



Young Reporters for the Environment
International collaboration Slovenia and Turkey

Article | 11-14 years

OSNOVNA ŠOLA RODICA

and

IZMIR PRIVATE ÇAKABEY MIDDLE SCHOOL



Main theme is pollution and loss of biodiversity

April 25th, 2022

Students: Eylül Karabulak, Özgü Soylu, Alize Şeker, Sude Ceren Ceylan, İdil Muslular, Jaka Šuštar, Ažbe Jagodič, Val Begić, Brina Umek, Manca Seničar, Eva Kos.

Mentors: Melis Soylu, Çağatay Ergen, Beyza Aygün, Aydan Acar, Martin Mah, Jana Stancic.

Title of the submission: The Effects of Light Pollution on Biodiversity

In our world where people have started to build bigger cities. However, the thing is missed by billions that no one has ever thought how to make these big cities brighter during the night. The solution was found, by contrasting to our nature. Light is inevitable source for both humankind and the nature to live on earth, yet, modernized human has started to use artificial lightning with the developments by the 21st century without thinking the consequences of it.

The collaboration between students was excellent. The students were eager to work hard as people have started attention how to protect our nature. Moreover, students enjoyed communicating via video conferences though covid-19. With several online meetings, they presented their ideas and shared their ideas to compound to work together. Meanwhile, they have gained confidence to present and work. They have shared their cultural differences while they were working together. First, mentors met online and then they decided online meetings. Throughout the process both mentors and students decided online meeting fates. The Slovenians were responsible for observing and taking pictures of light pollution to raise awareness while the Turkish group was responsible for measuring the light pollution by producing a SQM device to raise awareness about light pollution.

WATCH OUT, LIGHT!

Have you ever looked up in the night sky to watch the stars dance like a Van Gogh painting and you couldn't see any? And at the same time have you admired increasingly illuminated roads, streets, buildings, billboards, stadiums etc.? Although the light is a source of energy without which we cannot imagine life, only few people are aware of the negative impact of excessive lighting.

The amount and brightness of light in cities around the world is at such a high level that it is reducing the darkness of night and in this case we are talking about light pollution.

So, what is light pollution? We could say that it is "Lighting where we don't need light". Light pollution is the use of excessive artificial light which leads to less visibility of the stars in the night sky.

By the 21st century, we have started to face some vital problems on us and on our lovely planet, Earth. However, one of them causes real damage on biodiversity that can see by eyes but can't be prevented by hands of millions. Light is an energy resource and without it, life cannot be

considered. Today, light is seen as a pollution agent which destroys the photoperiodism of the plants and animals which have been adapted to city ambience by stressing them. Especially in developed countries, it has even reached a level that could threaten astronomy observatories as well as our beloved environment. Thus, many countries are trying to take legal actions to reduce the light pollution.

There are several different ways to cause light pollution, but here are some of them:

- The use of strong and colorful lights
- External reflection of lights used in home lighting
- Visual light shows
- Non-professional lighting of streets
- The increasing number of light sources

The artificial sky brightness prevents citizens from watching the sky and amateur astronomers from watching celestial objects with their special tools.

Unfortunately, the negative effects of light pollution on human health were not known until yesterday, but when some sensitive scientists conducted research, they encountered a thing that extremely threatens human health. When people live in environments with intense light pollution, they experienced strong headache, excessive anxiety, and their blood pressure increased. Light pollution also causes the signs of many psychological problems. Quality sleep is extremely important, especially for elderly people, which is only possible in complete darkness. At night, the hormone melatonin is formed in the human body, which has a significant impact on our health.

The electronics industry is becoming increasingly aware of this fact, as electronic devices already have a software for blue light filters and applications have a dark mode. Melatonin deficiency is also manifested by insomnia, which is one of the major causes of diabetes, and depression.

Lots of insects, birds, bats, etc. orient themselves to natural night lights such as the moon and the stars. Artificial lights, however, obstruct their path and thus disable their natural life. For example, many insects actively congregate around light sources until they die of exhaustion. The loss of darkness has a potentially important, almost completely neglected, impact on biodiversity and coupled natural–social systems. Thus, we see an urgent need to prioritize research, and to inform policy development and strategic planning. It is known that animal species located in cities are also extremely affected by light pollution. For instance, *Caretta Carettas* mistake artificial light as moonlight. They swim towards the light and get away from the sea. All kinds of noise, artificial lighting and human activities frighten the young animals and cause them to get away from the water. It causes plants to engage in such untimely movements since light sources change the temperature of the air.

Most plants need light to grow. Green plants also need light for the process of photosynthesis. Light affects the activities of plants. Some implications are already known about the impact



Image 1. Two cities in Turkey during the night

of light pollution on plants. In winter, deciduous trees lose their leaves. However, leaves that are exposed to excessive artificial light do not fall off, as photosynthesis is constantly carried out in them. This causes the plant to freeze in winter.



Image 2. Slovenia during the night

Slovenia has the highest light pollution in larger cities such as Ljubljana and its surroundings (which also includes Domžale), Koper, Nova Gorica, Maribor, Kranj, Celje, Velenje, Ptuj and Murska Sobota. Photos show a comparison of the southern part of the night sky with the constellation Orion, namely from the vicinity of Domžale, where light pollution is high.

To sum up, there are so many negative impacts of light pollution on our life and nature, but how can we prevent this and find better solutions?

At night, the biggest light pollutants are non-ecological lights. As one of many solutions, Francisco Silva, an astronomer from NASA, suggested “In the local level, you can raise awareness by talking to your local astronomy groups, going to the universities. This is directly affecting animals, humans, plants.” Also, he added “I don’t have any problems if you want to have a beautiful billboard full of light during the day.” More, light pollution can be reduced by using ecological lamps. These types of lights have yellow and red spectrum of light, do not glow in the UV spectrum and are airtight. This prevents insects from getting caught in them. If people were to limit the use of artificial light in larger cities in general, they could reduce energy consumption. According to Oğuzhan Köse “Because Street lightings, road lightings are under control of municipalities, we should work with the government organs.” Even if we know the solutions that would help reduce light pollution, this is not enough, as we must also strive for effective control of light pollution and compliance with the measures prescribed by experts in this field. No one is safe in this pollution; we should consistently take care of our surroundings.

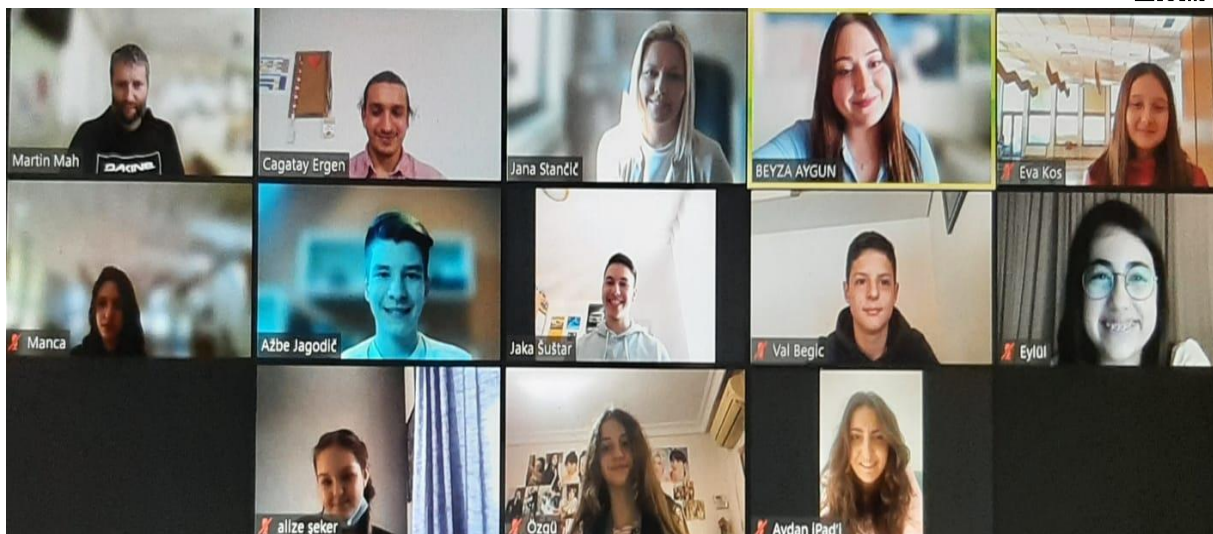


Image 3. From a mutual online meeting

REFERENCES

Hölker, Franz, et al. "Light pollution as a biodiversity threat." *Trends in ecology & evolution* 25.12 2010, pp. 681-682.

Aubrecht, C., Elvidge, C., Ziskin, D., Rodrigues, P., & Gil, A. *Observing stress of artificial night lighting on marine ecosystems-a remote sensing application study*. na. 2010.

Birriel, Jennifer, Jaclyn Wheatley, and Christine McMichael. "Documenting Local Night Sky Brightness Using Sky Quality Meters: An Interdisciplinary College Capstone Project and a First Step Toward Reducing Light Pollution." *Journal of the American Association of Variable Star Observers* 38, 2010, 132.

Rich, Catherine, and Travis Longcore, eds. *Ecological consequences of artificial night lighting*. Island Press, 2013.

Nasıroğlu, I., Güney, Y., Kılıç, Y., Shameoni Niaei, M., Tozoğlu, B. Atatürk Üniversitesi Kampüsünün Gökyüzü Kalite Ölçümü (Işık Kirliliği). *Turkish Journal of Astronomy and Astrophysics (TJAA)*. 1(1), 2020, pp. 431-432.

Marolt, S. *Škodljivi vplivi svetlobnega onesnaževanja na živa bitja*. Ljubljana: Visoka šola za zdravstvo. 2006.

Svetlobno onesnaženje

http://www.temnonebo.si/images/pdf/svetlobno_onesnazenje_zbornik.pdf

Mohar, Andrej, et al. *Naravi prijaznejša razsvetljava objektov kulturne dediščine (cerkva): priporočila*. Društvo Temno nebo Slovenije, 2014.

http://www.temnonebo.si/images/pdf/naravi_prijaznejša_razsvetljava_brosura_web.pdf

DISSEMINATION

<https://www.egetelgraf.com/arsiv/16-04-2022/>

<https://www.facebook.com/cakabeyokullari/videos/675221717068948/>

https://www.instagram.com/p/CcUuIVZIPHX/?utm_source=ig_web_copy_link

<https://youtu.be/AOjtRy3wows>

http://www.cakabey.k12.tr/duyuru.asp?Duyuru_id=6624