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BIOLOGICAL DISASTERS AND SOME PREVENTION METHOD SAMPLES IN TURKEY

ABSTRACT

Disaster is a natural, technological and human-based phenomenon that requires the coordination of many institutions and organisations and causes physical, economic and social losses for human rights, interrupts normal life and human activities. Biological disasters are situations caused by organic origin or biological carriers. These biological carriers can be disease-bearing microorganisms, toxins, and bioactive products. When this situations occur, many deaths can occur, as well as injuries, illness or health problems. Moreover, these biological factors can turn into agricultural production losses, pasture-grazing diseases, social and economic breakdowns or even an environmental disaster depending on the type. The emergence of all kinds of negative effects of pesticides, the abundance of natural enemies that can be exploited in nature and the increase of environmental awareness should be the reasons for focusing on an environmentally friendly, sustainable and cheap control method such as Biological Control. Entomopathogens used in biological control against insects include bacteria, fungi, viruses, protozoa and nematodes. In terms of biological disasters, insect infestation and epidemic diseases stand out among this group. The most important biological disasters are disasters caused by microorganisms, and COVID-19, which the whole world is trying to deal with today, is a global biological disaster. The epidemic started in Wuhan / China in late 2019 and is now spreading all over the world.

Keywords: Biological Disaster, Microorganisms, Biological Control, Pandemia, COVID-19

1. INTRODUCTION

Disaster is a natural, technological and human-based phenomenon that requires the coordination of many institutions and organisations and causes physical, economic and social losses for human rights, interrupts or normal life and human activities [1, 2, 3, 4 and 5]. The magnitude of the disaster is generally measured by the loss of life, injuries, structural damages, social and economic losses caused by an event. Disaster Area is a region that is severely affected by the negative consequences of the disaster and occurs naturally without the requirement to declareted a "Disaster Zone" when urgent assistance is needed by the authorities [1]. According to Şahin and Sipahioğlu and Özey [5 and 2] disasters can be classified as their origin:

- Geological-geomorphological disasters (earthquake, tsunami, volcanic eruptions, all kinds of mass movements),
- Climatic-meteorological disasters (flood, extreme heat and extreme cold, extreme snowfall, air pollution, drought,

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effective winds, tornado, hurricane, lightning, fog, hail, avalanche, frost and icing, acid rains, El Nino, melting of glaciers, global warming and climate changes),

- Hydrographic disasters (river floods, pollution of rivers, overflow and demolition of dams, pollution of lake waters, sea swellings),
- Biological disasters (forest fires, infectious diseases and epidemics, animal outbreaks, insect infestations, grasshopper infestations),
- Social disasters (starvation, famine, large fires in people's communities, wars and genocides, immigration, terrorist attacks) and even,
- Technological disasters (mine accidents, oil tanker accidents, nuclear accidents, industrial accidents, road, railway, seaway, airline, transportation, use of NBC weapons, space accidents).

The most effective and the only action that can be taken in the face of disasters nowadays and in the future is to conduct research, develop various plans and implement them in order to get rid of the effects of these disasters or minimize their effects on society. All of the studies that allow people to be aware of the natural events occurring in the environment they live in, to recognize them in detail until their causes and in case of repetition of these events are never effected or at least effected by them are called Disaster Management [6]. The effects of biological disasters can be the most long-term effects. Biological disasters can be solved in a short time as well as long term solutions. Biological disasters include forest fires, animal and human diseases, epidemics and insect infestations [7]. Biological agents are organisms that kill humans, animals and plants. Also biological agents cause illness, or toxic substances (toxins) produced by these organisms and cause biological threats such as biological agents and conditions such as unsafe laboratory procedures. According to this definition; natural biological diseases (infectious and non-infectious), biological agents found in the environment or identified in animals, potentially infecting human beings or they are containing weapons or spreading biological agents (biological weapons), terrorist attacks with biological agents (bioterrorism). Biological assault is the deliberate spreading of biological agents into humans, animals and plants to cause illness or death [8 and 9]. These agents are present in nature and can be modified to enhance their ability to make diseases, to make them resistant to existing drugs, or to increase their ability to spreading in the environment. They are preferred by terrorists because they are extremely difficult to detect and take time to cause illness.

A type of natural disaster is a pest infestation that is caused by the excessive increase of pests in one area or the transport of these pests to another area. The most common and most harmful of these is the catastrophe that occurs due to insects that increase in certain atmospheric conditions and affect other regions in flocks. Different types of insect infestation cause great damage to agricultural and forest areas. These biological pests, which cause natural disasters, are related to reproduction, development, gathering of flocks and migrating to a place where they cannot find food, directly related to the weather conditions of the place or destination, and especially humidity conditions. These conditions are like a precursor to such a disaster. For this reason, the experts in the areas sensitive to these hazards are required to warn the responsible institutions and organisations in order to take urgent measures in case such a danger is expected [10, 11 and 12]. Unfortunately, nowadays, the precautions

to be taken against these biological hazards are limited to the use of pesticides that kill insects and plants. Taking into account weather observations and forecasts, especially during spraying, increases the effectiveness of this control and prevents some undesirable events. For example; a spraying in rainy and windy weather cannot protect the plant and destroy the pest, and as a result of the spreading of the medicine, it may cause destruction of the natural environment, resulting in severe ecological problems. For this reason, using biological products should be preferred to chemical products. The term biological control was born after the ecological, biological and systematic examination of the relationships between living beings in nature, and was first used by Smith in 1919 and described biological control simply as suppressing and regulating harmful populations through natural enemies [13 and 14].

2. RESEARCH SIGNIFICANCE

Climate change is one of the underlying causes of disaster risks. Rising sea level affects conditions such as rising temperatures, ocean acidification, glacial retreat, salinization, soil and forest degradation, biodiversity loss, desertification, and extreme weather events. When all these events come together, they also reveal the underlying causes of biological disasters. Insect invasions, which are one of the biological disasters, and the damage they cause seriously harm both the national economies and the biological balance. Epidemics, one of the other important biological disasters, again threaten the country's economies and mass human health. Due to the importance of biological disasters affecting our daily life and future, it is aimed to draw attention to the subject with this review.

3. BIOLOGICAL HAZARDS

Biological disasters, which caused by organic origin or biological carriers, are phenomena. These biological carriers can be disease-bearing microorganisms, toxins, and bioactive products. When this phenomenon occurs, many deaths can occur, as well as injuries, illness or health problems. Moreover, these biological factors can turn into agricultural production losses, pasture-grazing diseases, social and economic problems or even an environmental disaster depending on the type. Examples of these are epidemics in animals and plants, insects or other animal infestations [15].

Biological disasters that caused by microorganisms can be grouped under two headings as “epidemic” and “pandemic”. Some examples of recent large outbreaks, epidemics or pandemics due to biological hazards either on their own or following a disaster are:

- The Ebola Virus Disease outbreak in West Africa in 2013-2016, the largest epidemic of its kind to date in the populations of Guinea, Liberia, and Sierra Leone.
- The ongoing outbreak of Zika virus infection in the Americas and the Pacific region, associated with congenital and other neurological disorders.
- Significant increase in diarrheal disease incidences following recurrent floods in most African countries or significant increase following the 2004 tsunami in Indonesia and Thailand.
- Outbreaks of yellow fever in Angola, the Democratic Republic of Congo and Uganda in 2016.
- Outbreaks of Middle East Respiratory Syndrome – Coronavirus (MERS CoV), an emerging disease identified in 2012 [15].

4. APPLICATION METHODS OF BIOLOGICAL CONTROL

Insects, mites, bacteria, fungi, viruses, nematodes, fish, birds, mammals, snails and slugs, protozoa, etc., which are naturally found in nature. Almost every living group has natural hostile species, all of which have an indispensable importance in terms of maintaining the natural balance in biological control, especially in biological control. However, parasitoids, predators and entomopathogens have the highest success in biological control. These living groups, which are a part of nature and called as natural enemies, are applied in different ways in biological control [16, 17, 18 and 19]. Biological control predators and parasitoids for Turkey to import for the first time in 1910 against to *Rodolia cardinalis* (M.) (Torbalıkoşnil)'s been brought to begin. Then again against to *Chilocorus bipustulatus* (L.), (Torbalıkoşnil) Apple cotton wool *Aphelinus mali* (H.), (Dutkabuklubiti) *Prospaltella berlesei* How, Sunn *Trissolcus* spp. *Prospaltella perniciosi* (T) San-Jose crustaceae, *Cryptolaemus montrouzieri* (M.) and *Leptomastix dactylopii* (H.) citrus (unlubiti), *Phanerotoma flavitestacea* (F.) and *Chilocorus nigritus* (F.), *Rumina decollata* (L.) against brown snails, *Hippodamia convergens* (Guérin-Méneville) aphids, *Eretmocerus dabachi* (R.) and Rosen against citrus white fly and *Encarsia lahorensis* (H.) citrus white fly respectively. *Hippodamia convergences* [20] and *Chilocorus nigritus* [21] are some of these imported. However, the host or prey and can not be alone after being imported to Turkey by a part of the scientific literature are understood to be already there in advance [22 and 23].

4.1. Parasitoids

Parasitoids usually attack only one host species or several related species. This makes parasitoids the most suitable factor for biological control. They are the most widely used factor in biological control programs due to their ease of production compared to predators and their narrow spectrum [24]. Approximately 78% of the parasitoids found in natural and agroecosystems can be counted only in Hymenoptera and some in Diptera, while predators are reported to be more or less present in almost all orders of insects [25].

4.2. Predators

They are polyphagous, so predators form one of the most important natural enemies that can be used in biological control programs, especially in the form of protection and support. However, the fact that mass production is expensive and difficult, and that there are significant difficulties in determining the efficiency of the products produced in artificial fattening environments, limits the use of predators in biological control programs. Besides, cannibalism is seen in some species and some species are fed with other non-harmful living beings, which constitute other negative aspects of predators [26 and 27].

4.3. Entomopathogens

Entomopathogens, which include bacteria, fungi, viruses, protozoa and nematodes used in biological control against insects. In the literature, protozoa and nematodes are examined in separate groups under their own names. However, very few of them are used in pest control. Entomopathogens, naturally occurring in nature, attack insects, make them sick, and sometimes kill them as species specific. Many entomopathogens have been mass-produced and marketed as “biological insecticides”. One of the leading ones is *Bacillus thuringiensis* and it is used successfully against many insect species.

Entomopathogens are usually administered by mixing them with standard sprayer. Since these commercially produced entomopathogens are generally species-specific, they can be used safely in biological control. Unfortunately, these preparations constitute only 2-5% of the world pharmaceutical market [26].

5. IMPORTANT FOREST PEST INSECT SPECIES IN TURKEY

Turkey is a country that has rich forest areas. In addition to anthropogenic causes of deforestation, it is important not to overlook the causes of insect infestation.

5.1. Damage Status of Forest Insects

Insects are classified into two main categories according to their feeding behavior. Primary pests are insects that attack and live on healthy trees in a good physiological position. These are basically insect-sucking and leaf-eating insects. Secondary pests, on the other hand, are insects whose growth ability is more or less limited by the inadequate physiological status of the host. Secondary pests can multiply and be harmful in large quantities when environmental conditions are appropriate. These include approximately all xylophag insects such as bark beetles (Curculionidae: Scolytinae), goat beetles (Cerambycidae), fancy beetles (Buprestidae) and wood bees (Siricidae) [28]. *Ips sexdentatus* (Boerner), *Ips typographus* (L.), *Pityokteines curvidens* (Germ), *Tomicus minör* (Hart), *Tomicus piniperda* (L.), *Orthotomicus erosus* (Woll), which we know very closely bark beetles, many forests in which they find very overturned, broken and cut trees develop very well and grow rapidly.

5.2. Damage Types of Forest Insects

Damage patterns of forest insects can be grouped under four main headings. Most of the species that damage the forest trees are the insects that prevent the growth of the tree with repeated damages on the vegetative parts of the trees and thus cause loss of growth. Insects that cause this kind of damage are mainly Lepidoptera species, such as the Pinch-beetle, *Thaumetopoea pityocampa* (Den. & Schiff.), *Thaumetopoea wilkinsoni* (Tams.) Sponge knife, *Lymantria dispar* (L.), Six-butterfly, *Euproctis chrysorrhoea* (L.), Green oak bender, *Tortrix viridana* (L.). *Neodiprion sertifer* (Geoffroy) and *Diprion pin* (L.) and alder leaf beetle *Agelastica forehead* (L.), poplar and willow leaf beetles *Chrysomela populi* (L.), *Chrysomela tremula* (Fabricius) and beetle leaf beetles can also be added to them [29]. In addition, the damage of these insects can be followed by bark beetles that can kill trees. Sap-sucking insects, such as pineus orientalis, may have the same effect as leaf-consuming insects in reducing growth. Destruction of bark bugs such as *Tomicus minör* (Hartig), *Tomicus piniperda* (L.), and *Rhyacionia buoliana* (Den.& Schiff)'s end buds and shoots results in loss of growth.

The effects of some insect species can then lead to the degradation of the quality wood to be made during utilization of forest trees. Examples of this are the insects of the genus Pissodes, moth species such as *Cossus cossus* (L.) and *Zeuzera pyrini* (L.), species of bugs such as *Saperda carcharias (*L.), and some other beetles such as *Platypus cylindrus* (Fab.), and ambrosia insects of the genus Xyleborus or Xyloterus. *Trypodendron lineatum* (Olivier) and *Xyleborus dispar* (Fab.) are two important species.

Some insects can damage the trees in case of heavy infestation. This type of damage is caused by many xylophag species, such as bark beetles, and by some forests. In addition to *Ips typographus* (L.), *Ips sexdentatus* (L.), *Pityokteines curvidens* (Germ.), and partly

Dendroctonus micans (Kugelann), are of this variety. This is the most dangerous type of insect damage in our country and in the forests of most of the world. Therefore, bark beetles have a very special place and importance among forest pests.

Other insects are carriers of organisms such as viruses, fungi and nematodes that cause disease in plants. Sap-sucking insects, bark beetles, goat beetles are involved in the transport of disease agents in forest trees. *Scolytus scolytus* (F.) and elm death disease caused by *Scolytus multistriatus* (M.) is the transport of the fungus *Ceratocystis ulmi* (Buisman). The second species, *Hylurgopinus rufipes,* accompanies this mushroom in North America.

5.3. Basic Causes of Insect Outbreaks

Stress is a factor that effects a plant's normal functioning and causes potential physical and metabolic changes. Low productivity, very high or low pH levels in soil, drought, flood, atmospheric contamination (global warming and climate changes, ozone loss) and low and high temperatures are all stress factors. The most important pressure factor among these is water shortage, drought [10]. Drought effects trees in various ways. The most fundamental of these effects are reduced growth (especially reduction in the size of leaves, shoots and annual ring widths); changes in chlorophyll synthesis, causing yellowish color in leaves; reduction in sweating due to high temperature; increase in levels of soluble nitrogen compounds in leaves; interruptions in the plant nutrient liquid column in the xylem, which produce sounds heard by insects; changes in osmotic pressure; volatile compounds and changes in resin terpenes in coniferous and reduced flow of resin. As a result of these changes, the nutritional quality of the plant is improved for insects [10].

Pine Pouch Beetle

Eastern Pine Beetle

***Thaumetopoea wilkinsoni* Tams, 1924**

Western Pine Pouch Beetle *Thaumetopoea pityocampa* (Denis & Schiffermüller, 1775) (Lepidoptera: Notodontidae)

Thaumetopoea pityocampa called western pine processionary in Turkey (Denis & Schiffermül's, 1775) is thought to be the result of research conducted from common types of shows inconsistencies with this view. Turkey's eastern mountain pine beetle, according to new results which *Thaumetopoea vilkinson* name keseböcegi is alleged to have been widespread.

Production of *Calosoma sycophanta* L. (Coleoptera: Carabidae) in Biological Control Against Pine Processionary

As a predator of *Lepidoptera caterpillars*, the importance of *Calosoma sycophanta* L. has been known for many years. In the early 1900s, Sycophanta was determined to be placed in the outbreak areas of *L. dispar* and *E. chrysorrhoea* in New England and was successfully moved from Europe to the United States to support *L. dispar*'s struggle.

In recent years, *C. sycophant*, used in biological control with insects sac in Turkey. This hunting insect's high hunting ability and fertility led to the establishment of mass production laboratories and the release of these insects into the forests.

Mechanical, Chemical, Biotechnical and Biological control methods are applied against pests in Turkey:

- **Mechanical Control:** Gathering harmful insects, peeling the bark of insect trees, benefiting from trap trees, mushroom and

mistletoe the pest is done by cutting the diseased areas away from the forest.

- **Chemical Control:** It is the control using chemicals. It is used against other Lepidoptera and leaf bees, especially the pine beetle. It is the last contemplated method of struggle and should not be used unless it is very mandatory.
- **Microbial Control:** It is a form of control carried out by using bacteria, viruses, protists and nematode preparations that cause disease in insects. *Bacillus thuringiensis* (B.t.) preparations are mostly used against needle leaves and leaf pests. Also Baculovirus (NPV) preparations can be used.
- **Biotechnical Control:** It is applied by hanging pheromone substances called sexual (fragrance) emitted by insects during their reproductive periods in a specially made trap to the forest. Insects collected in traps are destroyed. It is applied against other bark beetles (*Ips sexdentatus*, *Tomicus minor*, *T. piniperda*), including typographus [30].
- **Biological Control:** It is done by using living organisms. It is the most suitable method of control for Turkey forests. Within the scope of biological control, bird nests are hung in the forest, forest ants (*Formica rufa* L.) are transported, predators that break down pests by eating harmful insects are produced and released into the forest, and biological control is supported by protecting existing predators and parasites in the forest.

Insectivorous birds are very voracious creatures and their daily food consumption is higher than their own weight. They are colorful and songbirds. These birds feed on insects and raise their offspring with insects.

The life span of insectivorous birds varies between 15-20 years and Tit species, Woodpecker, Ibibik, Swallow, Black flycatcher, Nuthatch, Cuckoo bird are seen in the forests of our country. These are important bird species in Turkey. Collecting and destroying pests by ants by creating new anthill in forests is another method of biological control [31].

Rhizophagus grandis (Gyll.), which is a predator against *D. micans*, which causes significant damage in the Eastern Black Sea Spruce forests, has been continuing for nearly 20 years, and the Biological control has been continued by being produced in laboratory conditions and given to insect fields. Since its predator is given to the forests in Artvin region early, it has a great balance in the forests in these regions. However, biological balance could not be achieved in the forests in Giresun and Trabzon regions. Against the pine beetle, insect pests belonging to the pest are collected in specially prepared islets and left for pest death, and this method aims to protect *Calosoma sycophanta* (L.), which is an important predator of the pest, and the parasitoid *Phryxe caudata* (Rond.) [30].

It is applied in the regions where the Çamkese beetle is concentrated in our country [31].

- Technical and Administrative Precautions Against Forest Pests:
- Irregular interventions that disrupt forests should be avoided.
- Forests resistant to diseases and pests should be grown with the silviculture techniques to be applied.
- Natural species should be protected, mono cultures should be avoided and mixed stands should be established.
- Tree species suitable for growing environments should be included in plantations, and research results, especially origin

tests, should be taken into account in native, foreign and rapidly developing species afforestation.

- Forest maintenance studies (frequency maintenance, searches) should be done in accordance with the technique and on time.
- Applications that will lead to the reproduction of bark beetles should always be avoided and clean management should be given great importance. In this context;
- Crustaceans in drying, sick and inverted trees and in forest depots and ramps coniferous wood should be removed from the forest before insects fly. Cuttings in coniferous forests should be carried out in November-February period except for the vegetation season. The bark of the cut trees should be peeled off immediately and especially summer cuts should be avoided.
- Shellwood production should be done in November-December.
- To protect insects' natural enemies, existing trees, shrubs, bushes and flora should be preserved or brought in a special way.
- Forests should be screened frequently and pests should be checked regularly.
- People-forest relations should be given importance.
- Foreign and domestic quarantine measures should be taken.
- It should be ensured that the forest products entering our country from abroad are controlled by expert forest engineers at the customs gates.
- Biological, mechanical and biotechnical control methods should be emphasized, chemical control should be avoided as much as possible, bacterial biological preparations should be preferred for spraying and unlicensed drugs should not be used.
- Useful insects, birds and other living things should be protected and their production should be increased.

Studies involving detections and evaluations on damages caused by *Ips sexdentatus*, *Dendroctonus micans* and *Ips typographus* bark beetles [28 and 29] while focusing mainly on the forest area and tree wealth size values that are exposed to damage in different time periods, a similar approach is also encountered in the studies, which aims to determine the insect species that damage the fir trees and their economic importance. On the other hand, from time to time extraordinary productions (felling) in our country's forestry have been partially discussed in the context of the economic effects of insect damages, even if indirectly. For example, Özder and Keskinalemdar [29] stated that unexpected production was made due to insect damage at the level of approximately 90% of the planned production in the Şavşat Forestry between 1990-1991, referring to the extent of damage caused by bark beetles in the Eastern Spruce Forests of the Black Sea Region at different places and times. Again, in the study by Çatal and Carus [30] where forest regional directorates were grouped according to the annual average extraordinary revenue levels, insect damage was the fourth among seven extraordinary revenue felling types across the country, with a rate of 14%, and the second among the non-human effect feses with a rate of 30%. It was stated that it was ranked. In the study of Aytar [31] besides the extraordinary production amounts due to insect damage, combat expenses made in terms of insect species are also included. In summary, the studies, which are handled for different purposes and emphasized the extraordinary productions arising from insect damage, were indirectly mentioned, physical effects were highlighted, and general observations regarding the decrease in insect control expenditures and image-related demands

and the formation of excess supply in the markets were included. Biological disasters can be from animal origin as well as from microorganisms. These often cause epidemic diseases. These epidemic diseases either turn into pandemics or cause great losses in a country. If we look at the important epidemics in the history of our country, malaria and smallpox can be counted among them [32].

6. SIGNIFICANT INFECTIOUS DISEASES OUTBREAKS IN TURKEY

According to the Executive Order no. 4, Ministry of Interior Disaster and Emergency Management Presidency-Civil Defense Department is responsible:

- To determine measures to be taken and identify works to be done against Chemical, Biological, Radiological and Nuclear (CBRN) threats and hazards and to ensure coordination between Ministries, Governmental and private institutions/agencies in this regard [33].

In the historical process, infectious diseases have turned into epidemics in almost every part of the World, causing the deaths of millions of people. It was one of the places where epidemic diseases were seen intensely in the geography where the Ottoman Empire ruled. In the 19th century, great developments were achieved with the vaccines developed in the fight against infectious diseases. It is seen that in the Ottoman State, an effort was made to show parallel development with modern medical developments in this process. Although new vaccines and methods have been developed against infectious diseases, this appears to be limited in certain regions. Only the Anatolian geography remained in the hands of the Ottoman State, which suffered a high amount of land loss as a result of long and tiring wars. With the end of the First World War in 1918, the dismissal of soldiers posed a completely different problem [34]. The soldiers who returned to the flock houses were the biggest factors in the transmission of infectious diseases. Many diseases have been faced in Anatolia until today. A state that actually ended would not be expected to establish and implement a health policy against outbreaks. The struggle with scarce opportunities during the National Struggle gained a new dimension after 1923. Syphilis disease, which is known in some regions in Anatolia, spread to the whole country with the soldiers who were discharged after the First World War. Active struggle against the disease started with the Law on the Mental and Restriction of Syphilis, enacted in October 1923. In the first place, combat committees were established in places where the disease was intense. It took a long time like three years to treat syphilis. Necessary drugs were imported from the state by the state. Prostitutes were examined regularly and spread of the disease was prevented. In the early Republican era, a successful struggle with syphilis was made possible [36]. In the First World War, the trachoma brought by soldiers and causing people to be blind was intense in the provinces of Southeast Anatolia. To fight against infectious disease trachoma, it was started to fight hospitals opened in Adıyaman and Antep. Region determination studies were carried out with the experts brought from abroad to combat the disease. Tuberculosis fighting hospital, which could not be opened despite numerous attempts in the Ottoman State, could not be opened. Despite limited possibilities, tuberculosis struggle started with Heybeliada Sanatorium, which was opened in the first years of the Republic. Although struggling with tuberculosis is very costly, the struggle has been successful since the first years. Apart from these, infectious diseases have been successful in the fight against variola, scarlet fever and diphtheria, both thanks to the vaccines produced and timely intervention, before major deaths

occurred. One of the biggest struggles in the period of 1925-1930 was against malaria. Great efforts were made to prevent the disease. Country considerable portion of the budget is considered an early Republican era in the fight against the disease impossibility despite all were kept in the forefront of the fight against public health diseases. The introduction of preventive health services of the early republican period in Turkey. Preventive vaccines were started in this period to prevent infectious diseases. Intense efforts were made to increase the level of welfare, which is one of the main arguments of being a social state, and to ensure that the public has healthy bodies. For this, completely free health services were provided. No region with epidemic disease was left to its fate [35].

Nowadays, COVID-19 disease caused by the SARS-CoV 2 virus, which has turned into a pandemic, causes losses in our country as well as all over the World. Coronaviruses (CoV) are a large family of viruses that cause a variety of diseases, from the common cold to more serious diseases such as the Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). Coronavirus or corona virus (Latin: Orthocoronavirinae) are viruses that cause diseases in birds and mammals and constitute one of the two subfamilies of the Coronaviridae family. Although the virus, which is usually not serious in humans, causes a significant number of catarrhal cases, some rare coronavirus variants, including MERS-CoV, SARS-CoV, and COVID-19 (2019-nCoV), can cause respiratory infections with a risk of death [36]. Coronaviruses cause diarrhea in cows and pigs and upper respiratory tract diseases in chickens [36].

The genetic material (genome) it contains consists of single-stranded RNA with positive polarity. They are viruses with the largest RNA genome ever detected, with a length greater than 30 kilobases. The most prominent feature of the virus, which is 125 nanometers in size, is its stick-like protrusions around it. With this feature, it is named as coronavirus because it resembles the coron of the sun (Latin: corona) under the microscope [37].

No vaccine or special antiviral drug has yet been developed against coronavirus diseases, including SARS-CoV 2. Symptomatic therapy, isolation and various experimental applications are involved in controlling the disease. At the beginning of 2021, news of vaccine development came from different countries and these were started to be tested.

Coronaviruses were discovered in the 1960s. The first discovered viruses include infectious bronchitis virus seen in chickens and two types of viruses that are taken from the nasal cavities of human patients with symptoms of colds and are named as human coronavirus 229E and OC43. Later, many new types of coronaviruses have been discovered, including the SARS coronavirus discovered in 2003, HCoV NL63 identified in 2004, HKU1 diagnosed in 2005, MERS-CoV noticed in 2012, and CoVID-19 of Wuhan origin. Many of these viruses cause serious respiratory infections [38].

Coronaviruses are thought to be responsible for a significant portion of the common cold cases in adults and children. This group of viruses causes symptoms such as fever and enlargement of the tonsils, but most often causes colds in winter and early spring. In addition, coronaviruses can cause pneumonia and bronchitis (viral or secondary bacterial) [39].

There are 7 different human coronaviruses [37]:

- Human coronavirus 229E (HCoV-229E)
- Human coronavirus OC43 (HCoV-OC43)
- SARS-CoV

- Human coronavirus NL63 (HCoV-NL63, Haven coronavirus)
- Human coronavirus HKU1
- MERS coronavirus (MERS-CoV)
- New coronavirus (CoVID-19)

HCoV-229E, -NL63, -OC43, and -HKU1 viruses cause respiratory infections in children and adults among the worldwide human population. The last common ancestor of coronaviruses (ESOA) dates back to around 8000 BC. However, it is also thought that coronaviruses may be much older. The ESOAs of Alphacoronovirus, Betacoronavirus, Gammacoronavirus, and Deltacoronavirus species are based on 2400 BC, 3300 BC, 2800 BC, and 3000 BC, respectively. It is thought that vertebrates such as birds and mammals are ideal hosts and are the main factors in the evolution and spread of coronavirus. Bats are the ideal genetic source for Alphacoronovirus and Betacoronavirus, and birds are the ideal genetic resource for Gammacoronavirus and Deltacoronavirus [37].

7. CONCLUSION

Reducing the health risks and consequences of emergencies is vital to local, national and global health security and to build the resilience of communities, countries and health systems. Sound risk management is essential to safeguard development and implementation of the Sustainable Development Goals (SDGs), including the pathway to universal health coverage (UHC), the Sendai Framework for Disaster Risk Reduction 2015–2030 (Sendai Framework), International Health Regulations (IHR) (2005), Paris Agreement on Climate Change (Paris Agreement) and other related global, regional and national frameworks [40].

The emergence of all kinds of negative effects of pesticides, the abundance of natural enemies that can be exploited in nature and the increase of environmental awareness should be the reasons for focusing on an environmentally friendly, sustainable and cheap control method such as “Biological Control”. In addition, the facilitation of international natural enemy imports and the use of modern technology in mass production of natural enemies There are also other reasons that require speeding up the work of biological control. Today, the unit is not only to take abundant products from the area, but also perhaps more importantly to produce food safety. For this reason, in all western countries, especially in the USA, there is a lot of intensive work done by the state in order to switch to combat methods where there is no or least drug use. For example, 75% of government-led products in the United States have been reported to be rapidly continuing to implement Integrated Struggle (IPM) practices [9]. Integrated control practices, in which biological control is predominantly activated, drug use is eliminated or minimized, is at the top of the national product protection strategy, even in developing Asian countries. In our country, it is not possible to say that the state support is sufficient for “biological struggle”. In fact, the only Biological Control Research Institute ’in Antalya, which conducts biological control studies, was closed down in 1984. Our products are exported due to our hope and suggestion, healthy life, unmedicated vegetables and fruits, clean environment, remnants of medicines to ensure that the researchers, producers, practitioners and all segments of the society are sensitive and support the government's support in order to protect biodiversity and ensure sustainability. Many biological control laboratories affiliated to the Ministry of Forestry continue their functionality in this context.

COVID 19, which is one of the biological disasters seen as a pandemic and affects the whole world today, has an important place. The 2019-20 coronavirus pandemic is a virus outbreak that occurred in Wuhan, the capital of the Hubei region of China on December 1, 2019. A new coronavirus, called SARS-CoV-2, was diagnosed when a pneumonia that developed for no specific reason in various patients and did not respond to treatment and vaccines was detected [37]. The transmission rate of the virus, which can be transmitted from person to person, grew in mid-January 2020. In the future, cases of viruses in various countries in Europe, North America and Asia-Pacific began to be reported. On March 11, 2020, the Global Health Organization was declared a global epidemic. On March 13, 2020, he reported that Europe has now become the epicenter of the coronavirus crisis. As of April 12, 2020, 1.780.315 confirmed cases in the world, while 404.031 recovered, 108.828 patients died due to the virus.

There is some uncertain evidence that the virus is infectious even before symptoms appear, with the duration from 2-to-27 days from contact with the virus to the occurrence of symptoms. Disease symptoms include high fever, coughing and difficulty breathing, and the virus can cause death [38].

The first death caused by the disease occurred on January 9, 2020. Scientific studies estimate that the virus is transmitted to more people. The first contagion occurred outside of China occurred in Vietnam, when a father passed on to his son, and the first contagious case in which the family did not play a role was experienced in the state of Bavaria on January 22 in Germany, after a Chinese businessman smeared it on a German man. The first death outside China occurred in the Philippines on February 1, 2020, when a man infected with COVID-19, Influenza B and Pneumococcus died.

The virus is transmitted from person to person, by airborne droplets containing viruses that enter the body through the breath. There are findings that the disease can be transmitted from person to person without any symptoms, for example, the first transmission event in Germany is not known. It is not known how much the transmission cases played without the symptoms like this, and if the role it plays is difficult, it will make it difficult to control the epidemic [36, 37 and 38].

Since viruses are very small and consist of a small amount of atoms and are a unique RNA protein molecule, it is not known today whether it has a perception or not, as alive or inanimate. That is why their classes are called PARTICLE types. It has no metabolism, crystallizes outside the cell and lives lifeless, reaching the appropriate cell, leaving its RNA inside the cell, producing copies of cells, the cell explodes, newly produced viruses act on other cells. Viruses are so small microrganisms, they are made up of a small number of atoms. There were trillions of viruses in a tiny droplet in a sneeze [36].

Throughout history, biological disasters have caused physical, economic and psycho-social devastations, mostly regionally and sometimes globally. The COVID-19 pandemic is a biological disaster with a global impact. Because of its transmission from person to person, its transmission through droplets and contact, and its high spreading rate, it has caused millions of people to be affected and hundreds of thousands of people to die.

Trainings to be given are of great importance for long-term biological disaster management. Biological control methods for the mentioned insect infestations will provide long-term results that are both effective and environmentally friendly.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

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