

**SIWI** STOCKHOLM  
JUNIOR  
WATER PRIZE | HUNGARY

# HUNGARY 2021



## About the Stockholm Junior Water Prize



The Stockholm Junior Water Prize (SJWP) was established in 1997 and is an annual competition open to young people between ages 15 and 20, who have conducted water-related projects focusing on local, regional, national or global topics of environmental, scientific, social or technological importance. The Stockholm International Water Institute administers the Stockholm Junior Water Prize and it serves as its secretariat [www.siwi.org/prizes/stockholmjuniorwaterprize](http://www.siwi.org/prizes/stockholmjuniorwaterprize).

The Stockholm Junior Water Prize consists of two parts: the National Competition and the International Final. All participating countries organize their own National Competition. The winner proceeds to the International Final in Stockholm. As a result of the competitions, thousands of young people around the world develop personal interests, undertake academic studies and often pursue careers in water or environment-related fields.

The International Final takes place during the World Water Week in Stockholm, an ample event where water people from all over the world meet. This generates many opportunities for networking and exposure. The efforts of the participating countries are highlighted globally.

The winner of the Stockholm Junior Water Prize receives a 15,000 USD award, a blue crystal prize sculpture, a diploma, as well as the stay in Stockholm. Nevertheless, the participation is what genuinely matters. H.R.H. Crown Princess Victoria of Sweden is the Patron of the Stockholm Junior Water Prize.

### Hungary and the SJWP

Hungary joined the SJWP in 2013. Mr. János Áder, the President of the Republic, has been the patron of the competition since 2014. The national organizer of the SJWP is the GWP Hungary Foundation in agreement with the Stockholm International Water Institute. Details of the competition are available at [www.ifivizdij.hu](http://www.ifivizdij.hu).

### Previous winners of the national competition

**2013:** Dézi Kakas, János Béri, Péter Polák Jr. (Fényi Gyula Jesuit Secondary Grammar School, Miskolc) – Project title: The Importance of the Szinva Stream: Biological and Chemical-Physical Examinations

**2014:** Claudia Li, Livia Mayer, Nikolett Sebestyén (Eötvös József Grammar School, Tata) – Project title: Our Water is Our Future

**2015:** Márton Czikkely, Tamás Gergely Iványi, Tamás Márkus (Városmajori Grammar School, Budapest) – Project title: The Secrets of Drinking Water – How to Combat Polyethylene Terephthalate

**2016:** Dávid Kovács, Ákos Iván Szűcs (Kada Elek Secondary School of Economics, Kecskemét) – Project title: What Can We Gain by Using Grey Water?

**2017:** Anna Tari, Kristóf Stefán, Nikolett Szabó (Szent László High School, Budapest) – Project title: „Tanks of Water”

**2018:** Bence Zsolt Rappay (I.Béla Secondary Grammar School, Szekszárd) – Project title: „Hillside water management and possibilities of melioration in the Csatári-valley”

**2019:** Eszter Kun (Szentendrei Móricz Zsigmond Secondary School, Szentendre) – Project title: „Growing plants, growing minds with educational aquaponics system”

**2020:** Dóra Alexandra Gyémánt, László Török (Radnóti Miklós Experimental Grammar School, Szeged) – Project title: “Detecting the toxin production of the Microcystis species in hungarian lakes”

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Finalists of the national contest

## The Hungarian National Final



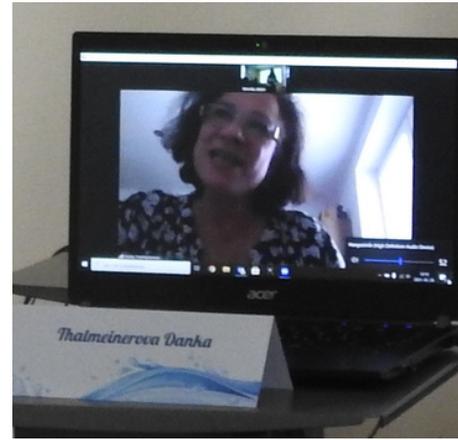
The jury

Several entries were received for the 2021 Hungarian National Competition. Altogether, there were sixteen secondary school students involved, participating either as individual contestants, or as teams of two members.

The projects were written in English, according to the requirements of the call and dealt with different topics, such as water reuse, the quality of drinking water and of surface waters, environmental awareness, eutrophication, wastewater treatment. Five projects were selected by the jury for the national final on the basis of the SJWP judging criteria.

The Hungarian National Final was organised at the Hungarian Water Utility Association (MaVíz) in Budapest on the 29th of June 2021. The finalists were requested to prepare a Power Point presentation displaying the results of their project.

During the final, the contestants presented their main findings and answered the jury's questions. Approximately 15 minutes per team were allocated. The presentations and the interviews were conducted in English.



The jury of the SJWP – Hungary 2018

### Chair:

- András Szöllősi-Nagy, professor, National University of Public Service

### Members:

- Sándor Baranya, Associate Professor at the Budapest University of Technology and Economics
- Anna Bérczi-Siket, consultant, Office of the President of the Republic
- Adrienne Clement, Associate Professor at the Budapest University of Technology and Economics
- Tamás Gampel, Business Development Manager at Xylem Water Solution Hungary
- Veronika Major, director of the VTK Innosystem Plc.
- Edit Nagy, Secretary General at the Hungarian Water Utility Association
- Szilvia Szalóki, Vice President at Hungarian Energy and Public Utility Regulatory Authority
- Danka Thalmeinerova, consultant

### Secretary:

- Monika Jetzin, GWP Hungary Foundation

## Summary of the finalists' projects

### Complex quality measurer and analyzer instrument

**Boglárka Dobi and Gyopár Antalka –**  
Napralforgó Waldorf School,  
Debrecen

"Among the several parameters we concentrated on the nitrate level of the water. There are several systems that can monitor the nitrate, but the normal operation of the fish farming does not permit the usage of these systems. What can be the source of the nitrate? There are several sources and ways why and how it changes in the water, but we concentrate on the situation where there is agricultural activity next to the lake. In this case the fertilizer (with nitrogen, it's very important for the plants during the spring) can reach the water. How? We asked the farmers to share their ideas with us.

The time when they get out the fertilizer depends mainly on weather, but in some cases when they start:

- the root of the plant is too small, it can not use some fractions of the nitrogen, so that goes into the underground or surface water
- there is ice on the field, but rain is coming and they have to start fertilizing, but the rain washes out sometimes large fractions of the fertilizer which goes to the drainage system and can reach the lakes."



## Summary of the finalists' projects

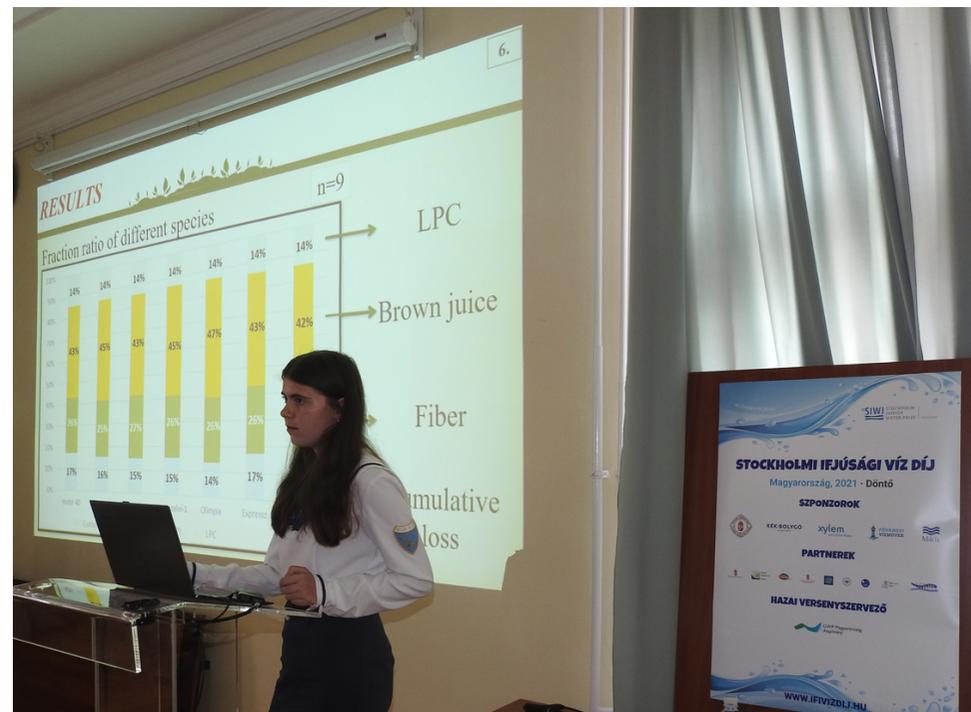
### Fermentation of alfalfa brown juice and its environmental friendly reusing

#### Emília Kovács –

Bessenyei György Gimnázium és Kollégium,  
Kisvárdá

"The human population is constantly growing on our Earth. Protein sources are in the middle of the interest, deficiency of protein could be a significant problem in the future. Because of this the alternative protein sources will play main role in the nutrition of human population. Nearly the 18% of the alfalfa (*Medicago sativa* L.) is protein, so it is an excellent alternative protein source. The isolation of leaf protein resulted in four products, i.e., green juice, fibre, leaf protein concentrate, and deproteinized juice which is also referred to as brown juice. Fractionation of one-kilogram fresh biomass results in 450–550 mL brown juice which has a harmful effect on the environment.

Deproteinized juices are handle like sewage in the whole world. It is produced in a very large amount and difficult to store at room temperature, however there are several advantages if we recycle them. The brown juice entering the sewage causes a lot of environmental problem, because of its nitrogen content. Moreover a preservation procedure was developed and the effect of the brown juice for the growth of sweet basil (*Ocimum basilicum* L.) was examind."



### Blurred tire tracks II

#### Nándor Mészáros and Kevin Rick –

BMSZC Petrik Lajos Technician School,  
Budapest

"As a follow-up to our previous work, in our current study, we looked at the fate of smaller tire particles under 100µm that are washed into living water. The microparticles were captured using an oil separator that could be installed in rainwater sinks, and their behaviours were also tested in the filter model we built.

With the SEM-EDX analysis, we have highlighted that we are dealing with heterogeneous elements that are harmful to the environment, in which the rubber serves as a substrate, instead of pure rubber pieces. After solving this problem, it will be imaginable to mitigate the damage to living water."



## Summary of the finalists' projects

### Micro and nano plastic pollution in rivers of the North-Eastern part of Hungary; the „Sajó”

#### Bence Ferencz –

Herman Ottó Secondary Grammar School,  
Miskolc

"Nowadays plastic production, and the partly degradation of polymers, lead to the formation of microplastic, as well as nano sized plastics. Factories in which a diversity of polymer types are made tend to use water for cooling as well as for the cleaning of the end product; two major contact phases from where the elements of polymers can get into water. The outgoing water must be filtered before letting it back to the runnel, where it was lured in from, however these fragments and fibers can get through, just because they are smaller than the filter's density, ending up polluting the rivers. Generally these fragments are nano plastics, meaning they can not be observed by the naked eye, nor be effectively filtered. However, they are not that big they can end up damaging, human made machines, plug up filter or even entire water cleaning plants, for animals due to their size, which is a billionth of a meter, these particles can be consumed „safely”, because it will not cause any harm to the digestive system,

or respiratory system of animals. In my research, i will be mentioning, and monitoring these varieties of degraded polymer, however they are not the main objective of mine.

-Rivers play an important role in the circulation of water throughout a pretty widely expanded area. In fact, these are the things which keep the whole water cycle running, and because of this, whatever ends up in them, washed up on a shore or gets stuck in the ocean or the sea, where if it does, it gets nearly impossible turn things backwards and sort polymer particles out, and get the water uncontaminated again. Whereas, ont he other hand, rivers are easier to monitor, and also easier to clean, and maintain this condition. Just because they are constantly contain moving water and have a smaller water area to be looked after. This is why I chose a river to do my research on."



### How can rivers and humans affect one another?

#### Boróka Anna Bődócs and Botond Dávid Vincze –

Városmajori Grammar School,  
Budapest

"Lakes, rivers and all kinds of natural water bodies are parts of our everyday life whether we realize it or not. We both feel internal intention to make sure they prosper, instead of going down with absolute neglect. In our project we wish to dive deeper into how much our life is inseparable from the well-being of the rivers.

Our main goal was to point out the errors of the traditional ways of dealing with rivers and suggesting more eco-friendly solutions instead, which can assure not only economical growth, but as well as sustain the natural biodiversity."



## The result of the National Final



The jury decided on the winner in a closed session and announced the result on the spot. The decision was based on the same judging criteria used during the international final (Relevance, Creativity, Methodology, Subject Knowledge, Practical Skills, Report and Presentation), considering both the written project and the presentation, including the interview. The winner of the Stockholm Junior Water Prize – Hungarian competition 2021 is:

Emília Kovács (Bessenyei György Gimnázium és Kollégium, Kiszvárd) with the project: "Fermentation of alfalfa brown juice and its environmental friendly reusing". The teacher who assisted Emília was Mr. Gábor Koncz.



The winner of the SJWP Hungary 2021

The second place went to Nándor Mészáros and Kevin Rick (BMSZC Petrik Lajos Technician School, Budapest) for the project: "Blurred tire tracks II".



The third place was awarded to Boglárka Dobi and Gyopár Antalka (Napralforgó Waldorf School, Debrecen) for the project: Complex quality measurer and analyzer instrument.



For the official Award Ceremony of the 2021 Hungarian SJWP competition President János Áder invited the five finalist teams to his office. There the students shortly explained their results to the President in the presence of the media. Mr. Áder handed over the SJWP 2021 Hungary Prize to the winner.



The winner of the SJWP Hungary 2021 receiving the prize from President János Áder



Professor Szöllősy-Nagy introduces the teams

## The international final

The Stockholm Junior Water Prize 2021 edition was held online. This year, representatives from 32 countries competed for the SJWP: Argentina, Australia, Bangladesh, Belarus, Benin, Bolivia, Brazil, Cyprus, Ecuador, Germany, Hungary, Israel, Italy, Japan, Kazakhstan, Laos, Malaysia, Mexico, Netherlands, Nigeria, Republic of Korea, Russian Federation, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom and United States of America.

Hungary was represented by the one-member team formed of Emília Kovács (Bessenyei György Gimnázium és Kollégium, Kisvárdá) with their project "Fermentation of alfalfa brown juice and its environmental friendly reusing"



**Emília introduces herself**

The 2021 Stockholm Junior Water Prize was awarded to a student from the USA (Eshani Jha). H.R.H. Crown Princess Victoria of Sweden was announcing the winner during the online award ceremony on 24 August.



**The winner of SJWP 2021**

The Diploma of Excellence was awarded to the students from Thailand: Thanawit Namjaidee and Future Kongchu for their project: "Bio-Moisture-Nutrient Absorbing Belt for Promoting the Sugarcane Seedlings Growth from the Local Waste".



**The winners of the Diploma of Excellence**

**"Thiol Functionalized and Manganese Dioxide Doped Biochar for the Removal of Toxic Organic and Inorganic Contaminants from Water"**

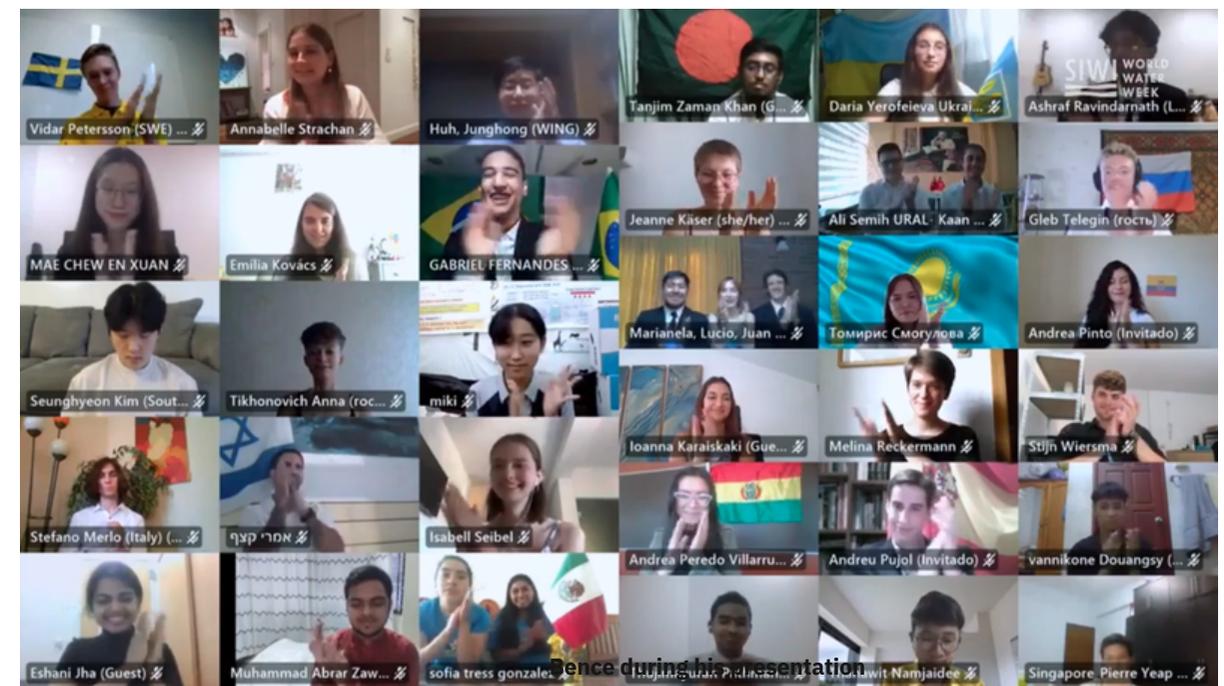
**Eshani Jha**  
United States of America

Less than one percent of the earth's water is easily accessible to us as freshwater and nearly half of this water is heavily polluted with pesticides, emerging contaminants, and heavy metals due to waste from industry, human establishments, and agriculture. This research aimed to remove these key classes of contaminants by manipulating biochar surface area, controlling chemical composition and catalytic properties for oxidative breakdown, adding surface complexing agents, and modifying intrinsic pore size.

This was the second year the new prize, the People's Choice Award was given to a student from Brazil: Gabriel Fernandes Mello Ferreira for the project: "Development of a microplastic retention mechanism in water treatment plants (WTPs)".



**The People's Choice Award was awarded to Gabriel Fernandes Mello Ferreira**



**Finalists waiting for the Award Ceremony**



Finalists and their teachers with President Áder on the balcony of Sándor Palace

## Sponsors



## Partners



## National Organiser



1119 Budapest Etele út 59-61.

Phone: +36 1 37 11 333

Fax: +36 1 37 11 334

E-mail: [gwpmo@gwpmo.hu](mailto:gwpmo@gwpmo.hu)

Web: [www.gwpmo.hu](http://www.gwpmo.hu)

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Edited by Réka Molnár

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