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Science is love, love requeries honesty

Determination of Butterflies' Potential in Tourism Diversification Based on a Route-Planning Case Study in Botan Valley National Park, Turkey

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Abstract

This paper intended to clarify the importance of studying Botan Valley's nature with the biodiversity as an ecotourism site and alternative tourism. Butterfly watching is an alternative sort of ecotourism and special interest tourism activity that has grown in popularity in recent years. Turkey hosts various butterfly species, as it does other animal and plant species. Butterfly watching is important for diversification in the sustainable tourism industry. But butterfly watching has yet to be sufficiently investigated. The authors conducted a case study in Botan Valley, Siirt province, located in southeastern Turkey, to address this deficiency. Botan Valley is among the new national parks of Turkey and spans approximately 29 kilometers. The butterfly species in the study region were identified by collecting or photographing samples between the years of 2017 and 2020. A total of 78 species of butterflies belonging to 7 families were determined. Of those species, 63 were first discovered in the valley. The list of identified species and photos of many species are presented in the paper. The most suitable trekking route has been determined and created in the valley where nature lovers can watch and photograph these butterflies on foot. The diversity of butterflies in Botan Valley contributes to the location's potential as a source of wildlife watching tourism opportunities and alternative ecotourism options in Turkey.

Key Words: Botan Valley, Butterfly, Butterfly Tourism, Butterfly Watching, Lepidoptera, Wildlife Watching.

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1. INTRODUCTION

Ecotourism is an essential component of sustainable tourism in unspoiled natural areas (Fennell, 2015). With developments such as overtourism, global warming, and COVID-19, the concept of holidays has undergone a dramatic shift worldwide and an increase of interest in nature-based tourism activities (De Vos, 2020; Fletcher et al., 2020). In the last decade, several ecotourism activities and campaigns have been designed to increase environmentally sensitive travel in Turkey (Ministry of Culture and Tourism, 2007). Ecotourism is growing due to the increasing worldwide demand for environmentally friendly travel in Turkey and is recognized as one of the most important sub-sectors of the tourism industry (Temurçin & Tozkoparan, 2020).

Butterflies and moths belong to the order Lepidoptera of the insect class and are a rich species group (Gullan & Cranstan, 2010). Approximately 19,000 butterfly species have been defined in the world (Van Nieukerken et al., 2011). They are remarkable creatures due to their uniqueness, stunning colorations, and shapes. Butterflies as a potential nature tourism product constitute a part of so-called entomotourism,

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or insect-focused tourism (Lemelin, 2007). Although butterfly collection and display constitute one of the oldest and most established recreational activities, the role of butterflies in tourism is very new (Kaufman, 2003; Quinn & Klym, 2009; Genç & Seven, 2020). As an increasingly popular tourism activity, butterfly watching benefits from the current birdwatching industry (Lemelin, 2007). The development of close-focus binoculars has provided an opportunity to closely observe living creatures in their natural environment. Along with the "diagnostic catalogs" of butterfly watching, information about butterflies is increasing as well as interest in this experience. Butterflies are among the tourism activities of Europe, USA, and Asia (Laurent, 2000). Many people will travel to observe butterflies in national parks and wilderness areas (Gonzalez et al., 2017). To increase their contribution to the regional gross domestic product, there is a need for appropriate ecotourism planning aimed at determining land suitability of national park areas for various ecotourism activities. Previous studies on butterfly watching (Koçak & Seven, 1998; Lemelin, 2007; Karaçetin & Welch, 2011; Genç & Seven, 2020) are conceptual studies on species identification or the importance of butterfly tourism, and there is a serious need for field studies on butterfly watching and tourism activities.

Figure 1. Botan Valley: a. Gökçebağ, Pier, 29.05.2020, b. Pier, 31.05.2020, c. Stream, 02.06.2020. Photos: E. Seven.

Turkey is rich in biodiversity, situated as it is between the major biogeographic regions. It hosts extremely rich habitats and species due to climatic diversity and vegetation types. Siirt province is located in the Iran-Turan phytogeographic region. Yet Botan Stream has the characteristics of a

Mediterranean climate, and the flora of the area consists of 381 taxa, belonging to 59 families and 232 genera. Of these species, 20 are endemic (Yangın, 2001). Turkey also has a rich butterfly population of 413 known species (Hesselbarth et al., 1995; John et al., 2018; 2020; Koçak & Kemal, 2018) and hosts 45 endemic and 21 near-endemic butterfly species (Karaçetin & Welch, 2011; Koçak & Seven, 1998). In Botan Valley (Siirt, southeastern Turkey), declared as a new national park, a total of 78 species of butterflies were determined. Botan Valley is little known in Turkey as an ecotourism destination, and ecotourism activities are not yet at the desired level. This study aims to plan a tour route for Botan Valley's butterfly watching in the interest of promoting ecotourism. The valley contains many natural beauties together with valley formations, karsts, caves, and endemic flora and fauna, all of which may attract the attention of nature-loving tourists (Figure 1). According to Alkan (2018) and Koday et al. (2018), many ecotourism activities, such as trekking, botanical tours, photo safaris, bicycle safaris, wildlife observation, camping-caravan tourism, paragliding, rafting, plateau tourism, and mountain tourism, can be engaged in sustainably in the valley so long as tourists take into account the proper principles of conservation. In addition to suggested ecotourism activities in Botan Valley, butterfly watching is recommended via a designated route with the aim of contributing to alternative ecotourism options in Turkey.

2. LITERATURE REVIEW

2.1. Ecotourism and Wildlife Watching

Although "wildlife" technically includes all flora and fauna, in popular usage it most often refers to animals in the wild (Higginbottom, 2004). Perhaps the classic image of wildlife for many people is a large mammal or a flock of wild birds, but the term fully encompasses all kinds of insects, marine life, and herbs. As the name implies, wildlife watching is simply watching wildlife and is thus distinct from other wildlife-related activities such as hunting and fishing (Valentine and Birtles, 2004). Watching wildlife is an observational activity, although it may include interactions with the animals being observed, such as touching or feeding them, in some cases (Belicia and Islam, 2018). Wildlife watching tourism is tourism organized and undertaken to watch wildlife (Cong et al., 2017). This form of tourism has grown considerably in recent years (Curtin and Wilkes, 2005). The tourism industry leans in favor of "wildlife tourism" rather than wildlife watching tourism, per se (Aquino et al., 2021). In most instances, the two terms are identical. On the other hand, wildlife watching has a lot in common with ecotourism, a type of tourism founded on the idea of actively contributing to the conservation of natural and cultural heritage (Tapper, 2006). This involves planning, development, and operations that contribute to the well-being of local and domestic communities and explain natural and cultural assets to visitors. Ecotourism is especially suited to organized tours for small groups and independent travelers (Caudill & Laughland, 1998; Caudill, 2003; Tapper, 2006).

Over the past two decades, the growth of tourism and travel has been noteworthy. Domestic tourism has grown worldwide as more visitors have more money to spend and more time participating in tourism (UNWTO, 2021). Wildlife watching tourism has seen an equal rise in popularity (Aquino et al., 2021; Belicia and Islam, 2018; Cong et al., 2017). Moreover, in other regions, such as whale watching in Sydney, the increase of wildlife watching could be considerably more substantial (Tapper, 2006). This growth is the result of a variety of factors, including many people's long-term interest in wildlife, people's affluence and longevity in industrialized countries, which allows them to pursue their interests in wildlife through travel once they retire, and tourists' shared desire to seek new experiences through tourism (Valentine and Birtles, 2004). Because the tourist sector is so responsive to market demand, tourism products will likely continue to improve to match consumer interest in wildlife. In addition to being carbon-neutral, an increasing number of tourism agents and operators emphasize the need for

tourism to be sustainable, developing and marketing tourism products that are "wildlife-friendly," ensuring that a fair part of tourist income goes to local people. Wildlife watching is a newer attraction in other locations that are helping to diversify tourism and support community development in rural areas (Valentine & Birtles, 2004; Tapper, 2006).

Sustainability is carried out with the intention of protecting nature and natural resources, leaving a suitable environment for future generations while meeting current needs (Collin, 2004). One of the most sustainable tourism activities is ecotourism (Fennell, 2015). Ecotourism is defined as responsible travel to unpolluted natural areas that allow tourists to learn about the natural environment and benefit the local community (Chan & Baum, 2007). It is a subset of sustainable tourism that aims to protect and balance economic growth, social benefits, and the environment (Walker & Moscardo, 2014). Botanical tourism, mountain tourism, photo safaris, wildlife watching, cave tourism, adventure tourism, boat trips, and trekking are examples of ecotourism. These activities are considered attractive as ecotourism products in that they provide tourists with a unique travel experience. Expenditures related to these nature-based activities are viewed as key sources of economic gain for businesses and communities (Sangpikul, 2015). According to the literature, learning about nature is the foundation of all ecotourism encounters and products (Cheung & Fok, 2014; Weaver, 2001). Such opportunities can help guests better grasp the destination's natural surroundings and respect nature more broadly, thereby reducing inappropriate behavior and its harmful effects (Chester & Crabtree, 2002).

People often have intense and deeply personal experiences in reaction to observing wildlife (Valentine & Birtles, 2004). Wildlife watching is therefore an integral part of ecotourism (Belicia & Islam, 2018). According to data compiled by the World Tourism Organization (UNWTO) in 2014, nearly 12 million tourists traveled the protected areas of 14 African countries, spending approximately 168 million dollars in the process. In addition, the act of wildlife watching is expected to increase by 10% every year (UNWTO, 2015). Wildlife tourism also plays an important role in developing countries. In 2030, international tourist arrivals of developing countries are expected to constitute 57% of the total market share. Developing countries contain most of the biological diversity of the world, and nature-based tourism has consequently been on the rise in these countries (Belicia & Islam, 2018).

In a study conducted by the United States Fish and Wildlife Service (USFWS) on the natural wildlife observation activities of over 15 thousand tourists in the USA in 2001, it was found that the spending levels of said tourists were very high in comparison with other tourism activities (Caudill, 2003). Tourists involved in wildlife tourism generally use highly technical equipment and spend approximately $2.6 billion a year on cameras and other photography equipment alone, and $507 million on binoculars and animal detection equipment (Caudhill & Laughland, 1998). Wildlife watching expenditures in the USA totaled $95.8 billion in 2001 (Caudill, 2003; Valentine & Birtles, 2004). When the data are analyzed, it is seen that wildlife watching has a significant share in terms of tourism revenues. Butterfly watching is a rapidly rising and important ecotourism and wildlife tourism activity worldwide.

2.2. Butterfly Watching

Butterfly watching is defined as the photographing of butterflies by professionals and amateurs alike in a forest or nature walk and includes the monitoring and identification of butterflies in their habitats. Butterflies are particularly attractive to humans due to their bright and majestic colors, short life spans, being active during the daytime, ability to fly, harmlessness, and symbolic associations with peace and harmony (Genç & Seven, 2020; Lemelin, 2013). Because butterfly watching is a type of ecotourism that should be conducted in nature (Çelik & Topsakal, 2017), it is a suitable tourism activity, especially for small groups and independent travelers, as it does not affect the natural lives of animals (Lemelin, 2013).

Butterfly watching has become widespread in recent years, especially in Europe and the USA (Surat et al., 2015). For example, Portugal hosts 33% of all butterfly species in Europe and has tour routes specific to butterfly watching (Gonzalez et al., 2017). Many butterfly species have also been observed in the USA. There is even a butterfly festival held annually in the state of Texas, where a specified route highlights upwards of 442 butterfly species. Such trips include a variety of activities and cost 375 dollars per person (Texas Butterfly Festival, 2020). Butterfly tourism opportunities offered in Costa Rica and Taiwan attract approximately 500 thousand butterfly-watching tourists per year (Samways, 2005). The tourist typology of butterfly enthusiasts is mostly comprised of well-educated, high-income individuals (Lemelin, 2007).

Studies of butterfly watching have gained traction in the last five years. Although butterfly watching is an ancient pastime, it is new as an ecotourism activity (Genç & Seven, 2020). Choudhury et al. (2019) have identified 962 butterfly species in Northeast India and stated that the presence of these butterflies would increase their ecotourism activities and provide an alternative source of livelihood for local people. Gonzalez et al. (2017) conducted a study to identify the butterfly species (522 in total) in five tourist trails in Northeast Portugal. Kurnianto et al. (2016) identified 107 butterfly species in the vicinity of Indonesia's Shepherd Rais Waterfall. As a result of these studies, tourism destinations have been created for butterfly watching and with ecotourism firmly in mind. Nevertheless, Lemelin and Lopez (2019) stated that tourists were not provided with sufficient information when watching monarch butterflies (*Danaus plexippus*) in Mexico, and adequate measures were not taken in the region for the protection of these butterflies and the development of local employment. According to the results obtained from the present research, it can be said that number of butterfly species, tracking, and visitor experience are essential to butterfly watching.

2.3. The Importance of Butterfly Watching

Butterflies have always been remarkable creatures, thanks to their wide variety of colors and patterns (Genç & Seven, 2020). Butterflies are considered more comfortable and beautiful to observe and photograph than other insect groups. Butterflies are a popular subject of ecotourism because of their attractive appearance and exciting life cycles.

Butterflies have significant attraction potential like other wildlife tourism subjects. Butterfly watching can be seen as important for diversifying touristic products in a destination and increasing the experiences of tourists. When it comes to butterfly observation, little is needed in the way of infrastructure and superstructure (Çelik & Topsakal, 2017), as too much structuring in such regions would disrupt the natural balance of butterflies, which are very sensitive (especially as larvae) to changes in the environment and are responsive indicators of environmental quality (Sparrow et al., 1997).

Butterfly species are sensitive to ecosystem degradation and are suitable for gauging habitat quality. Unfortunately, the number of butterfly species has globally been on the decline. Approximately one-third of the total number of butterfly species in Europe is decreasing, and 10% is in danger of going extinct (Van Swaay et al., 2012). Anthropogenic (i.e., human-induced) factors such as habitat destruction, climate change, use of fire, insecticides and herbicides, improper agricultural practices, and illegal collections for trade have all contributed to this decrease. Such factors have affected many species of butterflies and have caused some to fall into the rare or endangered species category (Koh, 2007; Pang et al., 2016). Yet this decline can have serious negative impacts not only on biodiversity but also on ecosystem balance. According to the IUCN, as of 2019, 30 thousand animal species face the real possibility of extinction (IUCN, 2020). Therefore, the richness and abundance of species in certain areas have direct effects on habitat quality and contributions to the ecosystem (Gonzalez et al., 2017; Pang et

al., 2016). Butterfly watching contributes to the sustainability of nature and can therefore be considered an essential component of sustainable tourism.

3. METHODOLOGY

This research is a case study. The Botan Valley offers excellent opportunities to examine how butterfly diversity contributes to butterfly-watching tourism. The butterflies and their flight periods in Botan Valley National Park were investigated between 2017 and 2020. And, to observe these butterfly species, the most suitable trekking route was created. The geographical and ecological characteristics of the area and the determination of the route are explained below.

3.1. The Study Area

The Botan River is situated in a hilly region consisting of limestone mountain and plateau formations, which are shaped by the breaks and curls of the Cenozoic era (Atalay & Mortan, 2006). The length of the Botan River, which originates from the Uluçay Stream in the south to the point where it pours into the Tigris, is approximately 270 km. The Botan River is located at the intersection of Southeastern Anatolia and Eastern Anatolia and extends from east to south of Siirt province. Botan Stream surrounds the Norduz Plateau from the west and takes its source from the high mountains forming the borders of Siirt-Hakkari and Siirt-Van (Figure 2). It flows first to the west and then to the northwest and in a narrow, deep, and steep valley (Alkan, 2018; Yangın, 2001).

Figure 2. Location of Botan Valley National Park in southeastern Turkey (D-maps, 2020)

Botan Valley's altitude ranges between 470-1360 meters. Depending on the slope of the valley, it has variable and diverse landscape assets. A rich and diverse ecosystem thrives within the valley due to its geomorphological structure. Botan Stream and dams built on it are undoubtedly the most important determiners of the current ecosystem in the area. Botan Valley is located in Siirt and was given status as Turkey's 45th national park on August 15, 2019 by the issue of the Official Gazette. The valley spans approximately 120 thousand acres and 29 kilometers of the route within the borders of the Siirt, Tillo, and Eruh provinces (Official Gazette of the Republic of Turkey, 2019).

3.2. Climatic Conditions

As is the case with many species, weather conditions play an important role in the flight paths and observability of butterflies. The vast majority of butterflies prefer sunny and hot conditions; they are not active in rainy and cold weather. Butterflies begin to fly in the spring, mostly after the third month, when the weather gets warmer. Pupae emerge only when the temperature and humidity are suitable.

Siirt province has a terrestrial climate, which means that summers are dry and hot while winters are rainy and cold. In the winter season, precipitation comes in the form of snow in higher elevations and the form of rain and snow in lower elevations. Precipitation is most common in March and April (Republic of Turkey Ministry of Agriculture and Forestry, 2020) (Table 1). Generally, following a short spring, rains decrease and the hot and dry weather in the region continues until autumn.

Botan Valley constitutes an important microclimate that differs significantly depending on elevation. Depending on the altitude, precipitation ranges between 300-400mm while temperatures ranges from 6-8°C (Alkan, 2018)

Table 1. Temperature and precipitation values of Siirt province by month

Siirt Province	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Measurement Periods (1939 - 2019)												
Average Temperature (°C)	2.6	4.2	8.3	13.7	19.3	25.9	30.6	30.3	25.4	18.2	10.4	4.8
Average Highest Temperature (°C)	6.6	8.8	13.3	19.1	25.2	32.2	37.0	36.9	32.2	24.4	15.4	8.7
Average Lowest Temperature (°C)	-0.5	0.5	4.0	8.9	13.5	19.0	23.4	23.2	18.7	12.7	6.3	1.6
Average Sun Time (Hour)	3.5	4.3	5.4	6.5	8.9	11.6	12.1	11.3	9.9	7.1	5.2	3.5
Average Rainy Days	12.4	11.9	14.1	13.1	10.2	3.3	0.6	0.6	1.6	7.2	8.9	11.5

Source: Republic of Turkey Ministry of Agriculture and Forestry (2020).

3.3. Determination and creation of the route

Google Earth and Botan Valley National Park's own maps were primarily used in the creation of the route. As of March 2020, most of the old known routes have been submerged due to the rising waters of Ilısu Dam. For this reason, the areas covering the entire national park were examined, and the most suitable route was determined. Throughout the route, criteria such as slope height, proper distance, and adequate return were taken into account. A route between Taşbalta and Çınarlısu, in the eastern part of the valley, was found to meet these conditions.

4. RESULTS

The butterflies were collected and photographed during the day, and observations were made in 2017-2020 in Botan Valley itself. The sampling process was carried out manually using insect nets and cameras. Because flight periods differ by species, timing played a vital role in determining the species. Pictures of many species naturally photographed and collected in the area were added. Figures of the

species were taken with Fujifilm Finepix HS30EXR and Nikon D5200 cameras. The second author analyzed the butterflies using the research of Hesselbarth et al. (1995).

As most of the valley was flooded by construction of the Ilısu Dam in 2020, detailed studies were carried out to determine the route. The most suitable route, between Taşbalta and Çınarlısu, which is around 11 kilometers and continues across Alkumru and Kirazlık Dams, was created. The route starts with Taşbalta at an elevation of 1100 meters and ends at an elevation of 600 meters in the vineyards and gardens of Çınarlısu. This route is offered for butterfly watchers, both as an enjoyable trekking opportunity and for the possibility of observing and photographing butterflies, taking into account their flight times.

After the length of the route was measured on Google Earth, it was calculated according to degree of difficulty. Kiracioglu (2013) was used to classify the difficulty of the route. The designated route is nearly 11 km within the coordinates of 37°58’43”N-37°53’53”N and 42°03’20”E-42°02’33”E. It has low slopes, ups, and downs and is of easy-to-medium difficulty, given that most of the total distance covers open and large areas (Figure 3, 4). This route is suitable for beginners.

In the route as shown on the map (Figure 3), there are any errors due to satellite view and subjects that could hinder field studies along the route (such as stony-rocky, reed-marshy, river). The area and the route were photographed panoramically, and their pictures were added to the paper (Figure 4).

Figure 3. The created route in Botan Valley (modified from Google Earth)

Figure 4. The created route in Botan Valley, Tillo, 03.06.2020. Photos: E. Seven.

The results of the observations are recorded in Table 2 with the flight periods and common English names of each species (Baytaş, 2007; Tolman & Lewington, 1997). For the two species that do not have an English name, specific as they are to Eastern countries, an English name was proposed in accordance with their original names: the names "Persian White" for *Pieris persis* and the name "Dessert Marbled White" for *Melanargia grumi* are proposed. Naturally photographed pictures of many species are illustrated (Figures 5, 6).

5. DISCUSSION AND CONCLUSION

Species that are more easily observed, have uncommon habits and colors, or are symbolic, rare, or exotic are unavoidably the focus of public attention. Ecotourism activities such as nature walks and butterfly watching have no negative impact on natural and cultural environments outside of their contribution to promoting a given region (Higginbottom, 2004). On the other hand, good guiding and interpretation can make any species interesting to the general public. For tourists, these components are often an essential part of their wildlife-watching adventures (Tapper, 2006). In this sense, butterfly watching has attracted attention in recent years for its easy observation, superb aesthetic value, and rarity for the wildlife watcher.

Among the alternatives of special interest tourism, interest in butterfly watching has been increasing in recent years (Genç & Seven, 2020). Butterfly diversity is one of the potential sources for tourism product variety and improvement. It is thought that the abundance and diversity of butterflies' potential will contribute to the diversification and development of tourism products in the sustainable tourism industry. Butterflies, like other wildlife tourism subjects, have an important potential in destination development and can be used to diversify touristic activities in destinations. Tourism income levels of rural areas, including rich natural areas, can be increased by an improvement of ecotourism through butterfly watching and the conservation of biodiversity.

This paper intended to clarify the importance of studying Botan Valley nature with the butterflies watching as an ecotourism site. Turkey's Botan Valley, located in Southeastern Anatolia, is this study's region of interest, and as such is shown to reveal the potential for butterfly watching with the aim of contributing to the development of the region's ecotourism potential via tourism diversification.

The recent declaration of Botan Valley as a national park is proof positive of national and international conservation efforts alike and has enabled the region to develop itself as a viable ecotourism destination. It has also encouraged local employment (i.e., guidance, food and beverage, etc.). And yet, Botan Valley has yet to see any significant amount of tourism, despite its enormous potential in terms of butterfly watching. When the literature is examined, butterfly watching is an important tourism activity for its protection and use of nature (Gonzales et al., 2017; Kurnianto et al. 2016; Lemelin, 2007; Lemelin & Lopez, 2019). It also has serious economic potential (Gonzales et al., 2017; Laurent, 2000). In this context, revealing butterflies' potential is consistent with other studies conducted with boosting Botan Valley ecotourism in mind.

Turkey has significant tourism potential. Approximately 45 million foreign tourists visited Turkey in 2019 (KTB, 2020). Yet most of incoming tourists travel for 3S (sea-sand-sun) and cultural tourism (Okumus et al., 2012). The impact of COVID-19 on Turkey's tourism industry was, of course, deep, especially because Turkey's tourism economy ranks fourth globally at 11.3%, after Mexico, Spain, and Italy (WTTC, 2020). When tourism projections are analyzed, it is expected that tourists will trend toward ecotourism activities in their short and medium-term purchasing behaviors (Desbiolles, 2020; Galvani et al., 2020; Lew et al., 2020). Therefore, this study is consistent with the increasing tourism and future prospects of Turkey's tourism potential.

Southeastern Anatolia, where Botan Valley is located, is home to important cultural and natural places such as Göbekli Tepe, Mount Nemrut, the ancient city of Zeugma, and Hevsel Gardens. This study provides a butterfly checklist for the area, thus serving as a primary data set and reference point for future conservation efforts and biodiversity assessments in the region. Butterfly watching could be introduced as a new attraction for Botan Valley, apart from common activities such as camping, trekking, hiking, and wildlife watching. Its potential to contribute to the region's touristic development is high.

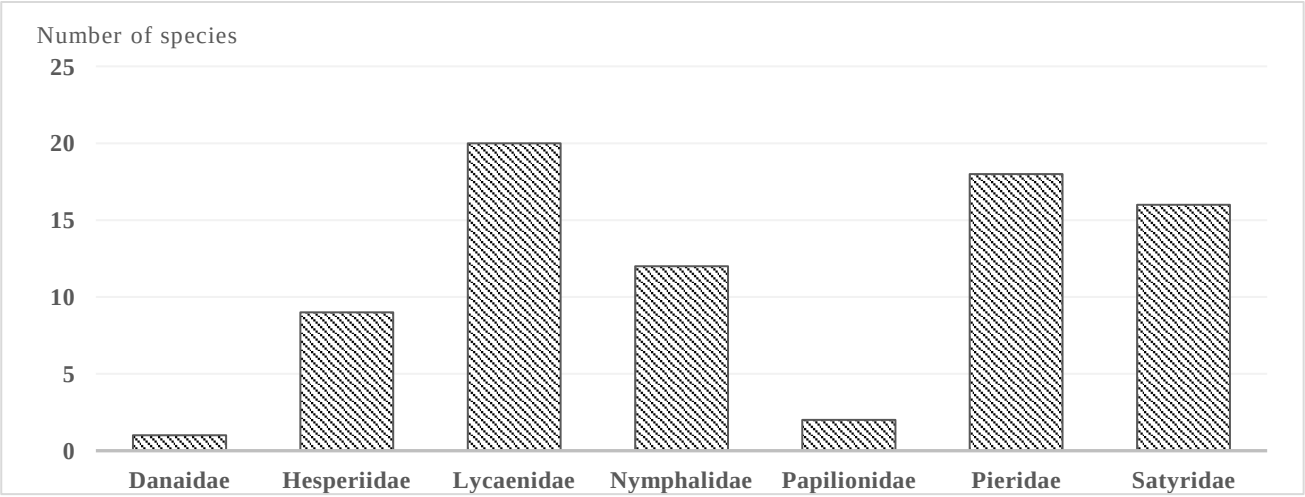

Figure 5. Number of species according to families identified in the area

Turkey has a rich array of butterfly fauna, with 413 known species (Hesselbarth et al., 1995; John et al., 2018; 2020; Koçak & Kemal, 2018). A total of 123 butterfly species are known in Siirt province alone

(Seven, 2010). Researched on the butterflies of Botan Valley is lacking. John et al. (2018; 2020) have presented a new species, *Pontia glauconome*, to the Turkish butterfly fauna, and have reported 14 butterfly species from Botan Valley alone. In this study, a total of 78 butterfly species were reported in 7 families, and 63 of those species are recorded from the valley for the first time. Most species of butterflies in Botan Valley were identified respectively from the Lycaenidae, Pieridae, and Satyridae families (Figure 5).

The species: *Danaus chrysippus, Gegenes nostrodamus, Cigaritis uighurica, Zizeeria karsandra, Precis orithya, Thaleropis ionia, Archon apollinaris, Belenois aurota, Colias alfacariensis, Colotis fausta, Pontia glauconome, Hipparchia fatua, Hipparchia parisatis, Pieris persis* were determined rare in the field. *In addition: Carcharodus alceae, Erynnis marloyi, Spialia orbifer, Thymelicus lineolus, Thymelicus sylvestris, Glaucopsyche alexis, Lycaena phlaeas, Polyommatus agestis, Polyommatus icarus, Satyrium abdominalis, Tarucus balkanicus, Argynnis pandora, Vanessa cardui, Zerynthia deyrollei, Colias crocea, Pieris brassicae, Pieris ergane, Pieris rapae, Pontia chloridice, Pontia edusa, Brintesia circe, Coenonympha saadi, Hyponephele lycaon, Kirinia roxelana, Melanargia grumi species* were found to be widespread and common. Pictures of many species photographed in their natural position in the Botan valley are presented (Figure 6-7).

The species *Danaus chrysippus, Belenois aurota, Colotis fausta*, and *Pontia glauconome*, known as "immigrants" to Botan Valley, are primarily seen in late summer-autumn in the area. As these species are visually beautiful and worth seeing, they also attract the attention of butterfly watchers. *Pieris persis*, which shows distribution only in Iraq, Iran, Turkmenistan, and Turkey (in East and Southeast), is remarkable among the species.

Approximately 19,000 butterfly species have been identified in the world (Van Nieukerken et al., 2011). In addition, there are 60 species of butterflies in the UK and Ireland, 850 in the United States (USA) and Canada, and around 500 in all of Europe (Wiemers et al., 2018; Pelham, 2020). In this context, Botan Valley offers an important route for observers with the variety of butterflies it presents.

This study offers some practical work and theoretical application opportunities. Botan Valley National Park is a viable attraction in and of itself, with its narrow yet deep canyons, geomorphological formations, and biodiversity. It has high potential as a place for trekking, especially as an alternative tourism attraction. Yet conservation of nature should be taken into consideration should such activities be touted for the region. The valley meets the criteria of protected areas that are necessary for ecotourism to be realized and sustainable due to its resource-rich land structure. That said, it remains insufficient in terms of infrastructure and transportation. By eliminating these problems, the area will become much more attractive.

Conservation of species and management of tourism in protected areas are very important in the butterfly watching process. Such diversity of species further shows the quality of nature in the region. Effective legislation with sufficient resources for implementation should be provided, and national policies in protected areas need to be organized. For this, support can be obtained from tourism planners, public administrators, and even biologists studying the butterflies themselves. When the literature is examined, it is seen that the studies on butterfly watching are very limited. Especially Covid-19 shows that nature tourism will be much more popular in the future. In this context, more research is needed on the development of butterfly watching.

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Appendix

Table 2. Butterflies of Botan Valley with common English names and flight periods

Family	No	Species	Common name	Flight period
Danaidae	1	*Danaus chrysippus*	Plain Tigger	July-September
Hesperiidae	2	*Carcharodus alceae*	Mallow Skipper	April-October
	3	*Carcharodus orientalis*	Oriental Skipper	May-June
	4	*Carcharodus stauderi*	Stauder's Skipper	May/September-October
	5	*Eogenes alcides*	Alcides Skipper	July-September
	6	*Erynnis marloyi*	Inky Skipper	April-August
	7	*Gegenes nostrodamus*	Mediterranean Skipper	July/September
	8	*Spialia orbifer*	Red Underwing Skipper	April-August
	9	*Thymelicus lineolus*	Essex Skipper	May-June/October
	10	*Thymelicus sylvestris*	Small Skipper	April-August
Lycaenidae	11	*Callophrys rubi*	Green Hairstreak	April-May
	12	*Celastrina argiolus*	Holly Blue	April-August
	13	*Chilades galba*	Small Desert Blue	March/July-August
	14	*Chilades trochylus*	Grass Jewel	March/June/October
	15	*Cigaritis uighurica*	Large Silver-line	May-June
	16	*Glaucopsyche alexis*	Green-underside Blue	April-July
	17	*Lampides boeticus*	Long-tailed Blue	April-June
	18	*Lycaena phlaeas*	Small Copper	March-November
	19	*Polyommatus agestis*	Brown Argus	April/July/October
	20	*Polyommatus bellargus*	Adonis Blue	May-June
	21	*Polyommatus daphnis*	Meleager's Blue	June-August
	22	*Polyommatus icarus*	Common Blue	April-October
	23	*Polyommatus loewii*	Loew's Blue	May-August
	24	*Polyommatus thersites*	Chapman's Blue	May/July
	25	*Plebejus carmon*	Eastern Brown Argus	May-August
	26	*Pseudophilotes vicrama*	Vicrama Blue	March/May/August
	27	*Satyrium abdominalis*	Gerhard's Black Hairstreak	April-August
	28	*Satyrium marcidum*	Riley's Hairstreak	June
	29	*Tarucus balkanicus*	Little Tiger Blue	April-October
	30	*Zizeeria karsandra*	Dark Grass Blue	August-November
Nymphalidae	31	*Argynnis pandora*	Cardinal	May-October
	32	*Issoria lathonia*	Queen of Spain Fritillary	April-September
	33	*Limenitis reducta*	Southern White Admiral	May-August
	34	*Melitaea persea*	Persian Fritillary	May-June
	35	*Melitaea syriaca*	Lesser Spotted Fritillary	May-June
	36	*Nymphalis polychloros*	Large Tortoiseshell	March-July
	37	*Polygonia egea*	Southern Comma	March/May-September
	38	*Polygonia c-album*	Comma Butterfly	March/June
	39	*Precis orithya*	Blue Pansy	July/October-November
	40	*Thaleropis ionia*	Ionian Emperor	July
	41	*Vanessa atalanta*	Red Admiral	March/June/October
	42	*Vanessa cardui*	Painted Lady	March-November
Papilionidae	43	*Archon apollinaris*	False Apollo	March-April
	44	*Zerynthia deyrollei*	Eastern Steppe Festoon	April-May
Pieridae	45	*Anthocharis cardamines*	Orange Tip	March-April
	46	*Anthocharis grueneri*	Gruner's Orange Tip	March-April
	47	*Aporia crataegi*	Black-veined White	April-June
	48	*Belenois aurota*	Pioneer	October-November
	49	*Colias alfacariensis*	Southern Clouded Yellow	May/August-October
	50	*Colias crocea*	Dark Clouded Yellow	March-November
	51	*Colotis fausta*	Large Salmon Arab	August-November
	52	*Euchloe ausonia*	Dappled White	April-May
	53	*Gonepteryx farinosa*	Powdered Brimstone	Mayıs-Eylül

	54	*Gonepteryx rhamni*	Brimstone	May-September
	55	*Pieris brassicae*	Large White	March-October
	56	*Pieris ergane*	Mountain Small White	April-July
	57	*Pieris persis*	Persian White*	April/July/September
	58	*Pieris pseudorapae*	False Small White	April-September
	59	*Pieris rapae*	Small White	March-October
	60	*Pontia chloridice*	Small Bath White	March-September
	61	*Pontia edusa*	New Bath White	March-November
	62	*Pontia glauconome*	Desert White	April/September-October
Satyridae	63	*Brintesia circe*	Great Banded Grayling	May-July
	64	*Chazara briseis*	The Hermit	June-August
	65	*Coenonympha pamphilus*	Small Heath	May/July
	66	*Coenonympha saadi*	Saadi's Heath	April-June
	67	*Hipparchia parisatis*	White-bordered Grayling	June-September
	68	*Hipparchia fatua*	Freyer's Grayling	June-July
	69	*Hipparchia syriaca*	Syrian Rock Grayling	June-September
	70	*Hyponephele lupina*	Oriental Meadow Brown	May-October
	71	*Hyponephele lycaon*	Dusky Meadow Brown	April-August
	72	*Kirinia roxelana*	Lattice Brown	May-September
	73	*Lasiommata maera*	Large Wall Brown	April-September
	74	*Lasiommata megera*	Wall Brown	April-September
	75	*Maniola jurtina*	Meadow Brown	September-October
	76	*Maniola telmessia*	Eastern Meadow Brown	May-September
	77	*Melanargia grumi*	Dessert Marbled White*	May-June
	78	*Pararge aegeria*	Speckled Wood	March-September

Figure 6. Butterflies of Botan Valley: a. *Danaus chrysippus*, b. *Callophrys rubi*, c. *Lycaena phlaeas*, d. *Polyommatus icarus*, e. *Satyrium abdominalis*, f. *Issoria lathonia*, g. *Limenitis reducta*, h. *Polygonia c-album*, i. *Precis orithya*, k. *Thaleropis ionia*, l. *Vanessa atalanta*, m. *Anthocharis grueneri*. Photos: a, b, f, g, i-k (N. Kaymaz); c-e, h (E. Seven).

Figure 7. Butterflies of Botan Valley: a. *Aporia crataegi*, b. *Belenois aurota*, c-d. *Colias crocea*, e. *Colotis fausta*, f. *Gonepteryx rhamni*, g. *Pieris rapae*, h. *Pontia glauconome*, i. *Coenonympha saadi*, k. *Hipparchia parisatis*, l. *Melanargia grumi*, *Pararge aegeria*. Photos: b-h, k (N. Kaymaz); a, i, l, m (E. Seven).

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ETHICS STATEMENT FORM

Support Information: This research has not received any support from anywhere.
Ethics Committee Approval
( ) Ethics committee approval is required.
Which institution issuing an ethics committee approval report?
Ethics committee report decision date and decision number:
(X) Ethical committee approval is not required (The reason is stated below).
( ) Ethics committee approval is not required since the data were collected before 2020. **(X) The method used in the study does not require ethics committee approval.**
Author(s) Contribution Rate
1. Author: %40
2. Author: %35
3. Author: %25
Informed Consent Form: All parties are involved in the study with their own consent.