
545. *Linum flavum* L.
546. *Lythrum salicaria* L.
547. *Mentha longifolia* subsp. *longifolia* (L.) L.
548. *Molinia arundinacea* Schrank
549. *Paeonia officinalis* L.
550. *Peucedanum oreoselinum* Moench
551. *Peucedanum verticillare* Spreng.
552. *Rhododendron hirsutum* L.
553. *Ruta graveolens* L.
554. *Sanguisorba officinalis* L.
555. *Satureja montana* subsp. *variegata* (Host) P.W.Ball
556. *Satureja subspicata* subsp. *liburnica* Šilic
557. *Saxifraga hostii* Tausch
558. *Scabiosa hladnikiana* Host (syn. *Scabiosa cinerea* subsp. *hladnikiana* (Host) Jasiewicz)
559. *Seseli gouanii* W.D.J.Koch
560. *Sibiraea laevigata* (L.) Maxim.
561. *Silene coronaria* (L.) Clairv.
562. *Silene latifolia* subsp. *alba* (Mill.) Greuter & Burdet
563. *Telekia speciosa* (Schreb.) Baumg.
564. *Trollius europaeus* L.
565. *Veratrum nigrum* L.

Curator: Špela Pungaršek
Hortulani: Monika Poklukar, Klemen Završnik

LITERATURE (citirana in uporabljena) / LITERATURE (cited and used)

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