Plant protection problems of public areas: new bacterial diseases of ornamental trees

In Europe, so in Hungary too, deciduous ornamental trees are beloved on streets, in public areas and in parks. The ornamental trees are exposed to abiotic and biotic factors in urban environment. From biotic factors plant pathogen fungi and bacteria can be the causing agents of cracks on woody part of plants and exudates. Several international and national publications are about new bacteria from the genera *Brenneria* (*Erwinia*) /*Lonsdalea/ Acinetobacter* which can cause similar symptoms. Between 2015 and 2019, 45 samples were collected from cracks and exudates of ornamental trees (willow, elm, birch, sycamore, horse chestnut and magnolia) in public places and parks in Hungary. On King's B media pure cultures were made. Pathogens were identified by classical (morphological, biochemical properties, Gram, hypersensitive response and pathogenicity tests) and molecular (16S rRNA) methods. On the basis of classical and molecular methods it was verified that the pathogens are the members of *Brenneria/Lonsdalea/Acinetobacter* genus.

Species of the *Brenneria* and *Lonsdalea* genus are widely distributed pathogens in the world. *Brenneria* genus consists of eight species (*Brenneria salicis*, *B. nigrifluens*, *B. rubrifaciens*, *B. alni*, *B. goodwinii*, *B. roseae*, *B. populi* and *B. corticis*) and five subspecies, the genera *Lonsdalea* includes five species (*Lonsdalea britannica*, *L. iberica*, *L. populi* and *L. quercina*). The genus *Acinetobacter* comprises 26 species with validly published names, and it is ubiquitously distributed in nature, being found in humans, animals, activated sludge and other environmental sources and includes three plant pathogen species (*Acinetobacter puyangensis*, *A. qingfengensis*, *A. populi*). Some species of *Brenneria* and *Lonsdalea* genera were reported in Europe as well: Great Britain, Belgium, French, Hungary, Italy, Netherlands, Serbia and Spain. These bacteria affect *Alnus*, *Juglans*, *Populus*, *Salix* and *Quercus* species. These diseases are characterized by similar symptoms: on the bark longitudinal streaks and vertical cracks, on inner bark necrosis, on the trunk irregularly shaped cankers can develop. The infected shoots and branches are wilting and dying. When the climatic conditions are favourable for bacteria during summer and autumn, different coloured, watery fluid (black, brown, red or white) is oozing from cracks and cankers. In some cases it seems like the trunk is bleeding ("bleeding canker"). If there are warm and humid conditions the bacterial exudation is intensive and running down on the bark of the trunk. The weather was changing in the last few years, there were long lasting, hot summers, warm and humid autumns which were increasing the possibility for the bacteria to spread and infect the trees.

Materials and methods

The isolates originated from different parts of Hungary, from various parks, public areas, nurseries, arboretums and orchards. The infected branches, plants first were disinfected with ethanol. All isolates were clear–cultured, grown on King-B agar at 24-26°C. In case of those isolates, which were collected for the purposes of this study, it is important to define the basic characteristics, which ensure selective isolation and enables us to make sure that the isolates belong to the *Brenneria*/Lonsdalea/*Acinetobacter* genus.

C*olony types*

The isolates were transferred into the King-B media. The Petri-dishes were incubated on 24-26 ˚C. The isolates were typified by colony types. The isolates were evaluated after 24-48

hours, under microscope. The colony types were distinguished by consistence, shape, surface, margin and colour.

Identification of Gram-features
24 hours after inoculation, 1-2 colonies from the clean, fresh medium were placed on sterile slides. 3% potassium hydroxide was added and then was homogenized. The bacteria is Gram-negative in case of the potassium hydroxide dissolves the cell wall (the mixture is stingy), while the bacteria is Gram-positive if the cell wall is left intact (the mixture is watery).

Hypersensitive reaction
The bacterium suspension ($5x10^7$cells/ml) was injected into tobacco leaves (*Nicotiana tabacum* L. cv. *xanthi*). After 24-48 hours the hypersensitive reaction (tissue necrosis) was monitored.

Pathogenicity test
Pathogenicity tests (Koch, 1976) was carried out in 3-6 repetition on each newly isolated bacteria species. The young shoots of ornamental trees were inoculated. The surfaces of the shoots used in the pathogenicity test were disinfected with ethanol. The bacterium suspension ($5x10^7$cells/ml) was injected with a syringe. In order to assure optimal conditions for the infection to spread, the plants were then kept in the laboratory, in 80-90% relative humidity and on 24-26 ˚C. The untreated control was infiltrated with a sterile syringe with distilled water. The control plant was kept separated, under the same conditions as the treated ones. Pathogenicity tests were evaluated after 1-3 months.

The pathogenicity test for *Brenneria* sp. (*B. nigrifluens, B. goodwinii, B. alni, B. salicis*) and *Acinetobacter* sp. which now is in use usually carried out on the trees by shoots inoculation, and requires at least 1-3 months to give a result.

Biochemical characteristics
Newly isolated bacteria species were tested by API 20E (Biomérieux, Marcy l'Étoile, France) strip, according to the manufacturer's (Biomérieux, Marcy l'Étoile, France) introductions. In case of each isolate, $5x10^7$ cells/ml bacterium suspension was pipetted to the sample places containing special media of the kits. All tests were incubated on 36 ˚C and evaluated after 24-48 hours based on colour changes correlate to positive and negative test strips provided by the manufacturer.

Identification of the pathogens by molecular method, and study of the genetic diversity

The most common method among molecular bacteriology tests for the identification and taxonomic studies of bacteria is the determination of the sequence encoding 16S rRNA and housekeeping genes (*atp*D, *rpo*B, *inf*B).

For 16S rDNA sequence determination universal primers (63f, 1389r) were used. The PCR products were cloned using pGEM-T Easy vector and *Escherichia coli* competent cells. The nucleotide sequences of the cloned cDNA fragments were determined and matched to the corresponding similar sequences found in the international databases.

For housekeeping genes (*atp*D, *rpo*B, *gyr*B) sequence determination special primers (*atp*D 01F, *atp*D 02R, *atp*D 03F, *atp*D 04R; *gyr*B 01F, *gyr*B 02R, *gyr*B 07F, *gyr*B 08R, *rpo*B CM7-F, *rpo*B CM31b-R, *rpo*B CM81b-F, *rpo*B CM32b-R) were used. The PCR products were sequenced. The nucleotide sequences were determined and matched to the corresponding similar sequences found in the international databases (NCBI Genebank). All

sequence data and phylogenetic analysis were performed by CLC SEQUENCE Viewer software.

Genes	Primer	Sequence
16S	63F	5'-CAGGCCTAACACATGCAAGTC-3'
	1389R	5'-ACGGGCGGTGTGTACAAG-3'
atpD	*atpD* 01-F	5'-RTAATYGGMGCSGTRGTNGAYGT-3'
	atpD 02-R	5'-TCATCCGCMGGWACRTAWAYNGCCTG-3'
	atpD 03-F	5'-TGCTGGAAGTKCAGCARCAG-3'
	atpD 04-R	5'-CCMAGYARTGCGGATACTTC-3'
***gyr*B**	*gyr*B 01-F	5'-TAARTTYGAYGAYAACTCYTAYAAAGT-3'
	*gyr*B 02-R	5'-CMCCYTCCACCARGTAMAGTT-3'
	*gyr*B 07-F	5'-GTVCGTTTCTGGCCVAG-3'
	*gyr*B 08-R	5'-CTTTACGRCGKGTCATWTCAC-3'
***rpo*B**	*rpo*B CM7-F	5'-AACCAGTTCCGCGTTGGCCTG-3'
	*rpo*B CM31b-R	5'-CCTGAACAACACGCTCGGA-3'
	*rpo*B CM81b-F	5'-TGATCAACGCCAAGCC-3'
	*rpo*B CM32b-R	5'-CGGACCGGCCTGACGTTGCAT-3'

Primers used in molecular analysis

Composition of PCR mix (50 µl):
35,5 µl sterile H_2O
5 µl 10x Taq puffer (5 u/µl)
3 µl $MgCl_2$ (25 mM)
2 µl 5 mM dNTPs
1 µl forward primer (20 pmol/µl)
1 µl reverse primer (20 pmol/µl)
0,5 µl Taq polimeráz enzyme (5 u/µl)
2 µl bacterial suspension (10^7 CFU/Colony form unit)

Efficiency of different active substances, plant conditioner product, disinfectant, natural materials against the pathogens

The *in vitro* antibacterial activities of different substances/agents in different concentrations were compared on the basis of the inhibitory effect on the growth of different bacterium species (agar dilution technique/poisoned agar plate method) (Klement et al., 1990). The isolates used in the studies were *Brenneria/ Lonsdalea* strains from Germany, the Microorganism Genetic Bank of DSMZ (Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH) and some domestic *Brenneria/Acinetobacter* isolates. The following formulations were tested: Cupertine M, Cuproxat FW, Dithane M-45, Kasumin 2L, Streptomycin, Pluto 50 WP Copper Oxychloride, Vitra Copper Hydroxide, Drop Mix, Fitostore F Solution, Em-Bio, Fagél, Cinnamon oil, Thyme oil, 100% cranberry juice, 10% vinegar and Hypo. A bacterial strain mixture with a concentration of 10^7 CFU was used in the

experiment. The results are evaluated by comparing the efficacy of different formulations on the growth rate of the bacteria on King-B agar. Sterile distilled water was used as a control. Petri dishes were incubated at 24-26°C. Results were evaluated when control colonies reached the margin of Petri dishes. Bacterial growths were evaluated after 24 and 48 hours. Agents were tested in undiluted, practical dose and in 10%, 1%, 0,1%, 0,01% dilution.

Isolate code/ DSMZ code	**Pathogen**	**Host plant**	**Origin**
Bn-Walnut-Zn-Hun1	*Brenneria nigrifluens*	*Juglans regia* L.	Zánka
BN3Z	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Zamárdi
Bs-HuB1	*Brenneria salicis*	*Salix alba* L.	Budapest
BPP1B	*Brenneria populi*	*Populus nigra*	Budapest
BS1	*Brenneria sp.*	*Betula pendula* Roth.	Budapest
Bp. Aes. 1	*Brenneria nigrifluens*	*Aesculus hippocastanum*	Budapest
AP1M	*Acinetobacter puyangensis*	*Magnolia kobus*	Szombathely
DSM30175	*Brenneria nigrifluens*	*Juglans regia* L.	USA
DSM30166	*Brenneria salicis*	*Salix* sp.	UK
DSM11811	*Brenneria alni*	*Alnus glutinosa* L.	Olaszország
DSM4483	*Brenneria rubrifaciens*	*Juglans regia* L.	USA
DSM4561	*Lonsdalea quercina* subsp. *quercina*	*Quercus* sp.	USA

Isolates (bacterial strain mixture) used in survey

Results and discussion

Symptoms caused by *Brenneria/Acinetobacter* species on ornamental trees

During 2013-2019, a severe unusual disease symptom was observed on ornamental trees (willow, elm, birch, sycamore, poplar, horse chestnut and magnolia) in Hungary. Symptoms were noticed on trunk where brown-to-black exudates staining appeared on the bark. Due to the humid and hot weather, the symptoms were even more pronounced and stronger. On hot summer evenings we could sense an unpleasant smell. Samples were collected and pure cultures were prepared. The 45 isolates originated from different parts of Hungary, from various parks, public areas, nurseries, arboretums and orchards.

Bacterial bark canker symptoms on ornamental trees
(A- birch tree, B-elm tree, C-magnolia tree, D- horse chestnut tree, E-willow tree)

I.

II.

Origin of the isolates in Hungary (I.) and directly of Lake Balaton (II.)

Isolates code	Isolates	Host plant	Origin	Year of isolation
Bn-Walnut-Zn-Hun1	*Brenneria nigrifluens*	*Juglans regia* L.	Zánka	2013
BN4B	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Budapest	2014
BN6S	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Siófok	2014
BN3Z	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Zamárdi	2014
BN5Ba	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Bázakerettye	2014
BN7B	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Budapest	2014
BS1	*Brenneria alni*	*Betula pendula* Roth.	Budapest, Soroksár	2014
BSZ1	*Brenneria alni*	*Betula pendula* Roth.	Szentendre	2015
BL1	*Brenneria alni*	*Betula pendula* Roth.	Leányfalu	2015
BJ1	*Brenneria alni*	*Betula pendula* Roth.	Budapest	2016
BK1	*Brenneria alni*	*Betula pendula* Roth.	Budapest	2016
BK3	*Brenneria alni*	*Betula pendula* Roth.	Budapest	2016
Bs-HuB1	*Brenneria salicis*	*Salix alba*	Budapest	2013
Bp. Aes. 1	*Brenneria nigrifluens*	*Aesculus hippocastanum*	Budapest	2015
BG1B	*Brenneria goodwinii*	*Ulmus spp.*	Budapest	2015
Szil1	*Brenneria goodwinii*	*Ulmus spp.*	Kecskemét	2015
Szil2	*Brenneria goodwinii*	*Ulmus spp.*	Kecskemét	2015
Szil3	*Brenneria goodwinii*	*Ulmus spp.*	Kecskemét	2015
AP1M	*Acinetobacter puyangensis*	*Magnolia kobus*	Szombathely	2013
HU-Mk-3	*Acinetobacter puyangensis*	*Magnolia kobus*	Szombathely	2016
HU-Mk-5	*Acinetobacter puyangensis*	*Magnolia kobus.*	Budapest	2016
HU-Mk-6	*Acinetobacter puyangensis*	*Magnolia kobus.*	Budapest	2017
BPP1B	*Brenneria populi*	*Populus nigra*	Budapest	2016
Hu-Bn- Pl 1	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Budapest	2017
Hu-Bn- Pl 2	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Siófok	2016
Hu-Bn- Pl 3	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Balatonfüred	2016
Hu-Bn- Pl 4	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Budapest	2016
Hu-Bn- Pl 5	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Balatonfüred	2016
Hu-Bn- Pl 6	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Budapest	2018
Hu-Bn- Pl 7	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Siófok	2017
Hu-Bn- Pl 8	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Balatonfüred	2018
Hu-Bn- Pl 9	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Budapest, Margit sziget	2017
Hu-Bn- Pl 10	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Balatonfüred	2017
SZ1Bu	*Brenneria goodwinii*	*Ulmus spp.*	Budapest	2017
SZ2Bu	*Brenneria goodwinii*	*Ulmus spp.*	Budapest	2018
SZ4Bu	*Brenneria goodwinii*	*Ulmus spp.*	Budapest	2018
SZ5Bu	*Brenneria goodwinii*	*Ulmus spp.*	Hódmezővásárhely	2018
SZ6Bu	*Brenneria goodwinii*	*Ulmus spp.*	Kecskemét	2018
Bp. Aes. 2	*Brenneria nigrifluens*	*Aesculus hippocastanum*	Budapest	2018
Bp. Aes. 3	*Brenneria nigrifluens*	*Aesculus hippocastanum*	Budapest	2019
Hu-Bn- Pl 11	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Mátészalka	2019
Hu-Bn- Pl 12	*Brenneria nigrifluens*	*Platanus* x *acerifolia* Ait.	Debrecen	2019
Bs-HuB2	*Brenneria salicis*	*Salix alba*	Budapest	2019
Bs-HuB3	*Brenneria salicis*	*Salix alba*	Budapest	2019
Bs-HuB4	*Brenneria salicis*	*Salix alba*	Balatonalmádi	2019

Data of isolates (isolate code, isolates, host plant, origin, and year of isolation)

Colony type

All *Brenneria* isolates colonies on King-B media were uniform, milky and cream-colored, smooth surfaced with intact outlines. The colonies of all *Acinetobacter* isolates on King-B agar were uniform, grey-white coloured, with soft surfaces, circular, intact outlines and not fluorescent. The results are the same as those described in the literature.

Gram-test

Since the 3% potassium hydroxide solution dissolved the cellular wall of the bacteria, the isolates collected from the different host plants proved to be Gram-negative. The results are the same as those described in the literature (*Brenneria/Acinetobacter* species are Gram-negative bacteria).

Hypersensitive reaction

On the leaves of the tobacco plants inoculated with $5x10^7$ cell/ml suspension of the tested bacteria-in case of all *Brenneria* isolates, quick tissue necrosis was not formed after 24-48 hours, while in the case of the four *Acinetobacter* isolates, quick tissue necrosis was formed. The results are the same as those described in the literature.

Hypersensitive reaction of the pathogen on tobacco leaf
A- Hu-Bn- Pl 1 (*Brenneria nigrifluens*) isolate;
B- HU-Mk-3 (*Acinetobacter puyangensis*) isolate

Pathogenicity tests

Fresh, young shoots of the tested willow, elm, sycamore, birch, horse chestnut and magnolia plants inoculated with different bacterium suspensions showed infection. Shoots of the sycamore and poplar trees did not show intensive reaction and did not forme typical symptoms after 1-3 month. The *Brenneria* species was re-isolated from lesions on inoculated shoots. No lesions were observed on controls.

Brenneria species (*Brenneria nigrifluens, B. alni*) from sycamore, birch, horse chestnut did not show typical symptoms during the pathogenicity test. *Brenneria* species did show symptoms two months after inoculation, necrotic lesions were observed in the inner

bark and dark lines were observed in internal wood. The bacterium could be re-isolated after three months of infection.

*Brenneria salicis (*origin from *Salix alba)* showed symptoms two months after inoculation, necrotic lesions were observed in the inner bark and dark lines were observed in internal wood. Three months after inoculation, the plants died (A). *Brenneria goodwinii (*origin from *Ulmus* sp.*)* showed symptoms two months after inoculation, necrotic lesions were observed in the inner bark and dark lines were observed in internal wood. The leaves were yellow and dried. The bacteria could be re-isolated after two months of infection.

Inoculated *Magnolia kobus* sapling showed symptoms two months after inoculation, necrotic lesions were observed in the inner bark and dark lines were observed in internal wood, but no external cankers were observed on inoculated branches. The magnolia plant was withered and dried (B). The negative control appeared normal (C). *Acinetobacter* species was re-isolated from lesions on inoculated branches and identified.

Results of a pathogenicity tests on willow (A-*Salix alba*) and magnolia (B-*Magnolia kobus*) plants and a control magnolia plant (C-*Magnolia kobus*) two months after infection

Result of the API 20E test

The API 20E test is used for the determination of Gram-negative bacteria. The collected 45 isolates were tested with API 20E biochemical kits in order to identify and characterized them as *Brenneria* and *Acinetobacter* species.

The *Brenneria nigrifluens* isolate (Bn-Walnut-Zn-Hun1-host plant: *Juglans regia*-this is a first report of *Brenneria* species in Hungary) was positive for citrate utilization, H_2S, urease and acetoin production, glucose, inositol, saccharose and arabinose reactions.

Based on the API 20E test results *Brenneria nigrifluens* isolates (BN4B, BN6S, BN3Z, BN5Ba, BN7B, Hu-Bn-Pl1,Hu-Bn-Pl 2,Hu-Bn-Pl3,Hu-Bn-Pl4,Hu-Bn-Pl5, Hu-Bn-Pl6, Hu-Bn-P7, Hu-Bn-P8, Hu-Bn-P9, Hu-Bn-Pl10, Hu-Bn-Pl11, Hu-Bn-Pl2-host plant: *Platanus* x *acerifolia*) were uniform. The all isolates were positive for tryptophan deaminase and acetoin production, glucose, mannitol, inositol, rhamnose, saccharose, amygdalin and arabinose reactions.

Based on the API 20E test results *Brenneria alni* isolates (BS1, BSZ1, BL1, BJ1, BK1, BK3-host plant *Betula pendula*) were uniform. The all isolates were positive for acetoin production, mannitol, saccharose, melibiose, amygdalin and arabinose reactions.

Based on the API 20E test results *Brenneria nigrifluens* isolates (Bp. Aes. 1, Bp. Aes. 2, Bp. Aes. 3- host plant*: Aesculus hippocastanum*) were uniform. The all isolates were

positive for tryptophan deaminase and acetoin production, mannitol, inositol, rhamnose, saccharose, amygdalin and arabinose reactions.

The *Brenneria populi* isolate (BPP1B- host plant: *Populus alba*) was positive for glucose, mannitol, saccharose, amygdalin and arabinose reactions.

Based on the API 20E test results *Brenneria goodwinii* isolates (BG1B, Szil1, Szil2, Szil3, SZ1Bu, SZ2Bu, SZ4Bu, SZ5Bu, SZ6Bu- host plant *Ulmus* sp.) were uniform. The isolates were positive for β-galaktosidase, citrate utilization, tryptophan deaminase, acetoin and indole production, saccharose, melibiose, amygdalin and arabinose reactions.

Based on the API 20E test results *Brenneria salicis* isolates (Bs-HuB1, Bs-HuB2, Bs-HuB3, Bs-HuB4- host plant: *Salix* sp.) were uniform. The all isolates were positive for urease utilization, acetoin production, glucose, mannitol, inositol, sorbitol, rhamnose, saccharose, melibiose, amygdalin and arabinose reactions.

Based on the API 20E test results all *Acinetobacter puyangensis* isolates (AP1M, HU-Mk-3, HU-Mk-5, HU-Mk-6- host plant *Magnolia kobus*) were uniform. The all isolates were positive for citrate utilization, glucose, mannitol, rhamnose, amygdalin and arabinose reactions.

Isolates from the same host plants showed the same biochemical results based on the API 20E test results.

	ONP	**ADH**	**LDC**	**ODC**	**CIT**	**H_2S**	**URE**	**TDA**	**IND**	**VP**	**GEL**	**GLU**	**MAN**	**INO**	**SOR**	**RHA**	**SAC**	**MEL**	**AMY**	**ARA**
B.S.1.	-	-	-	-	-	-	-	+	-	+	-	-	+	-	+	-	+	+	+	+
B.L.1.	-	-	-	-	-	-	-	+	-	+	-	+	+	-	-	-	+	+	+	+
B.Sz.1.	-	-	-	-	-	-	-	+	-	+	-	+	+	-	+	-	+	+	+	+
B.K.1.	-	-	-	-	-	-	-	-	-	+	-	+	+	-	-	-	+	+	+	+
B.J.1.	-	-	-	-	-	-	-	-	-	+	-	+	+	-	+	-	+	+	+	+
B.K.2.	-	-	-	-	-	-	-	-	-	+	-	+	+	-	-	-	+	+	+	+
Bn-Walnut-Zn-Hun1	-	-	-	-	+	+	+	-	-	+	-	+	-	+	-	-	+	-	-	+
Bs-HuB1	-	-	-	-	-	-	+	-	-	+	-	+	+	+	+	+	+	+	+	+
BN4B	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
BN6S	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
BN3Z	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
BN5Ba	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
BN7B	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
BG1B	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
Szil1	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
Szil2	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
Szil3	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
Bp. Aes. 1	-	-	-	-	-	-	-	+	-	+	-	-	+	+	-	+	+	-	+	+
AP1M	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	-	+	+
HU-Mk-3	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	-	+	+
HU-Mk-5	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	-	+	+
HU-Mk-6	-	-	-	-	+	-	-	-	-	-	-	+	+	-	-	+	-	-	+	+
BPP1B	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	+	-	+	+
Hu-Bn-Pl 1	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 2	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+

Pl 3																			
Hu-Bn-Pl 4	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 5	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 6	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 7	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 8	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 9	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 10	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
SZ1Bu	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
SZ2Bu	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
SZ4Bu	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
SZ5Bu	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
SZ6Bu	+	-	-	-	+			+	+	+	-	+	+	+	+	+	+	+	+	+
Bp. Aes. 2	-	-	-	-	-	-	-	+	-	+	-	-	+	+	-	+	+	-	+	+
Bp. Aes. 3	-	-	-	-	-	-	-	+	-	+	-	-	+	+	-	+	+	-	+	+
Hu-Bn-Pl 11	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Hu-Bn-Pl 12	-	-	-	-	-	-	-	+	-	+	-	+	+	+	-	+	+	-	+	+
Bs-HuB2	-	-	-	-	-	-	+	-	-	+	-	+	+	+	+	+	+	+	+	+
Bs-HuB3	-	-	-	-	-	-	+	-	-	+	-	+	+	+	+	+	+	+	+	+
Bs-HuB4	-	-	-	-	-	-	+	-	-	+	-	+	+	+	+	+	+	+	+	+

ONPG: b-galactosidase, ADH: arginine-dihydrolase, LDC: lysine decarboxilase, ODC: ornitin-decarboxilase, CIT: citrate utilization, H_2S utilization, URE: urease, TDA: tryptophan deaminase, IND: indole production, VP: acetoin production, GEL: gelatinase, GLU: D-glucose, MAN: D-mannitol, INO: inositol, SOR: D-sorbitol, RHA: L-rhamnose, SAC: D-saccharose, MEL: D-melibiose, AMY: amygdalin, ARA: L-arabinose

Molecular study of the 16S rRNA gene

The PCR products of the reactions were about 1300 bp long. The 16S rDNA nucleotide sequences (1300-1324 bp) of all partially sequenced isolates were sent to the international databank. The sequences of the isolates collected from different ornamental trees were matched with the sequences found in the international data bases. The nucleotide sequences of the fragments showed 98-100% similarity/identity with many *Brenneria/Acinetobacter* isolates.

The 16S rDNA nucleotide sequences were deposited in NCBI Genebank (Acc. No.: HF936707, HG518658, LN875279, LN875281, LN875278, LN875280, LN875282, LN875288, MG934697, MG934855, MG937799, MG962536, MG951474, MG950413, MG951472, MG951475, MG951473). The nucleotide sequence of the other isolates is being uploaded to the international database.

The sequence of Bn-Walnut-Zn-Hun1, BN4B, BN6S, BN3Z, BN5Ba, BN7B, Hu-Bn-Pl1,Hu-Bn-Pl 2,Hu-Bn-Pl3,Hu-Bn-Pl4,Hu-Bn-Pl5, Hu-Bn-Pl6, Hu-Bn-P7, Hu-Bn-P8, Hu-Bn-P9, Hu-Bn-Pl10, Hu-Bn-Pl11, Hu-Bn-Pl2, Bp. Aes. 1, Bp. Aes. 2, Bp. Aes. 3 isolates showed 98-100% sequence identity with a number of *Brenneria nigrifluens* strains.

The sequence of BG1B, Szil1, Szil2, Szil3, SZ1Bu, SZ2Bu, SZ4Bu, SZ5Bu, SZ6Bu isolates showed 99-100% sequence identity with a number of *Brenneria goodwinii* strains.

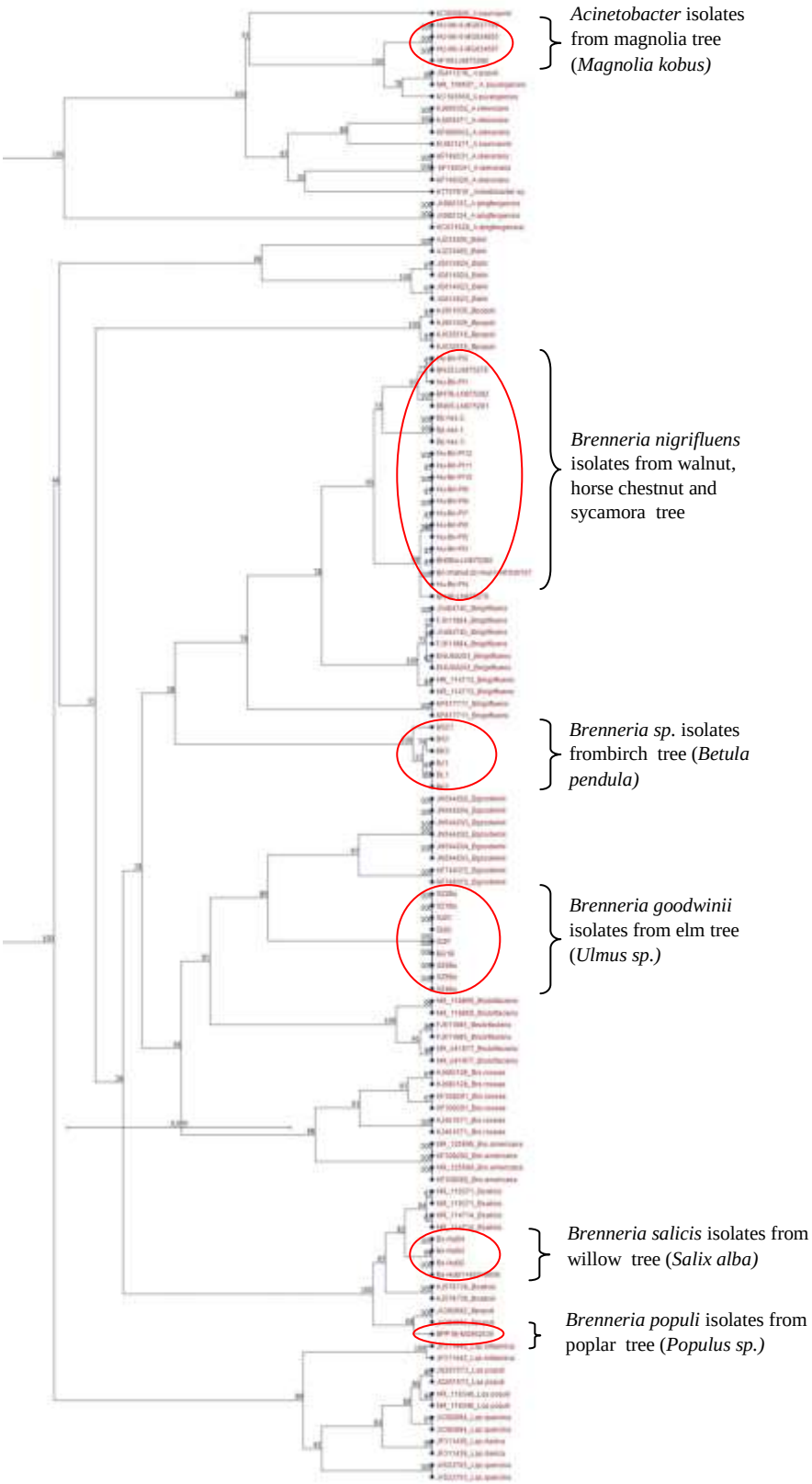
The sequence of BS1, BSZ1, BL1, BJ1, BK1, BK3 isolates showed 98-100% sequence identity with a number of *Brenneria alni* strains.

The sequence of Bs-HuB1, Bs-HuB2, Bs-HuB3, Bs-HuB4 isolates showed 99-100% sequence identity with a number of *Brenneria salicis* strains. The BPP1B nucleotide sequence showed 98-100% sequence identity with a number of *Brenneria populi* strains.

The AP1M, HU-Mk-3, HU-Mk-5, HU-Mk-6 sequences showed 99-100% nucleotide sequence identity with a number of *Acinetobacter puyangensis* strains, including type strains NR_109507,KC193569.

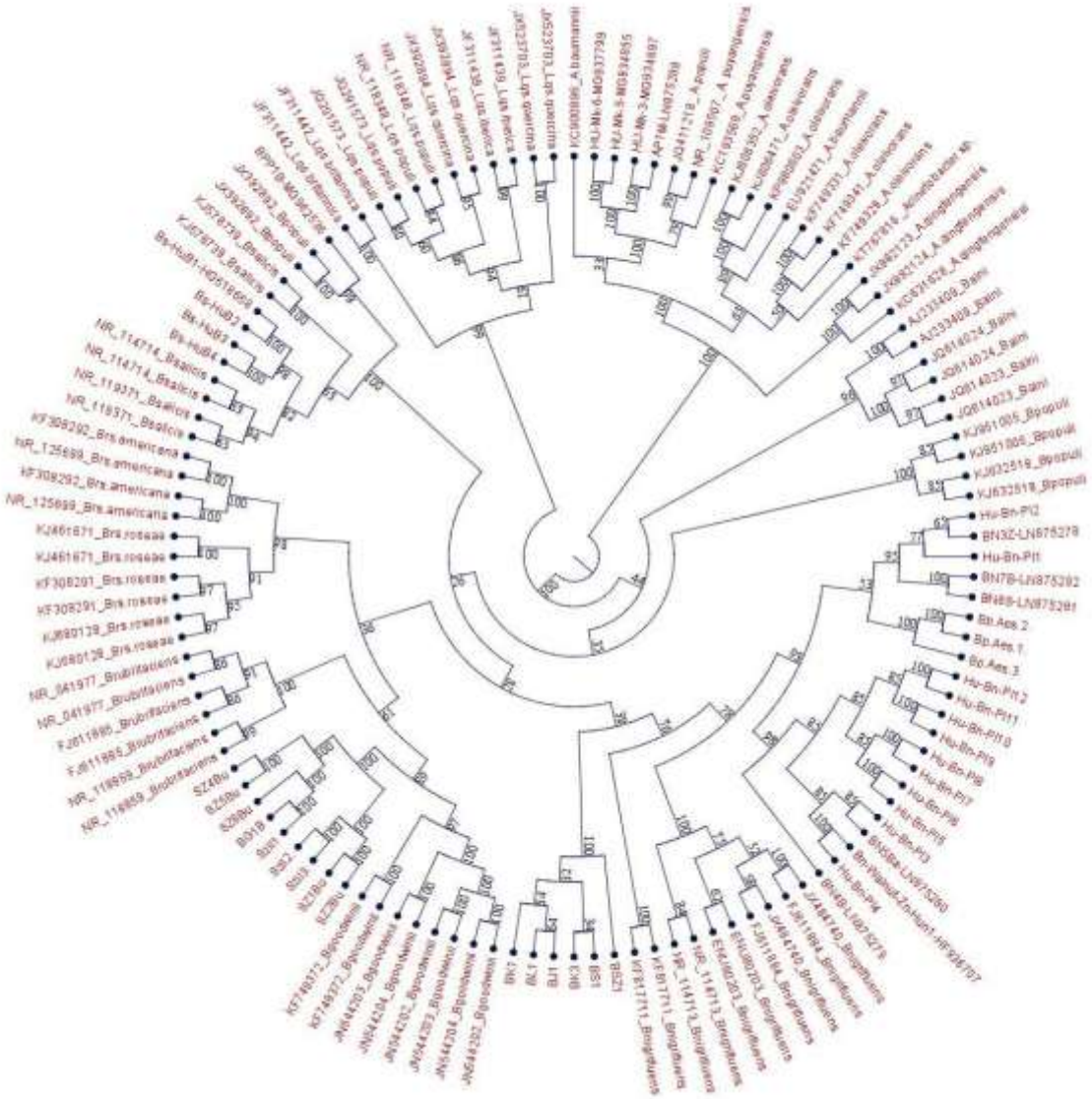
Isolates code	**NCBI Genebank Acc. No.**
Bn-Walnut-Zn-Hun1	HF936707
Bs-HuB1	HG518658
BN4B	LN875279
BN6S	LN875281
BN3Z	LN875278
BN5Ba	LN875280
BN7B	LN875282
BS1	*
BSZ1	*
BL1	*
BJ1	*
BK1	*
BK3	*
Bp. Aes. 1	*
BG1B	*
Szil1	*
Szil2	*
Szil3	*
AP1M	LN875288
HU-Mk-3	MG934697
HU-Mk-5	MG934855
HU-Mk-6	MG937799
BPP1B	MG962536
Hu-Bn- Pl 1	MG951474
Hu-Bn- Pl 2	MG950413
Hu-Bn- Pl 3	MG951472
Hu-Bn- Pl 4	MG951475
Hu-Bn- Pl 5	MG951473
Hu-Bn- Pl 6	*
Hu-Bn- Pl 7	*
Hu-Bn- Pl 8	*
Hu-Bn- Pl 9	*
Hu-Bn- Pl 10	*
SZ1Bu	*
SZ2Bu	*
SZ4Bu	*
SZ5Bu	*
SZ6Bu	*
Bp. Aes. 2	*
Bp. Aes. 3	*
Hu-Bn- Pl 11	*
Hu-Bn- Pl 12	*
Bs-HuB2	*
Bs-HuB3	*
Bs-HuB4	*

*uploading to NCBI Genebank database



The phylogenetic tree of *Brenneria* and *Acinetobacter* isolates is based on 16Sr DNA sequences. The phylogenetic tree was made by UPGMA method.

Explanation: The horizontal lines indicate the genetic distance of the isolates, while the vertical lines indicate the identity of the isolates up to the branches. The numbers at the branches represent the results of bootstrap analysis at 1000 samples, showing the reliability of the phylogenetic tree. The scale of the phylogenetic tree shows 8 base changes per 1000 bases.



The cladogram of *Brenneria* and *Acinetobacter* isolates is based on 16Sr DNA sequences. The phylogenetic tree was made by UPGMA method.

Based on the 16S rRNA sequence, isolates from birch trees (BS1, BSZ1, BJ1, BK1, BK3) have the closest relationship to *Brenneria alni* strain (AJ233409) and other *B. alni* isolates (AJ233409), JX996176), which are 96-97% similarity. However, birch isolates are also very closely related to various *B. nigrifluens* isolates, including hungarian isolates derived from walnut tree(HF936707) and sycamore tree (LN875278, LN875279, LN875181, LN875182;) with 95% to 96% concordance.

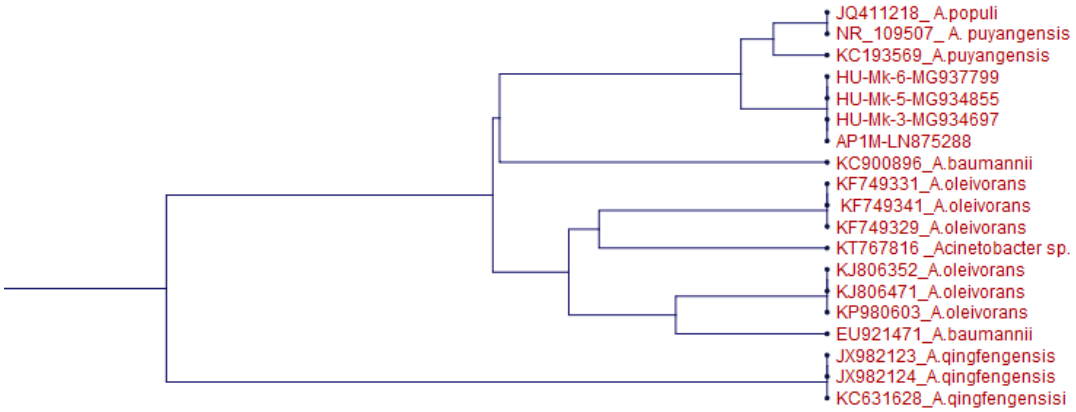
Based on the 16S rRNA nucleotide sequence, isolates from horse chestnut trees (Bp.Aes.1, Bp.Aes2, Bp.Aes3.) analysis revealed the closest relatedness to *Brenneria nigrifluens* 98.51-100% identity. Among them, the highest concordance was observed (98.51-99.37%) from the samples isolated from Hungary (HF936707) and sycamore (plane) tree (LN875280, LN875279, LN875281, LN875282, LN875278). Other *Brenneria nigrifluens* sequences (ENU80203, NR_114713, FJ611884, JX484740) from the NCBI database showed 97% agreement. It showed 95% similarity with domestic isolates of willow and elm tree and 94% identity with birch isolates.

On the phylogenetic tree, it is observed that the native isolates from willow (Bs-HuBu1, Bs-HuB2, Bs-HuB3, BsHuB4) are 98-99% identity to the *Brenneria salicis* strains identified so far in different countries.

The BPP1B nucleotide sequence showed 98-100% sequence identity with a number of *Brenneria populi* strains.

Hungarian isolates from elm tree (BG1B, Szil1, Szil2, Szil3, SZ1Bu, SZ2Bu, SZ4Bu, SZ5Bu, SZ6Bu) were on a separate branch and showed 100% identity with each other. The closest related to the 16S rRNA gene nucleotide sequence was the isolates of *Brenneria goodwinii* (JN544203, JN544202, JN544204, KF749372).

The nucleotide sequence of Bn-Walnut-Zn-Hun1, BN4B, BN6S, BN3Z, BN5Ba, BN7B, Hu-Bn-Pl1,Hu-Bn-Pl 2,Hu-Bn-Pl3,Hu-Bn-Pl4,Hu-Bn-Pl5, Hu-Bn-Pl6, Hu-Bn-P7, Hu-Bn-P8, Hu-Bn-P9, Hu-Bn-Pl10, Hu-Bn-Pl11, Hu-Bn-Pl2 isolates from sycamore trees showed 98-100% sequence identity with a number of *Brenneria nigrifluens* strains. It can be stated that among our isolates from Bázakerettye (BN5Ba) is 100% identical to the one from Zánka (HF936707). There is also 100% identity between the Siófok (BN6S) and one of the Budapest (BN7B) isolates. Other isolates (Hu-Bn-Pl1,Hu-Bn-Pl 2,Hu-Bn-Pl3,Hu-Bn-Pl4,Hu-Bn-Pl5, Hu-Bn-Pl6, Hu-Bn-P7, Hu-Bn-P8, Hu-Bn-P9, Hu-Bn-Pl10, Hu-Bn-Pl11, Hu-Bn-Pl2) from sycamore trees showed 98.56% and 98.79% identity with the *B. nigrifluens* type strain (DSM30175).



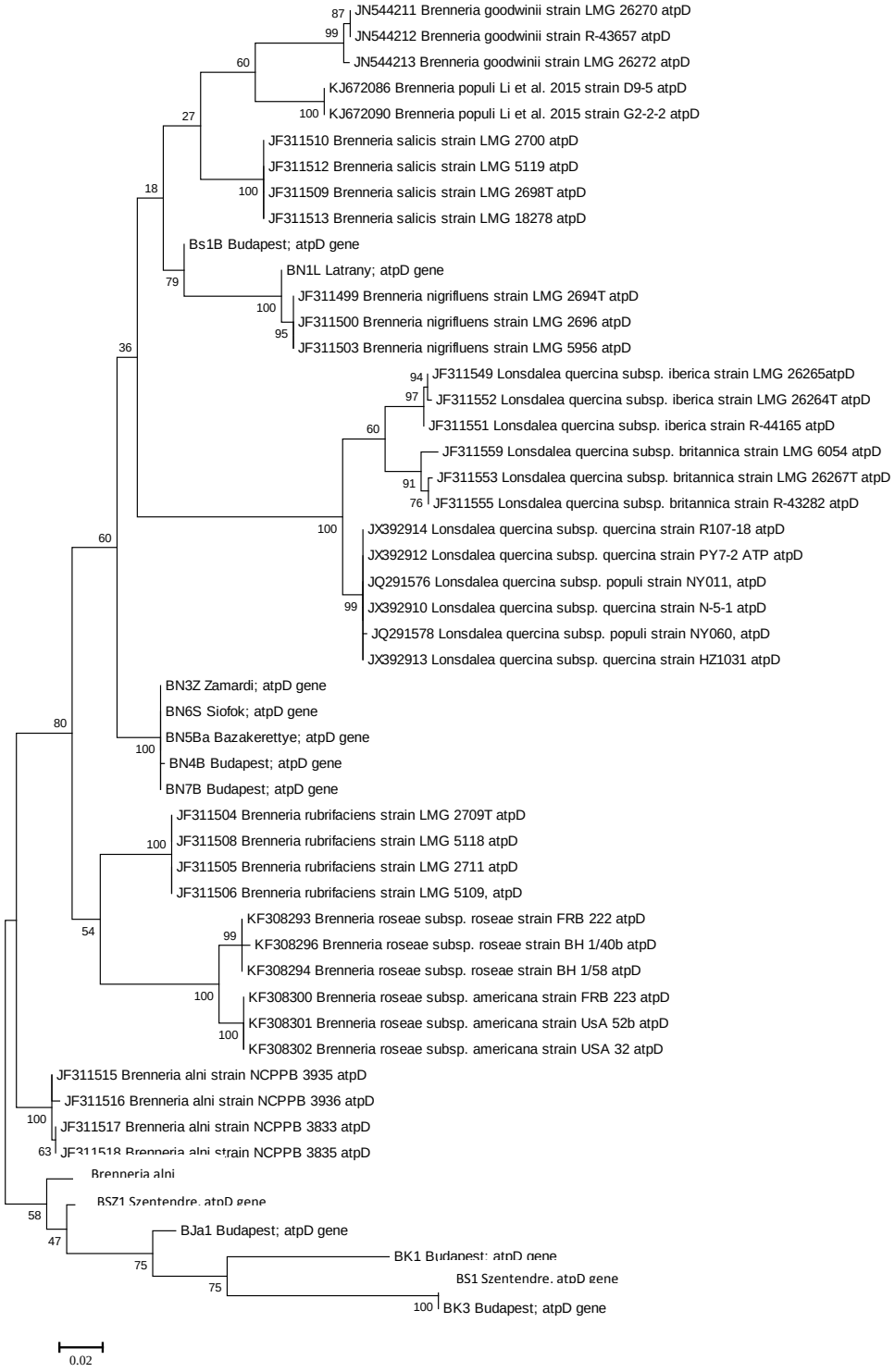
The phylogenetic tree of *Acinetobacter* isolates is based on 16Sr DNA sequences. The phylogenetic tree was made by UPGMA method.

Based on the comparison, the hungarian isolates (AP1M, Hu-Mk-3, Hu-Mk-5, Hu-Mk6) showed 99.39% identity (8 nucleotide difference) in the test section between *Acinetobacter puyangensis* chinese reference Acc. No. NR_109507 and *Acinetobacter populi* sp. nov. isolates. Chinese isolate of *Acinetobacter puyangensis*, reference Acc. No. KC193569, showed 99.09% identity, which represents 12 nucleotides. The isolates with 99% identity were all derived from poplar tree (*Populus* sp.). This branch also contains most of the tested isolates (poplar tree, poplar tree- *Acinetobacter oleivorans*- Acc.No.KF749341, KF749329, KF749331; rise- Acc. No. KP980603; water-*Acinetobacter oleivorans*- Acc. No. EU921471, KC900896; *Acinetobacter baumannii* and other *Acinetobacter* sp. isolates).

*Molecular study of the housekeeping (atp*D, *rpo*B, *gyr*B *genes)*

*atp*D gene

The *atp*D gene nucleotide sequences (559 bp). The sequences of the isolates (BS1, BSZ1, BJ1, BK1, BK3) collected from birch ornamental trees. The nucleotide sequences of the fragments showed 92% similarity/identity with many *Brenneria alni* isolates.



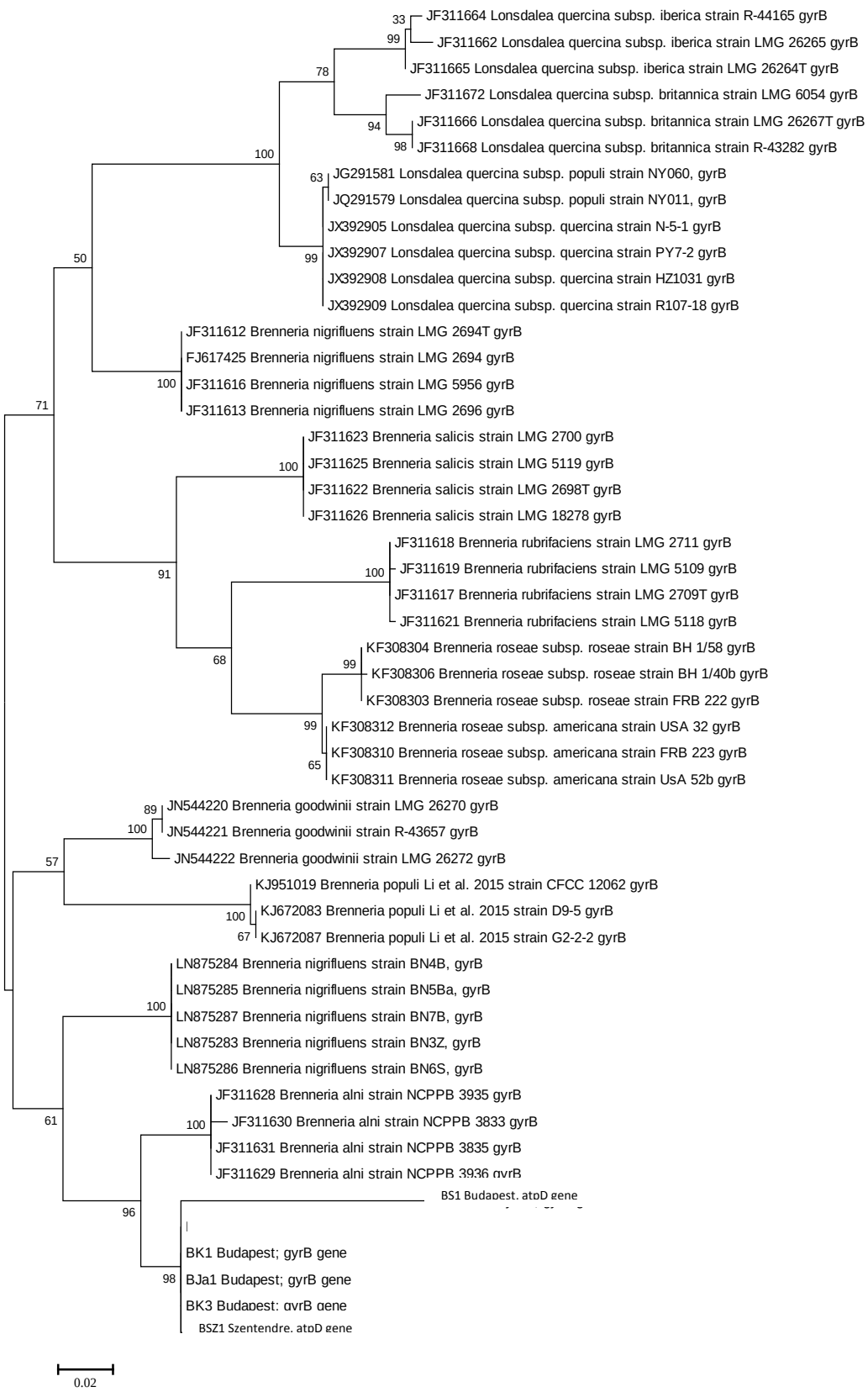
The phylogenetic tree of *Brenneria* isolates is based on *atp*D DNA sequences. The phylogenetic tree was made by UPGMA method.

The isolates from the domestic birch trees, based on the analysis of the *atp*D gene sequence, are located on a separate branch forming a separate group. By pairwise comparison, our own isolates are 99.82-100% identity. Our domestic isolates (BS1, BSZ1, BJ1, BK1, BK3) showed the most distant relation to oak *B. goodwinii* (JN544211, JN544212, JN544213) isolates. Based on the sequence analysis of *atp*D gene, isolates from domestic birch trees showed the closest relatedness to *Brenneria alni* isolates (JF311515, JF311516, JF311517, JF311518) among species of the *Brenneria* genus, with which they are 92% identity.

_gyr_B gene

The *gyr*B gene nucleotide sequences (509 bp). The sequences of the isolates (BS1, BSZ1, BJ1, BK1, BK3) collected from birch ornamental trees. The nucleotide sequences of the fragments showed 95-96% similarity/identity with many *Brenneria alni* isolates.

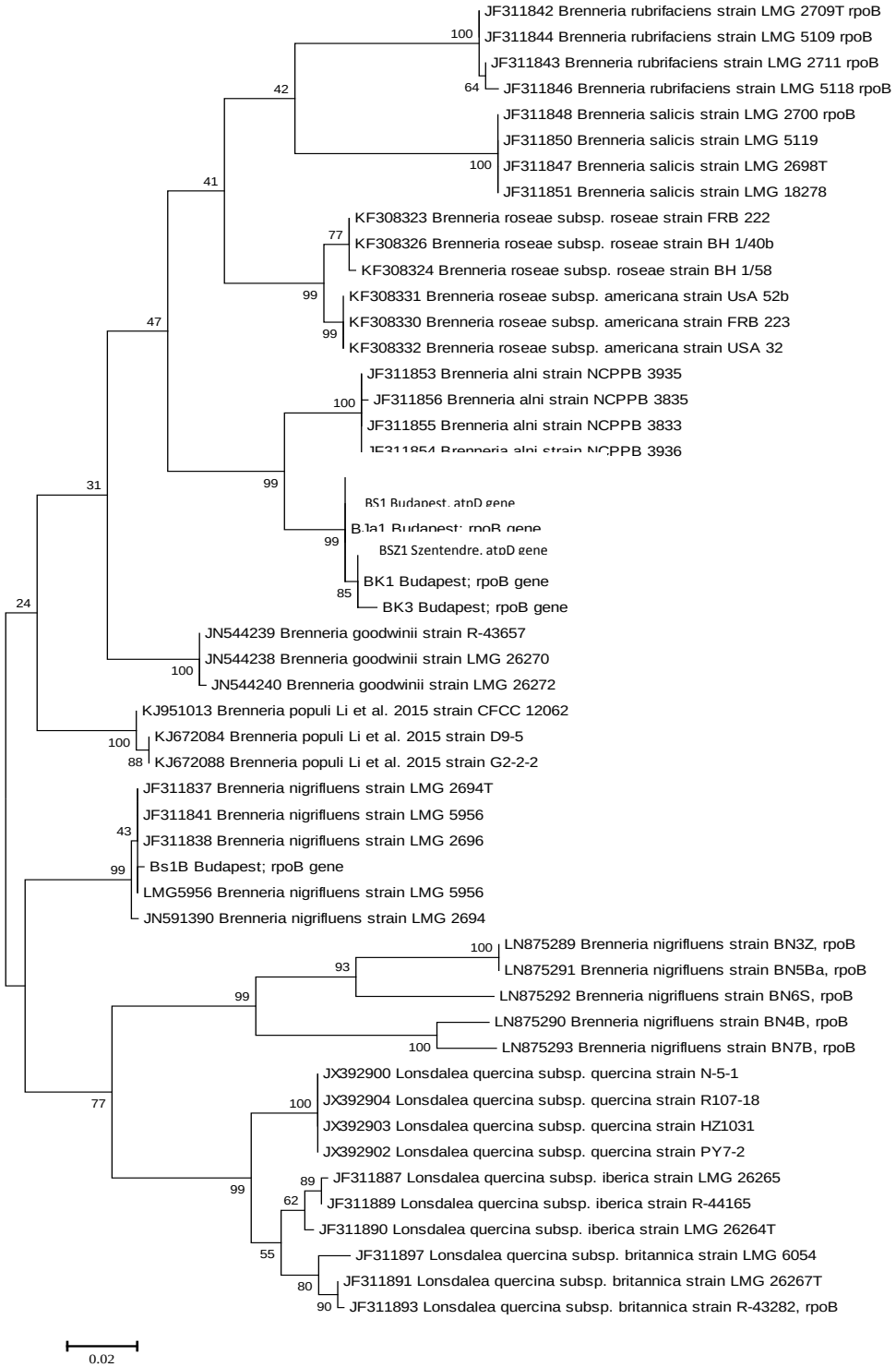
By comparison, our own isolates (BS1, BSZ1, BJ1, BK1, BK3) are 99.8-100% identity to each other. Most closely related are isolates (84-87%) of four subspecies of *Lonsdalea quercina* (JF311662, JF311664, JF311665, JF311666, JF311668, JF311672, JF311664, JQ291581, JQ291579, JX392905, JX392907, JX392908, JX392909), which are derived from oak and poplar. Based on the *gyr*B gene, our own isolates showed 95-96% identity with *Brenneria alni* isolates (JF311628, JF311629, JF311630, JF311631) from Italy, alder species. According to *gyr*B sequence analysis, the bacteria isolated from the birch showed the greatest similarity to the bacterial species *Brenneria alni*.



The phylogenetic tree of *Brenneria* isolates is based on *gyr*B DNA sequences. The phylogenetic tree was made by UPGMA method.

*rpo*B gene

The *rpo*B gene nucleotide sequences (552 bp). The sequences of the isolates (BS1, BSZ1, BJ1, BK1, BK3) collected from birch ornamental trees. The nucleotide sequences of the fragments showed 90-91% similarity/identity with many *Brenneria alni* isolates.



The phylogenetic tree of *Brenneria* isolates is based on *rpo*B DNA sequences. The phylogenetic tree was made by UPGMA method.

Bacteria isolated from birch are most distantly related to the subspecies *Lonsdalea quercina* (JF311893, JF311891, JF311897, JF311890, JF311889, JF311893 JF311887, JX392900, JX392902, JX392903, JX392904) and the five domestic isolates (LN875289, LN875290, LN875291, LN875292, LN875293) derived from sycamore tree.

Our isolates show 86% identity with the five domestic isolates from the sycamore trees and 88% identity with the *Lonsdalea quercina* subspecies. By pairwise comparison, our own isolates are 98.73-100% identity. Similarity to the 16S rRNA, *atp*D and *gyr*B gene sequences, the *rpo*B gene sequence analysis of our birch-derived isolates showed the greatest similarity with 90-91% of the *Brenneria alni* bacterial species.

Results of the efficiency of different plant protection agents/formulations, conditioner products and other substances against *Brenneria/Lonsdalea/Acinetobacter* pathogens

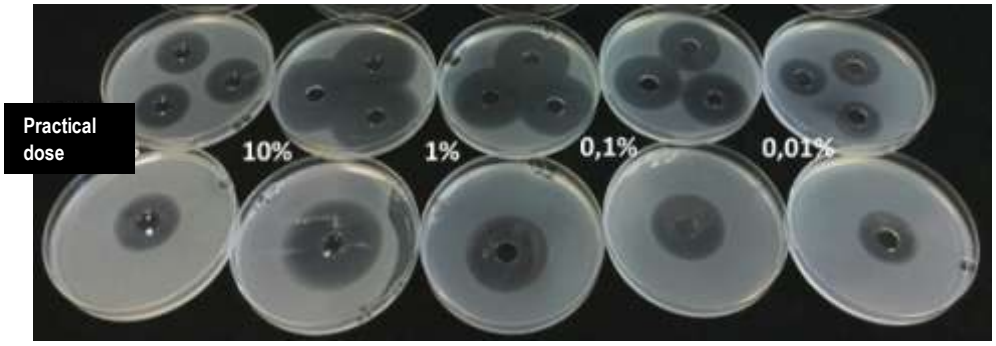
The *in vitro* antibacterial activities of different substances in different concentrations were compared on the basis of the inhibitory effect on the growth of the different bacterium species (agar dilution technique/poisoned agar plate method). Different plant protection products, antibiotics, plant conditioner, essential oils and other substances and disinfectants and a bacterium strain mixture with a concentration of 10^7 CFU were used in the experiments. The results were evaluated by comparing the efficacy of different formulations with the growth rate of the bacteria on King-B agar. Sterile distilled water was used as a control. Bacterial growth was evaluated after 24-48 hours. Agents were tested in practical doses and different concentrations.

After 24 hours incubation period no inhibition zones were detected in the control plates. The effect of the tested substances was evaluated by the comparison of the size of the inhibition zones observed on the treated and the control plates. The experiment was performed in four replicas. The size of the inhibition zones (mm) are shown in the table.

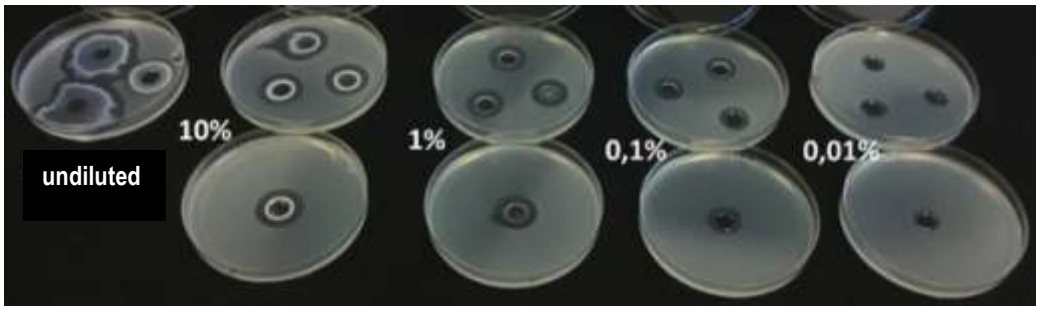
No inhibition zone was observed on the control plate after 24 hours of incubation

Plant protection formulas, conditioner products and other substances	Undiluted (mm)	Practical dose (mm)	10% (mm)	1% (mm)	0,1% (mm)	0,01% (mm)
Cupertine M	-	20.5	23.5	20	14	0
Cuproxat FW	-	12	22	15	0	0
Dithane M-45	-	14	23	21	21	13
Pluto	-	0	15.5	12	0	0
Vitra	-	0	14	0	0	0
Kasumin 2L	-	0	30	16	0	0
Streptomycin	-	32	48	40	38	27.5
Csöpp Mix	24.5	-	0	0	0	0
Fitostore F	39.3	-	25	21.6	17.6	14.3
Em-Bio	21	-	0	0	0	0
Fagél	27.9	-	-	-	-	-
100% Cranberry juice	21.1	-	0	0	0	0
Garlic pulp	32.5	-	20.8	0	0	0
Cinnamon oil	36	-	26.3	26.1	13	0
Thyme oil	22	-	18.6	11.5	0	0
10% vinegar	-	-	54.5	19.3	11	0
Hypo	40.3	-	12	0	0	0

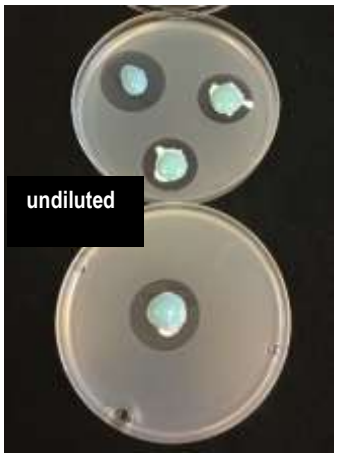
The most effective formulation was Streptomycin: in 10% dilution the inhibition zone was 48 mm. The most effective tested conditioner product was the Fitostore F solution. Csöpp Mix and Em-Bio inhibited only the growth of bacteria undiluted concentration. Fagél, which is a wound treatment material, was only tested in undiluted concentration; the inhibition zone was 27.9 mm. Fagél has undiluted bactericidal activity. Among the essential oils and natural substances, cinnamon oil proved to be the most effective, 36 mm inhibition zone was created. Out of the other substances, the bactericidal effect of the 10% vinegar was the most significant; the inhibition zone was 54.5 mm. Based on these results, we have begun the development *in vivo* plant protection options.



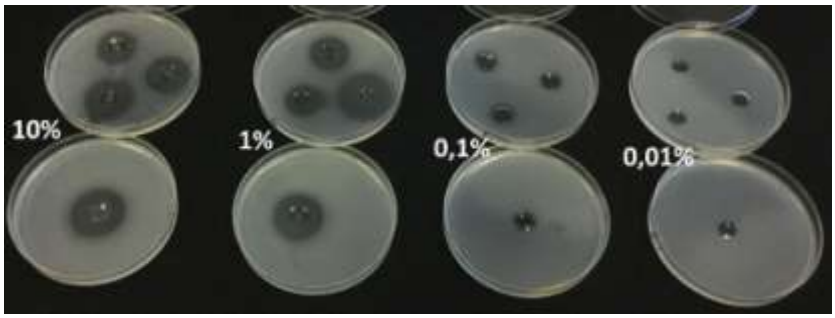
Demonstration of the antibacterial activity of Streptomycin by the inhibition zone at various dilutions



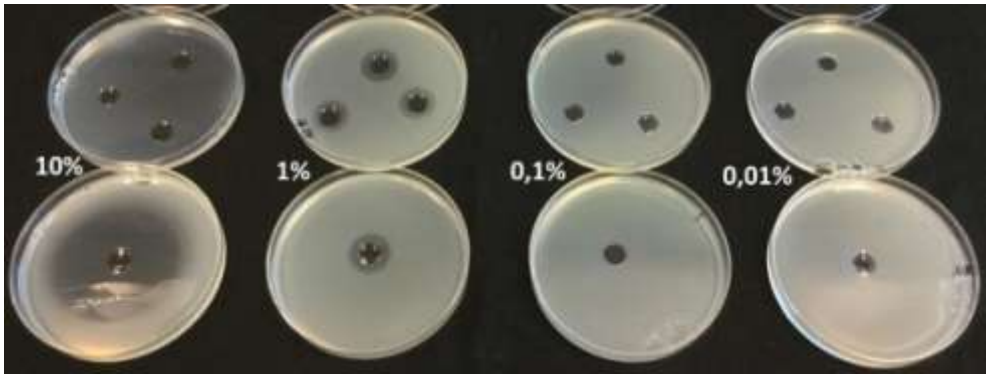
Demonstration of the antibacterial activity of Fitostore F by the inhibition zone at various dilutions



Demonstration of the antibacterial activity of Fagél by the inhibition zone at undiluted concentracion



Demonstration of the antibacterial activity of Cinnamon oil by the inhibition zone at various dilutions



Demonstration of the antibacterial activity of 10% vinegar by the inhibition zone at various dilutions

I have worked on the research plan, keeping according to the schedule and work plan except for molecular testing investigations (housekeeping genes). Detecting bacteria from the ornamental tree trunk is a difficult task. The pathogens are favoured by the warm and humid weather. Based on the experiences and observations so far, the discharge of the discharge appears in late summer-autumn. The pathogens can only be identified from the fresh effluent stream, while they have not been detected from the. The dried parts streams have not been detected so far. Isolates which were isolated collected between 2013 and 2015 were also tested. These were only isolated and identified by molecular method by identified, but other studies are in progress. Studies have now been determined. They were also included in the experiment for comparison purposes. While 45 isolates were identified by classical and molecular methods. The nucleotide sequences were uploaded in October 2019, but we have not yet received the international accession numbers yet. In the molecular assay, the 16S rRNA gene was determined for each isolate. In the case of housekeeping genes, only isolates from birch wood were identified studied. Other isolates are being tested. These studies (sample collection, identification and molecular investigations) will be continued in the future. The in vitro study of the effects of the plant extract, plant protection products, natural substances, disinfectants *in vitro* was completed. This study will continue *in vivo*. International publication of the results for some bacterial species (*Acinetobacter puyangensis, Brenneria nigrifluens* new host plants) is under way. However, further studies (fatty acid analysis and DNA hybridization) are needed to describe a new bacterial species or subspecies.

Graduate students on this subject (*MSc* in Plant Doctor):

- Hadar Zsófia: A szil brennériás betegsége, 2017

- Botyánszki Gergő: A vadgesztenye új baktériumos betegsége, 2017

- Gyapay Klára: Új adatok a platán brennériás betegségéhez, 2017

- Galambos Nikoletta: A brennériás betegség megjelenése nyírfán (*Betula pendula* Roth.)
Faculty Scientific Student Conference 1st place
National Scientific Student Circle Conference 1st place, Pro Sciencia Special Prize Winner

- Szentmihályi Zsófia: Kéregbetegséget okozó *Brenneria* és *Lonsdalea* baktériumfajok elleni védekezési lehetőségek
Prize winner of Foundation for Environmentally Friendly Plant Protection 2nd place

Current student on this subject (*MSc* in Plant Doctor):

Gyuris Rita: A vadgesztenyefák injektálása során felmerülő növénykórtani problémák

PhD student in the subject:

Tenorio Baigorria Imola (Obtained Absolutorium: 31. January 2018.)
PhD thesis: *Brenneria* nemzetséghez tartozó baktériumfajok biológiai diverzitása

Attachments

Sequence data of 16 S rRNS gene (uploading to NCBI Genebank database)

Isolate code: BS1
Origin: Budapest, 2014
Host plant: *Betula pendula* Roth..

GGTGGTAGCTGCTACTTTGCGGCGAGCGGCGGACGGGTGAGTAATGTCTGGGGATCTGCCT
GATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATCTCGGAAGAGCAAA
GTGGGGGACCTTMGGGCCTCACGCCATCGGATGAACCCAGATGGGATTAGCTAGTAGGCG
GGGTAAAGGCCCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGCCACACT
GGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCACAATGG
GGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAAGCACT
TTCAGCGGGGAGGAAGGGTGAGTGGTTAATAGCCACTTTCATTGACGTTACCCGCAGAAG
AAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAATCG
GAATGACTGGGCGTAAAGGGCACGCAGGCGGTGTGTTAAGTTGGATGTGAAATCCCCGGG
CTTAACCTGGGAACTGCATTCAAAACTGACATGCTAGAGTCTCGTAGAGGGGGGTAGAATT
CCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGGCCCC
CTGGACGAAGACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATACCCT
GGTAGTCCACGCTGTAAACGATGTCGACTTGAAGGTTGTGGCCTTGAGCCGTGGCTTTCGG
AGCAAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAATGAA
TTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGAAGAAC
CTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTAGGGAACTGA
GAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCCCGCA
ACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGAGACTGCC
GGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAGTAGGG
CTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTGCGAGGGTGAGCGGACC
TCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGGAATCG
CTAGTAATCGTAGATCAGATGYACCGTWSC

Isolate code: BSZ1
Origin: Szentendre, 2015
Host plant: *Betula pendula* Roth..

GGSSGGTAGTAGCTTGCTACTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGTCTGGGGAT
CTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATCTCGGAAG
AGCAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGAACCCAGATGGGATTAGCTAG
TAGGCGGGGTAAAGGCCCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGC
CACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCA
CAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAA
AGCACTTTCAGCGGGGAGGAAGGGTGAGTGGTTAATAGCCACTTTCATTGACGTTACCCGC
AGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTT
AATCGGAATGACTGGGCGTAAAGGGCACGCAGGCGGTGTGTTAAGTTGGATGTGAAATCC
CCGGGCTTAACCTGGGAACTGCATTCAAAACTGACATGCTAGAGTCTCGTAGAGGGGGGT
AGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGC
GGCCCCCTGGACGAAGACTGACGCCGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGAAGGTTGTGGCCTTGAGCCGTGG
CTTTCGGAGCAAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTC
AAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGC
GAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTAGG
GAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAG
TCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGA
GACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACG
AGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTGCGAGGGTGA
GCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTC
GGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTATTGSC

Isolate code: BL1
Origin: Leányfalu, 2015
Host plant: *Betula pendula* Roth..

GGRCGGTAGTAGCTTGCTACTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGTCTGGGGA
TCTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATCTCGGAA
GAGCAAAGTGGGGGACCTTCGGGCCTCACGCCATCGGATGAACCCAGATGGGATTAGCTA
GTAGGCGGGGTAAAGGCCCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAG
CCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGC
ACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTA
AAGCACTTTCAGCGGGGAGGAAGGGTGAGTGGTTAATAGCCACTTTCATTGACGTTACCCG
CAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGT
TAATCGGAATGACTGGGCGTAAAGGGCACGCAGGCGGTGTGTTAAGTTGGATGTGAAATC
CCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACATGCTAGAGTCTCGTAGAGGGGGG
TAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGG
CGGCCCCCTGGACGAAGACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGAAGGTTGTGGCCTTGAGCCGTGG
CTTTCGGAGCAAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTC
AAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGC
GAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGCGCCTTAGG
GAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAG
TCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGA
GACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACG
AGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTGCGAGGGTGA
GCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTC
GGAATCGCTAGTAATCGTAGATCAGAATGCTACGTAWTGSC

Isolate code: BJ1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth.

GGRCGGTAGTAGCTTGCTACTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGTCTGGGGA
TCTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATCTCGGAA
GAGCAAAGTGGGGGACCTTCGGGCCTCACGCCATCGGATGAACCCAGATGGGATTAGCTA
GTAGGCGGGGTAAAGGCCCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAG
CCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGC
ACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTA
AAGCACTTTCAGCGGGGAGGAAGGGTGAGTGGTTAATAGCCACTTTCATTGACGTTACCCG
CAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGT
TAATCGGAATGACTGGGCGTAAAGGGCACGCAGGCGGTGTGTTAAGTTGGATGTGAAATC
CCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACATGCTAGAGTCTCGTAGAGGGGGG
TAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGG
CGGCCCCCTGGACGAAGACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGAAGGTTGTGGCCTTGAGCCGTGG
CTTTCGGAGCAAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTC
AAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGC
GAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGCGCCTTAGG
GAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAG
TCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGA
GACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACG
AGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTGCGAGGGTGA
GCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTC
GGAATCGCTAGTAATCGTAGATCAGAATGCTACGTAWTGSC

Isolate code: BK1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

GGRCGGTAGTAGCTTGCTACTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGTCTGGGGA
TCTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATCTCGGAA
GAGCAAAGTGGGGGACCTTCGGGCCTCACGCCATCGGATGAACCCAGATGGGATTAGCTA
GTAGGCGGGGTAAAGGCCCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAG
CCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGC
ACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTA
AAGCACTTTCAGCGGGGAGGAAGGGTGAGTGGTTAATAGCCACTTTCATTGACGTTACCCG
CAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGT
TAATCGGAATGACTGGGCGTAAAGGGCACGCAGGCGGTGTGTTAAGTTGGATGTGAAATC
CCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACATGCTAGAGTCTCGTAGAGGGGGG
TAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGG
CGGCCCCCTGGACGAAGACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGAAGGTTGTGGCCTTGAGCCGTGG
CTTTCGGAGCAAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTC
AAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGC
GAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGCGCCTTAGG
GAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAG
TCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGA
GACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACG
AGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTGCGAGGGTGA
GCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTC
GGAATCGCTAGTAATCGTAGATCAGAATGCTACGTAWTGSC

Isolate code: BK3
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

AAGGRAAATAACTTGTCACTATGKCGGTCAGCGGCGTTACGGGTGAGCAAYGTCTGGGGA
TCTGYYTGATGSCKGGGGATAACTACTGGAAACTGKAKCTAATACCGCATAWTCTCGGAA
GAGCAAAGTGGGGGACCTTCGGGCCTCWCKCCATCGGATGAACCCAGATGGGATTAGCTA
GTAGGCGGGGTAAAGGCCCACCTAGGCGACSATCCCTAGCTGGTCTGAGAGGATGACCAA
CCCGCTGGAACTGATACTCSGTCCACACTCCTACGGGAGGCAGCCGTGGGCAATATTGCAC
AATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAA
GCACTTTCAGCGGGCAGGAAGGGTGAGTGGTTAATAACCACTTTCATTGACGTTACCCGCA
GAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTA
ATCGGAATGACTGGGCGTAAAGGGCACGCAGGCGGTGTGTTAAGTTGGATGTGAAATCCC
CGGGCTTAACCTGGGAACTGCATTCAAAACTGACATGCTAGAGTCTCGTAGAGGGGGGTA
GAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCG
GCCCCCTGGACGAAGACTGACGCTGAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGAT
ACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGAAGGTTGTGGCCTTGAGCCGTGGCT
TTCGGAGCAAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAA
ATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGA
AGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGTGCCTTAGGGA
ACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTC
CCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGGAGA
CTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAG
TAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTGCGAGGGTGAGC
GGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGG
AATCGCTAGTAATCGTAGATCAGAAKCTACGWWTTGCCC

Isolate code: Bp. Aes. 1
Origin: Budapest, 2015
Host plant: *Aesculus hippocastanum*

GAWMMGAAGARCTTGCTTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAA
ACTGCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAA
GACCAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTA

GTAGGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAG
CCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGGGGCAGCAGTGGGGAATATTGC
ACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTA
AAGCACTTTCAGCGGGGAGGAAGGCAACAAAGCTAATAAGTTTGTTGATTGACGTTACCC
GCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCG
TTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAAT
CCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGG
GTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAG
GCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGGGCAAACAGGATTA
GATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTG
GCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACT
CAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACG
CGAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGTGCCTTCG
GGAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAA
GTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGG
AGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTAC
GAGCAGGGCTACACACGTGCCACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGT
AAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAA
GTCGGAATCGCTAGTAATCGTAGATCAGATGCTACGTAATT

Isolate code: BG1B
Origin: Budapest, 2015
Host plant: *Aesculus hippocastanum*

GAGCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGT
CTGGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAAC
GTCGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGGGA
TTAGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGA
TGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGA
ATATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTTCG
GGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATTGACG
TTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTG
CAAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATG
TGAAATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAATGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAAC
TCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGG
CCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCTGC
GAGGGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCGGGC

Isolate code: Szil1
Origin: Budapest, 2015
Host plant: *Aesculus hippocastanum*

GAGCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAAT
GTCTGGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATA
ACGTCGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGG
GATTAGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAG
GATGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGG
GAATATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTT
CGGGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATTGA

CGTTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGG
TGCAAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGA
TGTGAAATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTA
GAGGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGT
GGCGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAA
CAGGATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTT
GAACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGG
TTAAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCG
ATGCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAAT
GTGCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATG
TTGGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGA
ACTCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCAT
GGCCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCT
GCGAGGGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGAC
TCCATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCGG
GC

Isolate code:Hu-Bn- Pl 6
Origin: Budapest, 2018
Host plant: *Platanus* x *acerifolia* Ait.

GRTMGAGGGRCTTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACT
GCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGAC
CAAAGTGGGGGACCTTCGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGTA
GGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGCCTGAGAGGATGACCAGCCA
CACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCACA
ATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCTTTCGGGTTGTAAAG
CACTTTCAGCGGGGAGGAAGGCAACAAAGCTAATAAGTTTGTTGATTGACGTTACCCGCA
GAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTA
ATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCCC
CGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGTA
GAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCG
GCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGAT
ACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGGCT
TCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAA
ATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGA
AGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGGGA
ACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTC
CCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGAG
ACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGA
GTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAAG
CGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCG
GAATCGCTAGTAATCGTAGATCAGAAKCTACGTATGCC

Isolate code: Hu-Bn-Pl 7
Origin: Siófok, 2017
Host plant: *Platanus* x *acerifolia* Ait.

MATCGAGAGCTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACTGC
CTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGACCA
AAGTGGGGGACCTTCGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGTAGG
CGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGCCTGAGAGGATGACCAGCCACA
CTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCACAAT
GGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAAGCA
CTTTCAGCGGGGAGGAAGGCAACAAAGCTAATAAGTTTGTTGATTGACGTTACCCGCAGA
AGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAAT
CGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCCCCG
GGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGTAGA

ATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGGC
CCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATAC
CCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGGCTTC
CGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAT
GAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGAAG
AACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGGGAAC
TGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCCC
GCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGAGAC
TGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAGT
AGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAAGC
GGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGG
AATCGCTAGTAATCGTAGATCAGAAKCTACGTATGCC

Isolate code: Hu-Bn-Pl 8
Origin: Balatonfüred, 2018
Host plant: *Platanus* x *acerifolia* Ait.

GGATMGAGGAGCTTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAAC
TGCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGA
CCAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGT
AGGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGCC
ACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCAC
AATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAA
GCACTTTCAGCGGGGAGGAAGGCAATAAGGTTAACAACCTTGTTGATTGACGTTACCCGC
AGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTT
AATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCC
CCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGT
AGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGC
GGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAG
ATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGG
CTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTC
AAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGC
GAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGG
GAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAG
TCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGA
GACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACG
AGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAA
GCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTC
GGAATCGCTAGTAATCGTAGATCAGAAKCTACGATGST

Isolate code: Hu-Bn-Pl 9
Origin: Budapest, Margaret-island, 2017
Host plant: *Platanus* x *acerifolia* Ait.

GGTMGAGGRCTTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACTG
CCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGACC
AAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGTAG
GCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGCCAC
ACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAATATTGCACAA
TGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAAGC
ACTTTCAGCGGGGAGGAAGGCAATAAGGTTAACAACCTTGTTGATTGACGTTACCCGCAG
AAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAA
TCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCCCC
GGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGTAG
AATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGG
CCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATA
CCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGGCTT

CCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAA
TGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGAA
GAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGGGAA
CTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCC
CGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGAGA
CTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAG
TAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAAGC
GGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGG
AATCGCTAGTAATCGTAGATCAGAAKCTACGTAATTGC

Isolate code: Hu-Bn-Pl 10
Origin: Balatonfüred, 2017
Host plant: *Platanus* x *acerifolia* Ait.

MGWMGAGGGRCTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACT
GCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGAC
CAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGTA
GGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGCCA
CACTGGAACTGAGACACGGTCCAGACTCTACGGGAGGCAGCAGTGGGGAATATTGCACAA
TGGGGGAAACCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAAGCA
CTTTCAGCGGGGAGGAAGGCAATAAGGTTAACAACCTTGTTGATTGACGTTACCCGCAGA
AGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAAT
CGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCCCCG
GGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGTAGA
ATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGGC
CCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATAC
CCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGGCTTC
CGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAT
GAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGAAG
AACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGGGAAC
TGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCCC
GCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGAGAC
TGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAGT
AGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAAGC
GGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGG
AATCGCTAGTAATCGTAGATCAGAAKCTACGTAATTGGC

Isolate code: SZ1Bu
Origin: Budapest, 2017
Host plant: Ulmus sp.

GAGCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGT
CTGGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAAC
GTCGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGGGA
TTAGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGA
TGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGA
ATATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTTCG
GGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATTGACG
TTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTG
CAAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATG
TGAAATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT

AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAATGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAAC
TCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGG
CCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCTGC
GAGGGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCG

Isolate code: SZ2Bu
Origin: Budapest, 2018
Host plant: Ulmus sp.

GAGCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGT
CTGGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAAC
GTCGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGGGA
TTAGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGA
TGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGA
ATATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTTCG
GGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATTGACG
TTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTG
CAAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATG
TGAAATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAATGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAAC
TCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGG
CCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCTGC
GAGGGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCG

Isolate code: Sz4Bu
Origin: Budapest, 2018
Host plant: Ulmus sp.

GAGCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGT
CTGGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAAC
GTCGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGGGA
TTAGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGA
TGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGA
ATATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTTCG
GGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATTGACG
TTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTG
CAAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATG
TGAAATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA

GGATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAATGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAAC
TCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGG
CCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCTGC
GAGGGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCG

Isolate code: Sz5Bu
Origin: Hódmezővásárhely, 2018
Host plant: Ulmus sp.

GAGCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGT
CTGGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAAC
GTCGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGGGA
TTAGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGA
TGACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGA
ATATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTTCG
GGTTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATTGACG
TTACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTG
CAAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATG
TGAAATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAATGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAAC
TCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGG
CCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCTGC
GAGGGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCG

Isolate code: Sz6Bu
Origin: Kecskemét, 2018
Host plant: Ulmus sp.

GCGGCAGCGGGAAGAAGCTTGCTTCTTTGCCGGCGAGCGGCGGACGGGTGAGTAATGTCT
GGGGATCTACCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAACGT
CGCAAGACCAAAGTGGGGGACCTTAGGGCCTCACACCATCGGATGAACCCAGATGGGATT
AGCTAGTAGGTGGGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATG
ACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAAT
ATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTATGAAGAAGGCCTTCGGG
TTGTAAAGTACTTTCAGCGGGGAGGAAGGGGGAAGATTTAATACGTCTTCTCATGACGTTA
CCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAA
GCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGA
AATCCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGG

GGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCG
AAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGG
ATTAGATACCCTGGTAGTCCACGCTGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAAC
CGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAA
AACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGC
AACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGTTTGCAGAGATGCGAATGTGCC
TTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGG
TTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCA
AAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCC
TTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGACCCTGCGAG
GGCGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATG
AAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCG

Isolate code: Bp. Aes. 2
Origin: Budapest, 2018
Host plant: *Aesculus hippocastanum*

GAWMMGAAGARCTTGCTTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAA
ACTGCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAA
GACCAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTA
GTAGGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAG
CCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGGGGCAGCAGTGGGGAATATTGC
ACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTA
AAGCACTTTCAGCGGGGAGGAAGGCAACAAAGCTAATAAGTTTGTTGATTGACGTTACCC
GCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCG
TTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAAT
CCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGG
GTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAG
GCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGGGCAAACAGGATTA
GATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTG
GCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACT
CAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACG
CGAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGTGCCTTCG
GGAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAA
GTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGG
AGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTAC
GAGCAGGGCTACACACGTGCCACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGT
AAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAA
GTCGGAATCGCTAGTAATCGTAGATCAGATGCTACGTAATT

Isolate code: Bp. Aes. 3
Origin: Budapest, 2019
Host plant: *Aesculus hippocastanum*

GAWMMGAAGARCTTGCTTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAA
ACTGCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAA
GACCAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTA
GTAGGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAG
CCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGGGGCAGCAGTGGGGAATATTGC
ACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTA
AAGCACTTTCAGCGGGGAGGAAGGCAACAAAGCTAATAAGTTTGTTGATTGACGTTACCC
GCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCG
TTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAAT
CCCCGGGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGG
GTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAG

GCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGGGCAAACAGGATTA
GATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTG
GCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACT
CAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACG
CGAAGAACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTTTTGTGCCTTCG
GGAACTGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAA
GTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATTCGGTCGGGAACTCAAAGG
AGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTAC
GAGCAGGGCTACACACGTGCCACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGT
AAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAA
GTCGGAATCGCTAGTAATCGTAGATCAGATGCTACGTAATTTSC

Isolate code: Hu-Bn-Pl 11
Origin: Mátészalka, 2019
Host plant: *Platanus* x *acerifolia* Ait.

MGWMGAGGGRCTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACT
GCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGAC
CAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGTA
GGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGCCA
CACTGGAACTGAGACACGGTCCAGACTCTACGGGAGGCAGCAGTGGGGAATATTGCACAA
TGGGGGAAACCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAAGCA
CTTTCAGCGGGGAGGAAGGCAATAAGGTTAACAACCTTGTTGATTGACGTTACCCGCAGA
AGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAAT
CGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCCCCG
GGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGTAGA
ATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGGC
CCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATAC
CCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGGCTTC
CGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAT
GAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGAAG
AACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGGGAAC
TGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCCC
GCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGAGAC
TGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAGT
AGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAAGC
GGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGG
AATCGCTAGTAATCGTAGATCAGAAKCTACGTAATTGGC

Isolate code: Hu-Bn-Pl 12
Origin: Debrecen, 2019
Host plant: *Platanus* x *acerifolia* Ait.

MGWMGAGGGRCTGCTCTTGGGTGACGAGCGGCGGACGGGTGAGTAATGTCTGGGAAACT
GCCTGATGGCGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATAATGTCGCAAGAC
CAAAGTGGGGGACCTTAGGGCCTCACGCCATCGGATGTGCCCAGATGGGATTAGCTAGTA
GGCGAGGTAAAGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGATGACCAGCCA
CACTGGAACTGAGACACGGTCCAGACTCTACGGGAGGCAGCAGTGGGGAATATTGCACAA
TGGGGGAAACCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGGGTTGTAAAGCA
CTTTCAGCGGGGAGGAAGGCAATAAGGTTAACAACCTTGTTGATTGACGTTACCCGCAGA
AGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGCAAGCGTTAAT
CGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTCTGTTAAGTTGGATGTGAAATCCCCG
GGCTTAACCTGGGAACTGCATTCAAAACTGACAGGCTAGAGTCTCGTAGAGGGGGGTAGA
ATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGGCGAAGGCGGC

CCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACAGGATTAGATAC
CCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGAACCGTGGCTTC
CGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTTAAAACTCAAAT
GAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGATGCAACGCGAAG
AACCTTACCTACTCTTGACATCCTCAGAAGAGACTGGAGACAGTCTTGTGCCTTCGGGAAC
TGAGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTTGGGTTAAGTCCC
GCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCGATACGGTCGGGAACTCAAAGGAGAC
TGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATGGCCCTTACGAGT
AGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCTCGCGAGGGTAAGC
GGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTCCATGAAGTCGG
AATCGCTAGTAATCGTAGATCAGAAKCTACGTAATTGGC

Isolate code: Bs-HuB2
Origin: Budapest, 2019
Host plant: *Salix alba*

GGGCGGTAGCACAGAGGAGCTTGCTCCTTGGGTGACGAGCGGCGGACGGGTGAGTAAAGT
CTGGGGATCTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATGAC
GTCTTCGGACCAAAGTGGGGGACCTTCGGGCCTCACGCCATGAGATGAACCCAGATGGGA
TTAGCTGGTAGGTGAGGTAACGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGAT
GACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAA
TATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGG
GTTGTAAAGCACTTTCAGCGGGGAGGAAGGCGATAAACTTAATAAGTTTGTTGATTGACGT
TACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGC
AAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTGTGTTAAGTTGGATGT
GAAATCCCCGGGCTCAACCCGGGAACAGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGACTGTAGAGATACGGTTGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCACGTAATGGTGGGAA
CTCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATG
GCCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTG
CGAGGGTGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCGGGC

Isolate code: Bs-HuB3
Origin: Budapest, 2019
Host plant: *Salix alba*

GGGCGGTAGCACAGAGGAGCTTGCTCCTTGGGTGACGAGCGGCGGACGGGTGAGTAAAGT
CTGGGGATCTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATGAC
GTCTTCGGACCAAAGTGGGGGACCTTCGGGCCTCACGCCATGAGATGAACCCAGATGGGA
TTAGCTGGTAGGTGAGGTAACGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGAT
GACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAA
TATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGG
GTTGTAAAGCACTTTCAGCGGGGAGGAAGGCGATAAACTTAATAAGTTTGTTGATTGACGT
TACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGC
AAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTGTGTTAAGTTGGATGT
GAAATCCCCGGGCTCAACCCGGGAACAGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG

CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGACTGTAGAGATACGGTTGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCACGTAATGGTGGGAA
CTCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATG
GCCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTG
CGAGGGTGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCGGGC

Isolate code: Bs-HuB4
Origin: Balatonalmádi, 2019
Host plant: *Salix alba*

GGGCGGTAGCACAGAGGAGCTTGCTCCTTGGGTGACGAGCGGCGGACGGGTGAGTAAAGT
CTGGGGATCTGCCTGATGGAGGGGGATAACTACTGGAAACGGTAGCTAATACCGCATGAC
GTCTTCGGACCAAAGTGGGGGACCTTCGGGCCTCACGCCATGAGATGAACCCAGATGGGA
TTAGCTGGTAGGTGAGGTAACGGCTCACCTAGGCGACGATCCCTAGCTGGTCTGAGAGGAT
GACCAGCCACACTGGAACTGAGACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGGGAA
TATTGCACAATGGGGGAAACCCTGATGCAGCCATGCCGCGTGTGTGAAGAAGGCCTTCGG
GTTGTAAAGCACTTTCAGCGGGGAGGAAGGCGATAAACTTAATAAGTTTGTTGATTGACGT
TACCCGCAGAAGAAGCACCGGCTAACTCCGTGCCAGCAGCCGCGGTAATACGGAGGGTGC
AAGCGTTAATCGGAATGACTGGGCGTAAAGCGCACGCAGGCGGTGTGTTAAGTTGGATGT
GAAATCCCCGGGCTCAACCCGGGAACAGCATTCAAAACTGACAGGCTAGAGTCTCGTAGA
GGGGGGTAGAATTCCAGGTGTAGCGGTGAAATGCGTAGAGATCTGGAGGAATACCGGTGG
CGAAGGCGGCCCCCTGGACGAAGACTGACGCTCAGGTGCGAAAGCGTGGGGAGCAAACA
GGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGTCGACTTGGAGGCTGTGGTCTTGA
ACCGTGGCTTCCGGAGCTAACGCGTTAAGTCGACCGCCTGGGGAGTACGGCCGCAAGGTT
AAAACTCAAATGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAT
GCAACGCGAAGAACCTTACCTACTCTTGACATCCAGAGAAGACTGTAGAGATACGGTTGT
GCCTTCGGGAGCTCTGAGACAGGTGCTGCATGGCTGTCGTCAGCTCGTGTTGTGAAATGTT
GGGTTAAGTCCCGCAACGAGCGCAACCCTTATCCTTTGTTGCCAGCACGTAATGGTGGGAA
CTCAAAGGAGACTGCCGGTGATAAACCGGAGGAAGGTGGGGATGACGTCAAGTCATCATG
GCCCTTACGAGTAGGGCTACACACGTGCTACAATGGCGCATACAAAGAGAAGCGAGCCTG
CGAGGGTGAGCGGACCTCATAAAGTGCGTCGTAGTCCGGATTGGAGTCTGCAACTCGACTC
CATGAAGTCGGAATCGCTAGTAATCGTAGATCAGAATGCTACGGTGAATACGTTCCCGGGC

Sequence data of *atp*D gene (uploading to NCBI Genebank database)

Isolate code: BS1
Origin: Budapest, 2014
Host plant: *Betula pendula* Roth..

GGGGWCAKWCGCASATCGCATGTGCTCWTCGACGGCYTGMGYCGCGGSTTGCACGTAAC
CACACWGGTGCACGCGATTGMGTACCGGTCGGTAAGGMRACRCTGGGTCGCATCATGAA
CGTGCTGGGCGAKCCGATCGAYGARSSMGGCCCGATCGGTGARCAASAGCGCWKGYCSAT
CCACCGWCCGCCCCGAGCTATGMCGATCWGRCMRCCTCKMASGARCTGCTGGAAACCGG
TATCAARGTSATCGAYCTGRTSTGCCCSTTTGCYAAGGGCGGYAAGGTSGGTCTGTTCGGTG

GTGCSGGTGTAGGTAAAACCGTKAACATGATGGAGCTYATCCGCAACATCGCCAYCGAGC
ACASCGGYTACTCYGTGTTCGCCGGYGTGGGTGAGCGTACGCGTGAGGGTAACGACTTCTA
TCATGAAATGACCGAATCCAACGTTATCGACAARGTAWCGCTTGTCTATGGTCAGATGAA
CKAGCCGCCSGGCAACCGWCTGCGCGTCSCGYTGACCGGYCTGACCATSGCTGAAAAATTC
CGTGATGAASGCCGYGACGTYCTGMTGTTCGTCGATAACATCTAYCGTTACACCCTGGCCG
GTACCGAAGTATCCGCCCTGCTGGGGRARTWWKCCKYMCMTRCKKRGGCTACCAGCCGA
CGCTGGCGGAAGAAATGGGCGTGTTGCAAGAACGTATAACTTCCACGAAAACCGGTTCTA
TCACATCGGTTCAGGCWRTWTAYGTWCCKGCGGATGAAMCCGASGTTSKGAATCTGTTTG
CCGGGAAGTCCACCTCCTTGAAACCGGCTTTCCAGCAGCGMGGGGGGGGGSRACGCGAGG
GAWTCAYCCCTCATRGGCTTACTCTCTTYCCCACCGTKTTCTATGGTKYTTTTKRTTATRGW
ACARCTWGTCTCTTACTTTCCTKTTTCTTTTTRCYCTGCTGGM

Isolate code: BSZ1
Origin: Szentendre, 2015
Host plant: *Betula pendula* Roth..

GGGGTCAKACGCTSTTCGCATGGGCTCTTCCGACGGCCTGCGTCGCGGGTTGAACGTMR
CKAACCTGGGACACSCGATTGAAGTACCGGTTGGTAAAGCSACACTGGGYCGTATCATGAA
CGTRCTGGGTGATCCGRTCGACATGAAAGGCGATATYGGYGAAGAAGAACGYTGGGCTAT
TCACCGYYCKGCACCWWSCTACGAAGAKYTGTCCAACTCKCAGGAWCTGCTGGAAACCG
GYATCAAGGTKATYGACCTGATGTGTCCGTTYGCCAAGGGCGGYAAAGTYGGYYTGTTYG
GCGGTGCKGGYGTAGGTAAAACSGTMAACATGATGGAGYTKATYCGTAACATYGCGATYG
AGCACTCCGGTTWCTCSGTGTTTGCSGGYGTGGGYGARCGTACCCGTGAAGGTAAYGACTT
CTACCACGAAATGACCGAYTCCAACGTTATCGAYAAAGTTTCRCTKGTCTATGGTCAGATG
AACRARCCRCCGGGTAACCGTCTGCGYGTKGCRYTGACCGGTCTGACCATGGCGGAAAAR
TTCCGTGASGAAGGTCGTGACGTMCTGYTGTTTATCGATAACATYTATCGYTACACCCTGG
CTGGTACWGAAGTRTCYMMMCMTMWGTRAMMGAMRWWWGCCTMMMWYRGKKKRGG
CTACMAGCCGACGCTGGCGRAAGAAATGGGCGTGTTGCAAGAACGTATAACTTCCACGAA
AACCGGTTCTATCACATCGGTTCAGCYRTWTAYGTACCTGCGGATGAAGTATCCGMACTR
MTKGGACCGKTTTCGWGGAAYTATAGTTYTTGGMACACSCATTTTCTTCCGSCGCGTCMG
MTGGTATCAASCCAAASWMWACMACTWAAYAAGAATATTCTTYTYTAYCAKGCGAKGSG
GAASTGTACGKGTAKCCAGAACAAYGACTCTCAATTTTCSYACAKATKTTAACCTTAGMTA
RCSGTCAAGGCMCASAAGAATGTYTAMCATRSGTTYGTGMGTGAACATAAACATGAAACK
TGWCCRTCACATTGMATSGATCATTSSTSGAARAAAKSATGAACMTMMCRMGCRTMAATA
CGCAACGCKCARCRGYAATAACA

Isolate code: BJ1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth.

AAGGGGCTGTCGCTGTTCGCATGGGCTCTTCGACGGCCTGCGTCGCGGSTTGAACGTMACK
AACCTGGGACACGCGATTGAAGTAYCSGYWGGTAWRGSSACACTGGGYCGTATCATGAAC
GTRCTGGGTGATCCGRTCGACATGAAAGGCGAYATYGGYGAAGAAGARCGYTGGGCTATT
CACCGYYCKGCACCWWCYTACGAAGAKYWGTCCAACTCKCASGAWCTGCTGGAAACCGG
YATCAAGGTKATYGACCTGATGTGTCCGTTYGCCAAGGGCGGYAAAGTYGGYYTGTTYGG
YGGTGCCGGYGTAGGTAAAACSGTMAACATGATGGAGYTGATCCGTAACATCGCGATSGA
GCACTCCGGTTACTCCGTGTTTGCYGGYGTGGGYGARCGTACCCGTGAAGGTAAYGACTTC
TACCACGAAATGACCGAYTCCAACGTTATCGAYAAAGTTTCRCTGGTCTATGGTCAGATGA
ACGAGCCRCCGGGTAACCGTCTGCGYGTKGCRYTGACCGGTCTGACCATGGCGGAGAAGT
TCCGTGASGAAGGTCRYGACGTMCTGYTGTTYATCGATAACATCTATCGYTACACCCTGGC
YGGTACWGAAGTRTCYGCMYTRYTKGGAGTATGCCTTCAGCKGTAKGCTACCAGCCGACG
CTGSCGGAAGAAATGGRMRTGTTGCAAGAACGTATAACTTCCACGAAAACCGGTTCTATC
ACATCGGTTCAGGCCRTWTAYGTWCCTGCGSATGAKAWACCCATCTGATTGGCCGGGGTT
TCCGTGAGATTTAGTTSTTGCACTAMCCCTTTWWTTTCACCCCTGGGGAGGCAGCCGCCGA
ATAARACTCACMMCAAATGAAGAWACCCTCTTCAASCGAGKTGKAGGWGCTTTAATTGTR
AKCWTATCAASAAGCTTCCCAGGTTTTCATGGARTTATATTTTCGGAAAWAGAKTGAGGC
CYTCGGGAATCTTACYCGGGGWTGGTAASTGMWTCAACTCTGGACCTGTGACTTGGGTTA

GGTACCGTTATRWTCCRGASCCATAGCTTAATTGACAGCACSGTTTTGCTSGCCCCCAYCGG
ARATGCCGGGTCAM

Isolate code: BK1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

GMAGSCGGATCGCWSTTCGCATGGGYTCTTCGACGCCTGMGYGYGGTCTGACGTCACTGA
ACTCTGGCACACSCCATCTCCGTACCGGTCTGTAWGCSACCCTGGGCCGKATCATGRACGT
CCTGGGTGAKCCGATCGACATGAAAGGYCCYATCGACACCGAAGAGCGCTGGGSKATTCA
CCGYCCTGCRCCTTCCTWCGMRGAWCWRKCSRRCTCYMASGAYCTGCTGGAAACCGGCAT
CAAGGTTATCGACCTGRTKTGYCCGTTCGCCAAGGGCGGTAAAGTCGGTCTGTTCGGYGGT
GCCGGTGTAGGYAAAACCGTAAACATGATGGARCTGATCCGTAACATCGCSATCGAGCAC
TCCGGTTACTCCGTGTTTGCCGGTGTGGGTGAGCGTACYCGTGARGGTAACGACTTCTACC
ACGARATGAMCGATTCCAACGTTMTGGACAAAGTGKCATTGGTTTAYGGTCAAATGAACG
AGCCGCCGGGTAACCGTCTGCGCGTAGCACTGACCGGCCTGACCATGGCCGAGAAGTTCC
GTGACGAAGGTAACGACGTTCTGCTGTTCRTCGACAACATCTATCGYTACACCCTGGCCGG
TACTGAAGTATCCGCACCTRCTKGGGACYATGCCKACAGCKGTAGGCTACAATCYACGCT
GGCCCACAARYGMACGAGTGCAKWGCAYATATCTTCCCCSAAACTGCTTAATSTCATCAG
TTAAGCKATATATACCCTGAYRCCCAGGMWCCRACGAGATCAMCRSYTTCGSGGAATTAW
RATTTATGGGCCWSGCTCATYTCTTCASMTAGMGCSCKKGGKAMTRCTGCCRCRAGGCTA
GMYTACTAMTGAATTGWCKTTTYCCCACRAGRTAGTGACTCWTGTYSTTGTATCGTGTASC
CRACAMMCTAKWAGCWTGATTTKCAYWACTCKTWCYCRAGATAATTSSCCGTKCGGAWC
TCGRCATCGTGMTGCAARCATACYWCTACACACTGAMAGGAMYGYTTYGMYTACAGTCA
STTMTCGKTSGATCCATTGACATAMAGCAMAGAMCGTATTGCKTGKCACKRYYTAGWSSA
RCTGCACAWAACTYTC

Isolate code: BK3
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

GGAGGSRTTTTGTTRTTGCATGGGTTCTYCGACGCYTGMGCSYGGYCTGGACGTYATCAAC
CTGGCACMGCCATCTCCGTACCGGTMGGYAARGCRACMCTGGGYCGSATCATGGACGTMC
TGGGYAACCCCATCSACSAAGCSGGCCCGATCGRMRMCGAAGAGCGCTGGRGTATCCACC
GYSCTGCGCCTTCCTTCKCYGATCWGGCTGGCKSCMACGAMCTGCTGGAAACCGGYATCA
AGGTYATCGACCTGRTKTGYCCGTTTGCCAAGGGCGGTAAAGTCGGTCTGTTCGGTGGTGC
CGGTGTMGGYAARACCGTAAACATGATGGARCTGATCCGTAACATCGCSATSGAGCACWS
CGGTTATTCCGTGTTYGCTGGTGTGGGYGAGCGYACCCGTGAGGGTAACGACTTCTACCAC
GAGATGAMSGACTCCAACGTTCTGGACAAAGTRKCGCTGGTCTACGGYCARATGAACGAG
CCGCCGGGWAACCGTCTGCGCGTTGCRCTGACTGGYCTGACCATGGCTGAGAAGTTCCGT
GACGAAGGTMRYGACGTTCTGCTGTTCRTCGACAACATCTATCGTTACACACTGGCCGGTA
CYGAAGTATCCGCACTRCTGGGAMSKTTTGCSTTCMTCGGTAGTTTATTCMTTGAMGKTGG
TCGAAAAAAAGRGCGKGGCGGGRRAYCGTATACTTCCSCGAACCCCGGTTCTACCTATAAA
TTCACGTGWATCGTTATYCCTGACGTACCACRATCATCCTCCAACCCGATAAAAAGAATTT
TTMAGWTTTTGCCGCCCTCTCCTTCTTTCGCGCACRCGGGGGCCMYACCGGGAAGSSWWW
ACACTTTCTTCGTATTTCCCTGGTCTGAGGGGTAAMATTTTTTTTGACGTACRCSCKYGSCA
ATATTCTCGGGTTATATTTATTTTAATACCSCARCGGCTTTGTGTCCTCTGTGTGGTGTCCCC
CKMSSCRAWAAAMAWATCCCCTATATCTMSGACCACASCTTTCTATCGCTAAATTGTGTCC
CGTKAARWAAAAACACACAGGAGACAATAGTRGTGTRTATTGGWGTCGGCTTGGGTGTGA
AATMTTC

Sequence data of *gyr*B gene (uploading to NCBI Genebank database)

Isolate code: BS1
Origin: Budapest, 2014
Host plant: *Betula pendula* Roth..

AYMAMCMGAMGAATCAGTATGACATTCTGGCCAAACGTCTGCGTGAGCTGTCGTTCCTGA
ACTCGGGTGTTTCTATCCGCTTGTTTGATGAACGCGAAAAAGATAAATCCGACCACTTCCA
CTACGAAGGTGGTATCAAAGCCTTTGTTGATTACCTCAACAGAAACAAGACGCCCATTCAT
CCGACGGTATTCTATTTTTCCACGGTGAAAGATGGTATCGGCGTTGAAGTGGCGTTGCAGT
GGAATGACGGCTTCCAGGAAAATATTTACTGCTTTACCAACAATATCCCGCAGCGTGACGG
CGGTACGCACCTGGCCGGTTTCCGTGCCGCGATGACCCGTACCCTGAACACCTATATGGAT
AAAGAGGGCTACAGCAAGAAAGCCAAGATCAGCGCCACCGGCGACGATGCGCGTGAAGG
CCTGATTGCCGTGGTTTCCGTTAAAGTGCCCGATCCGAAGTTCTCCTCTCAGACCAAAGAT
AAACTGGTGTCATCGGAAGTGAAAACCGCCGTTGAATCGCTGATGAATGARAAGCTGGTG
GACTATCTGATGGAAAACCCGTCARACGCTAAAATCGTGGTCGGSAAAATTATTGATGCGG
CCCGTGCCCGTGAAASCGGCRCGTAAAGCSCGWGATATGACCCGCCGTAAAGAAACCAAC
AAAAMRAAATTTCATTATGAMWTTCTGCGCARSCTSYCGGRGCGTCTTCTGAAMTCGGGG
GTTTCTATCCCTTGTTTGATGAASCAAAARATAAWTCGACYYTCTRMARGGGGGGWAWCA
ACCTTTTTTGATYAWCCRAAAAMARMACCMTTCTCSACGGTWWTYTWTTTTTCMGGGGA
AAAAKGGTATCGGSCTTGAAAAKGSSTTGCMCTGGAATGACGGCTYCTAAAAATATTTTW
GCTTTCATTATCCMCGGGMGGGSGTCRCGSCTTTSYGCGCMKKMCSTMACCTGAAMCMTT
TAGGGATAAAARARGGGTMWYARMAAAAAASCAAAAYACCCCCCGCMCAAAWYRCGCK
GGAGASGSAAGTGGSGGGGTYTCTTAAA

Isolate code: BSZ1
Origin: Szentendre, 2015
Host plant: *Betula pendula* Roth..

TCAGTATGACATTCTGGCCAAACGTCTGCGTGAGCTGTCGTTCCTGAACTCGGGTGTTTC
TATCCGCTTGTTTGATGAACGCGAAAAAGATAAATCCGACCACTTCCACTACGAAGGTGGT
ATCAAAGCCTTTGTTGATTACCTCAACAGAAACAAGACGCCCATTCATCCGACGGTATTCT
ATTTTTCCACGGTGAAAGATGGTATCGGCGTTGAAGTGGCGTTGCAGTGGAATGACGGCTT
CCAGGAAAATATTTACTGCTTTACCAACAATATCCCGCAGCGTGACGGCGGTACGCACCTG
GCCGGTTTCCGTGCCGCGATGACCCGTACCCTGAACACCTATATGGATAAAGAGGGCTACA
GCAAGAAAGCCAAGATCAGCGCCACCGGCGACGATGCGCGTGAAGGGCTGATTGCCGTGG
TTTCCGTTAAAGTGCCCGATCCGAAGTTCTCCTCTCAGACCAAAGATAAACTGGTGTCATC
GGAAGTGAAAACCGCCGTTGAATCGCTGATGAATGAGAAGCTGGTGGACTATCTGATGGA
AAACCCGTCAGACGCTAAAATCGTGGTCGGCAAAATTATTGATGCGGCCCGTGCCCGTGA
AGCGGCGCGTAAAGCGCGTGATATGACMCGCCCGTAAAGAACMCCAACMARAMATAATT
TCARTATGACRTTCTGGCMAACGTCGGGWGASTGTCGTTCCTKAACTYGGGTGTTTTCTAT
CCGKTGGWAGAWRAACRCAAAAASATAWMTCCGACCTCTMSAARGGGGGKTTTYAARCT
TTTGTTKAWWAMCCAMAMAAMACRCATTCATCKWYGKTATTCTATTTTTTCMGTGAAGA
WGGTATCGCGTTGAAGTGGCGTTGCRTGGAAWGACGCTACAGAAAATATTTAMTGCTTAC
AACAKATSACKGSRCKSGSWCWTKCTKCCSATGACGTACCTGAAACTAWGGAWAAAGAG
GCTMGCAGAGCAGATCWGCWCSCAMAARTCGCYGKARGGCGATGKCGGGTTSTTTAAGC
MWCMAAATTCTYCMAMACAAAT

Isolate code: BJ1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth.

CCGCATCAATAATTTTGCCGACCACGATTTTAGCGTCTGACGGGTTTTCCATCAGATAGTCC
ACCAGCTTCTCATTCATCAGCGATTCAACGGCGGTTTTCACTTCCGATGACACCAGTTTATC
TTTGGTCTGAGAGGAGAACTTCGGATCGGGCACTTTAACGGAAACCACGGCAATCAGGCC
TTCACGCGCATCGTCGCCGGTGGCGCTGATCTTGGCTTTCTTGCTGTAGCCCTCTTTATCCA
TATAGGTGTTCAGGGTACGGGTCATCGCGGCACGGAAACCGGCCAGGTGCGTACCGCCGT
CACGCTGCGGGATATTGTTGGTAAAGCAGTAAATATTTTCCTGGAAGCCGTCATTCCACTG
CAACGCCACTTCAACGCCGATACCATCTTTCACCGTGGAAAAATAGAATACCGTCGGATGA
ATGGGCGTCTTGTTTCTGTTGAGGTAATCAACAAAGGCTTTGATACCACCTTCGTAGTGGA
AGTGGTCGGATTTATCTTTTTCGCGTTCATCAAACAAGCGGATAGAAACACCCGAGTTCAG
GAACGACAGCTCACGCAGACGTTTGGCCAGAATGTCATACTGAAATTCTGTCTGGTTGGTG
AACGTTTCATAGCTCGGCCAGAAACGCACAAWCCAACYAGACAGAATTTCASTRTGAMAT
TCTGGGCAAASKTCTGCGTGAGCTGTCGTTCTGAACTCGGGTGTTTCTATCCGCTTGTTTGA

TGAACGCAAAAAGATWAATCCGACACTTCCMCTACRAAGGKGGTATCAARCCTTTGTTGA
TTACTCACAGAAACAGACGCCC

Isolate code: BK1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

TCAATAATTTTGCCGACCACGATTTTAGCGTCTGACGGGTTTTCCATCAGATAGTCCACCAG
CTTCTCATTCATCAGCGATTCAACGGCGGTTTTCACTTCCGATGACACCAGTTTATCTTTGG
TCTGAGAGGAGAACTTCGGATCGGGCACTTTAACGGAAACCACGGCAATCAGGCCTTCAC
GCGCATCGTCGCCGGTGGCGCTGATCTTGGCTTTCTTGCTGTAGCCCTCTTTATCCATATAG
GTGTTCAGGGTACGGGTCATCGCGGCACGGAAACCGGCCAGGTGCGTACCGCCGTCACGC
TGCGGGATATTGTTGGTAAAGCAGTAAATATTTTCCTGGAAGCCGTCATTCCACTGCAACG
CCACTTCAACGCCGATACCATCTTTCACCGTGGAAAAATAGAATACCGTCGGATGAATGGG
CGTCTTGTTTCTGTTGAGGTAATCAACAAAGGCTTTGATACCACCTTCGTAGTGGAAGTGG
TCGGATTTATCTTTTTCGCGTTCATCAAACAAGCGGATAGAAACACCCGAGTTCAGGAACG
ACAGCTCACGCAGACGTTTGGCCAGAATGTCATACTGAAATTCTGTCTGGTTGGTGAACGT
TTCATAGCTCGGCCAGAAAACGSACAACCMAASCRRRGMRGKAATTGCAGTGATGACATT
STGGGCAMRCGTCTGSGTGAGCTGTCGYTCCTGAACTCGGGTGTTTCTATCCGCTTGTTTGA
TGAAMGCGAAAAAGATAAATCGACACTTCACTAMAARGKGGTATCAAAACTTTGTTGATT
ACTCACAGAAACARGACSCYWTTCATSCGWGTTCTTYTWTTTWYCAGAGWRAATGATGTC
WTCGKSTTARAGTGGSTTGMGTGAAATGAMSGYYTCAGGAAAATATTTAYGCTTACACAT
ATCSASTGACGCGTASCACTGGCGGTTCGKGCGSATGWCGTACTGARCCTATGGATAAGAG
GTASTASGAAARCAAAYAGGCC

Isolate code: BK3
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

ATTTTGCCGACCACGATTTTAGCGTCTGACGGGTTTTCCATCAGATAGTCCACCAGCTTCTC
ATTCATCAGCGATTCAACGGCGGTTTTCACTTCCGATGACACCAGTTTATCTTTGGTCTGAG
AGGAGAACTTCGGATCGGGCACTTTAACGGAAACCACGGCAATCAGGCCTTCACGCGCAT
CGTCGCCGGTGGCGCTGATCTTGGCTTTCTTGCTGTAGCCCTCTTTATCCATATAGGTGTTC
AGGGTACGGGTCATCGCGGCACGGAAACCGGCCAGGTGCGTACCGCCGTCACGCTGCGGG
ATATTGTTGGTAAAGCAGTAAATATTTTCCTGGAAGCCGTCATTCCACTGCAACGCCACTT
CAACGCCGATACCATCTTTCACCGTGGAAAAATAGAATACCGTCGGATGAATGGGCGTCTT
GTTTCTGTTGAGGTAATCAACAAAGGCTTTGATACCACCTTCGTAGTGGAAGTGGTCGGAT
TTATCTTTTTCGCGTTCATCAAACAAGCGGATAGAAACACCCGAGTTCAGGAACGACAGCT
CACGCAGACGTTTGGCCAGAATGTCATACTGAAATTCTGTCTGGTTGGTGAACGTTTCATA
GCTCGGCCAGAAACGYACATACCAAYCARARAGAAWTTCAGTATGACATTSTGGCCAAAC
GTCTGCGTGAGCTGTCGTTCCTGAACTCGGGTGTTTCTATCCGCTTGTTTTGATGAACGCAA
AAAAGATAAATCGACCACTTCCYTWMAAAGGGGGTATCAAGCCTTTGGTTGATTACTCAC
AGAAACAAGACCCTTTCWCRGRTKTYYTYTTTTTTTCGGAGAAAGGTGYTAYCKCTWTRA
AGKYGYTTWSCGKGAATSACGYTTCCRGAAAWTATTYAYGGCTTTCMCACATATCGCGSG
TGACGGSGTAGCMCGGCGTTTCGKGCCGMTGACCGTACCT

Sequence data of *rpo*B gene (uploading to NCBI Genebank database)

Isolate code: BS1
Origin: Budapest, 2014
Host plant: *Betula pendula* Roth..

CAACTGTCACAGTTTATGGATCAGAACAACCCGCTGTCTGAGATCACGCACAAGCGTCGTA
TCTCCGCATTGGGCCCAGGTGGTTTGACCCGTGAACGCGCTGGCTTTGAAGTTCGAGACGT
ACACCCGACTCACTATGGTCGCGTATGTCCTATCGAAACGCCGGAAGGTCCGAACATCGGT

TTGATCAACTCCTTGTCTGTTTATGCACAGACTAACGAGTACGGTTTTCTTGAAACGCCATA
TCGTCGCGTGCGTGACAATGTGGTGACGGATGAGATCCATTATCTGTCGGCGATTGAAGAA
GGCAACTTTGTTATCGCTCAGGCGAATACCAACCTGGATGAAGAAGGCCACTTCATTGATG
AACTGGTAACCTGCCGTAATAAAGGTGAGTCCAGCCTGTTCAGCCGCGATCAGGTTGAATA
TATGGACGTATCCACCCAGCAGGTTGTATCCGTAGGTGCCTCGCTGATCCCCTTCCTTGAAC
ACGATGACGCCAACCGTGCATTGATGGGAGCGAACATGCAACGTCAGGCCGGTCCGATGA
TCAWTGCACGGTTGGCGTCATCGTGTTCAAGGAAGGCGATCAGCGAGGCACCTACGGATA
CAACCTGCTGGGTGGATACGTCCTATATTCAASCTGATCRGGCTGAACAGGTGGACTCATT
TAWTACGGSGGTTACATTCATCWGKAARKGGCCTCTTCTGRRKWKGGYWTTTCYMGGRA
AMAAAMTWTTTSTKCAACATAATGAGATCTCTCGCMCACATGTCGCACGCGAGATATGGG
TTTCAGAAACRTATCGTTRTCGKCATAAAMGAMAGAARTKTATCAACAAGTTSACTTCGCS
TTTCATAGG

Isolate code: BSZ1
Origin: Szentendre, 2015
Host plant: *Betula pendula* Roth..

CACTGTCACAGTTTATGGATCAGAACAACCCGCTGTCTGAGATCACGCACAAGCGTCGT
ATCTCCGCATTGGGCCCAGGTGGTTTGACCCGTGAACGCGCTGGCTTTGAAGTCCGAGACG
TACACCCGACTCACTATGGTCGCGTATGTCCTATCGAAACGCCGGAAGGTCCGAACATCGG
TTTGATCAACTCCTTGTCTGTTTATGCACAGACTAACGAGTACGGTTTTCTTGAAACGCCAT
ATCGTCGCGTGCGTGACAATGTGGTGACGGATGAGATCCATTATCTGTCGGCGATTGAAGA
AGGCAACTTTGTTATCGCTCAGGCGAATACCAACCTGGATGAAGAAGGCCACTTCATTGAT
GAACTGGTAACCTGCCGTAATAAAGGTGAGTCCAGCCTGTTCAGCCGCGATCAGGTTGAAT
ATATGGACGTTTCCACCCAGCAGGTTGTATCCGTAGGTGCCTCGCTGATCCCCTTCCTTGAA
CACGATGACGCCAACCGTGCATTGATGGGAGCGAACATGCAACGTCAGGSCCSGGTCCGA
GATCAAKGCASAGTTGGSGTCWKCGKGGTTCAAGGAARGGGATCATCGAGGCACCTACKG
ATACAACCTGCTGGGTGGAAACGTCCATATATTCAACCTGATCGCGGCTGAACAGGCGGG
ACTCCTTTTTTWAGGGSGGGTAACMTTTCAYAAAARGGGCCCTTTCCCCYCCGGGTGYTCC
CCSKAGAAMCAGACTATTTTTCCTCCATAAWAGGWATYSTTCCCCAYTTTTTCCCMCGSA
WTTRTGGGTTTTSAAAAATYCTTTTTTTTTGTGTYTAAAARAAAGGTGGTAMCACAATTKGC
CTCGCCGCTSTYKTAAAACCMCCCAAATGKGGWGSGGGGTARCTYCSCAATATAACCCGG
YTYAGGTAAAA

Isolate code: BJ1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth.

AACTGTCACAGTTTATGGATCAGAACAACCCGCTGTCTGAGATCACGCACAAGCGTCGTAT
CTCCGCATTGGGCCCAGGTGGTTTGACCCGTGAACGCGCTGGCTTTGAAGTTCGAGACGTA
CACCCGACTCACTATGGTCGCGTATGTCCTATCGAAACGCCGGAAGGTCCGAACATCGGTT
TGATCAACTCCTTGTCTGTTTATGCACAGACTAACGAGTACGGTTTTCTTGAAACGCCATAT
CGTCGCGTGCGTGACAATGTGGTGACGGATGAGATCCATTATCTGTCGGCGATTGAAGAAG
GCAACTTTGTTATCGCTCAGGCGAATACCAACCTGGATGAAGAAGGCCACTTCATTGATGA
ACTGGTAACCTGCCGTAATAAAGGTGAGTCCAGCCTGTTCAGCCGCGATCAGGTTGAATAT
ATGGACGTATCCACCCAGCAGGTTGTATCCGTAGGTGCCTCGCTGATCCCCTTCCTTGAAC
ACGATGACGCCAACCGTGCATTGATGGGAGCGAACATGCAASGKSRGGSCRCAKCCAMCC
AACGAAATGAASGGTTGGCSTCATCRWGTTYMTGGATGGGTATCAGCRAGGCSCTAGGAT
ARACCCTGATGGGTGGATACATCGTATATTAACTTGATCGCTGCTSACMGGCGGAATCCAC
TTTWWTAKGCGAGGTTACCTTTCATCATGAAGTGSWCTTCTTCATCAGGTCGGTTTTCCTG
ACSATTACAAAGTTGCTTCTTCATCGCGACWATATGGATCTCTCCTCACACATGTCGCACG
CRCCATATGCS

Isolate code: BK1
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

AACTGTCACAGTTTATGGATCAGAACAACCCGCTGTCTGAGATCACGCACAAGCGTCGTAT
CTCCGCATTGGGCCCAGGTGGTTTGACCCGTGAACGCGCTGGCTTTGAAGTCCGAGACGTA
CACCCGACTCACTATGGTCGCGTATGTCCTATCGAAACGCCGGAAGGTCCGAACATCGGTT
TGATCAACTCCTTGTCTGTTTATGCACAGACTAACGAGTACGGTTTTCTTGAAACGCCATAT
CGTCGCGTGCGTGACAATGTGGTGACGGATGAGATCCATTATCTGTCGGCGATTGAAGAAG
GCAACTTTGTTATCGCTCAGGCGAATACCAACCTGGATGAAGAAGGCCACTTCATTGATGA
ACTGGTAACCTGCCGTAATAAAGGTGAGTCCAGCCTGTTCAGCCGCGATCAGGTTGAATAT
ATGGACGTTTCCACCCAGCAGGTTGTATCCGTAGGTGCCTCGCTGATCCCCTTCCTTGAACA
CGATGACGCCAACCGTGCATTGATGGGAGCGAACATGCAACGTCAGGCCGGKCCGWTATC
AATGCWMTGTTGGCSTCTTGTGTTAATGAAGGGARCMAWAGGCACTACGGATACACYGCT
GGGTGGGAAACTCATATATTCACMTGATCCACTGAAAGGCTGGATCWCTTTATTARGCGG
TTACYTTATCATGAAKGGCCCTKTCCTAAGGRMGKATTGCTGACGATAAARKTTTCTTCTT
TATCGCMACCATAATGGATTCTCCGTCCCMCATTGTCAGCCCCRAYATATGCGTTTCAKAA
ACGTACTCTTATTTGTGATAWCAAAAGG

Isolate code: BK3
Origin: Budapest, 2016
Host plant: *Betula pendula* Roth

CCACTGTCACAGTTTATGGATCAGAACAACCCGCTGTCTGAGATCACGCACAAGCGTCGTA
TCTCCGCATTGGGCCCAGGTGGTTTGACCCGTGAACGCGCTGGCTTTGAAGTCCGAGACGT
ACACCCGACTCACTATGGTCGCGTATGTCCTATCGAAACGCCGGAAGGTCCGAACATCGGT
TTGATCAACTCCTTGTCTGTTTATGCACAGACTAACGAGTACGGTTTTCTTGAAACGCCATA
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CGTGAGGATACCACCTGTAAYAAWTTACTATCTGAWAGGCAGATCAAATTSRAGCGGAAG
TGCCMCTTCCAAATAAGTMYCTTCTCACCAGGTTGTWTCCWTCATGATAMAAGTTCTTCT
CATCCCAAMATAATWAYCCACCGTTTT