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Research Article

LEPIDOPTERA FAUNA IN THE BAMU NATIONAL PARK (PROTECTED AREA IN SOUTHERN OF IRAN)

***Farangis Ghassemi and Marzie Saidi**
Department of Biology, Jahrom Branch, Islamic Azad University, Jahrom, Iran
**Author for Correspondence*

ABSTRACT
Faunestic study of animal in protected areas due to preserve biodiversity in these areas. The aim of present study was to identify Lepidoptera fauna that some of them as pest play an important role in ecosystem in Baum National Park. This area with 48,000 ha in southern of Iran (Fars Province), divided to five stations that are varying in altitude and flora. Sampling was done by manual and using insect net during 9 months. Samples transferred to the laboratory and were sorted. Then they were formed and identified according to taxonomic keys and morphologic characters. A total of 169 specimens belong to 4 families (Lycaenidae, Nymphalidae, Pieridae and Hesperidae) were identified. Obtained results showed that in all of stations, there was a great abundance and diversity of butterflies. Lycaenidae and Nymphalidae respectively, had the highest diversity and number. High frequency of Lycaenidae in May and Pieridae and Nymphalidae were in June. The obtained results showed that this region has a high diversity of insects as butterflies. Due to present of widespread forests and grasslands and important role of butterflies in maintain of them, the study of their fauna and resolution of pest and benfic type of them is essential.

Keywords*: Biodiversity, Butterfly, Ecosystem, Pest*

INTRODUCTION
Lepidoptera is one of the largest orders of insects that are spreading world-wide. They have than 160,000 species that is about 17 % of the world's known insect fauna. They are known in different areas from the northern lands of earth to the tropical forests and arid deserts. This order includes moths and butterflies (Danner and Surholt, 2010), that identification of butterflies was investigated in this study.
The butterfly is the largest lineage of plant eating organisms, so some of them as pest, poses a major economic and environmental threat. The caterpillars hatching from these eggs can cause damage to large quantities of crops (Abaii, 2000). They are an important component of Biodiversity, good pollinators (Oliveira *et al.*, 2 004), are highly sensitive to any environmental change and are delicate creatures. They act as good bio-indicators of the health of a habitat (Sidhu, 2011).
Bamu National Park located in south-western of Iran (29˚ 36′ to 29˚ 53′ N & 52 ˚22′ to 52 ˚ 54′ E) and include extent about 49000 hectare. This Park has vast plains and mountain (to 2700 m), also it has a rich diversity of plant and animal that due to tourist attractions (Mehdizadeh, 2014). The average temperature is between -3 º C in the winter to +34 º C in the summer. Vegetation with over 350 species of plants and abundant springs, have created the perfect environment for a large number of insects (Powell *et al.*, 2009).
Significant variability of the climate and diverse vegetation due to richness of butterflies in Iran that more than 400 species of butterflies were known in it (Naderi, 2013). Bamu Park also is

favorite habitat for insect, so identification of them, helps to conservation and ecosystem sustainability.

Despite the importance of this order of insects, extensive research to identify butterflies hasn't been conducted in Iran especially in Fars province. Sadeghi *et al.*, (2005) reported *Lymantria dispar* L in Arasbaran's forests in north of Iran and introduced a pradator insect (*Calosoma sycophanta* L) and a bacterial pathogen (*Bacillus thuringi*ensis) as its parasitoid.

First reported from various plants, especially oak and eat a variety of insects as natural enemies are introduced. *Tortrix viridana* L as pest of Oka in Zagros region introduced. Lehmann and Zahiri (2011) reported new spices in north and northwest of Iran. Also the researches have been done for identification of this order in other region of Iran (Zahiri *et al.*, 2008, 2012).

In today's world, humans have been responsible for many changes in their environment, so that the extent of destruction of life butterflies and some species are endangered. Forests Destruction and human construction (without regard to principles of sustainable development) will cause the loss of plants that are essential nutrients for butterflies. So identification fauna, habit and habitat of them, aid to their conservation.

MATERIALS AND METHODS

The research region (Bamu Park) is divided to five stations that are varying in altitude and flora (Table 1). Insects were sampled manual and using insect net and cyanide jars. Collected insects were transferred to the laboratory and the butterflies were isolated. Then they were formed and identified according to taxonomic keys and morphologic characters in available literature (Modares Aval, 2002; Heppner, 2008).

The specimens was known by Taxonomic key as wingspans, body size, color, present or absent of compound eye and ocelli, covering of scales on the body in adult stage of them. The samples preserved in Islamic Azad University, Jahrom branch museum.

Table 1: The characters of Baum National Park

vegetation	Altitude	station
Cypress and Pine	1619	1
*Stipa barbata, stipa atriseta,*Thorns	1650	2
Stipa barbata, stipa atriseta	16844	3
onobrychis melanotricha, grasses, shrubs	18244	4
Pasture plants, Astragalus. Sp	1855	5

RESULTS AND DISCUSSION

Results

A total of 169 butterfly belong to 4 family include Lycaenidae, Nymphalidae, Hesperidae and Pieridae were identificated. Four families were new report in research region. In all of stations, there was a great abundance and diversity of butterflies. Lycaenidae (Figure 1- 4), Nymphalidae (Figure 5-9) and Pieridae (Figure 10-13) respectively, had the highest diversity and number. High frequency of Lycaenidae in May and Pieridae and Nymphalidae were in June.

Butterflies that belong to Nymphalidae family have small first leg and body with dense hairs. The spices belong to Lycaenidae family is metallic orange, gray or dark brown. Their compound eye covered by a row of scales, the body is short and they have fragile wings. In this family, Antennal base adjacent to margin of eye and usually indenting it; antennae lacking carinae.

Colias . sp belonge to Pieridae is colored butterfly with black region at the wing margin. Two black spot on the fore wings, and two red spot on hind wings. *C. crocea* (Figure 13) is a white above with black at the tips of the forewings. The front wings are also marked with black dots. *pieris.* Sp (Figure 10) have wings of a greyish white color. The front of forewing is sharp and it has black spots on the margin. They are medium-sized with white color, yellow and greenish. The scales of them have usually numerous pigmented. There are foreleg fully developed, bearing distinct bifid claw. *Thymelicus lineola* (Figure 14) are small and have hairy bodies, pointed wings, has orange color and curved end antennae.

Table 2: Collected Lepidoptera in Baum National Park (2013-2014)

Family	Genus	Sub genus	Species	*Sub Species:*	figure
Lycaenidae		*Plebeius (Plebejidea)*	*P.loewii* (Zeller, 1847)		1
		Plebeius (Kretania)	*P.eurypilus*(Freyer,1851)		2
	Polyommatus		*Polyommatus. sp*		3
		Plebeius (Vacciniina)	*P.morgianus*(Kirby, 1871*)*		4
Nymphalidae	*Coenonympha*		*C. saadi* (Kollar, 1849 *)*		5
	Pseudochazara		*P. telephassa* (Geyer, 1827)		6
	Chazara		*C. persephone* (Hubner, 1805)		7
	Melitaea		*M. trivia* (Denis & Schiffermüller, 1775)		8
	Melanargia		*M. larissa* (Geyer, 1828)	*M. larissa Iranica* (Seitz, 1907)	9
Pieridae	*Pieris* *Pontia*		*P. rapae* (Linnaeus, 1758)		10
	Pontia		*Pontia . sp*		11
	Colias		*Pontia . sp*		12
			C. crocea (Fourcroy, 1758)		13
Hesperidae	*Thymelicus*		*T. lineola* (Ochsenheimer ,1808*)*		14
	Carcharodus		*C. alceae* (Esper, 1780)		15

Figure 1: ***Polyommatus(Plebejus)loewi***

Wing spam: fore wing 25 mm and hind wing 20 mm

Figure 2: ***Polyommatus(Kretania) euripylus***

Wing spam: fore wing 25 mm and hind wing 20 mm

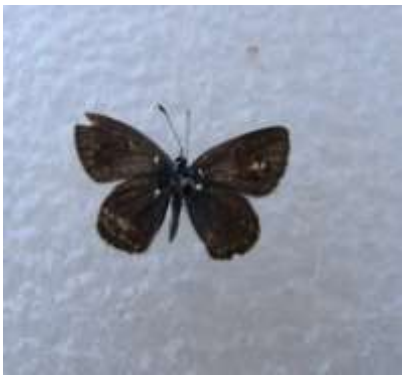

Figure 3: ***Polyommatus.sp***

Wing spam: fore wing 25 mm and hind wing 20 mm

Figure 4: ***Polyommatus (Vaccinina) morgianus***

Wing spam: fore wing 25 mm and hind wing 23 mm

Figure 5: ***Coenonympha saadi***

Wing spam: fore wing 33 mm and hind wing 21 mm

Figure 6: ***Pseudochazara telephassa***

Wing spam: fore wing 50 mm and hind wing 40 mm

Figure 7: ***Chazara persephone***

Wing spam: fore wing 60 mm and

Figure 8: ***Melitaea trivia***

Wing spam: fore wing 30 mm and

Figure 9: ***Melanargia larissa Iranica***

hind wing 50 mm

Figure 10: *Pieris rapae*

Wing spam: fore wing 40 mm and hind wing 35 mm

hind wing 20 mm

Figure 11: *Pontia . sp*

Wing spam: fore wing 37 mm and hind wing 32 mm

Wing spam: fore wing 60 mm and hind wing 50 mm

Figure 12: *Pontia . sp*

Wing spam: fore wing 35 mm and hind wing 30 mm

Figure 13: *Colias croceus*

Wing spam: fore wing 50 mm and hind wing 40 mm

Figure 14: *Thymelicus lineola*

Wing spam: fore wing mm and hind wing mm

Figure 15: *Charcharodus alceae*

Wing spam: fore wing 28 mm and hind wing 13 mm

Discussion

The considerable variation in climate and enrichment vegetation are the important factors in diversity and density of butterflies. 413 species of butterflies have been identified in Iran (Naderi, 2013). Climate is a major factor in the life cycle of butterflies (Grimaldi and Engel, 2005). Total butterfly population showed population decline in June, which is perhaps due to increased temperature (Katbeh, 2003).

Lycaenidae was introduced by Mentris for the first time in Iran, 168 years ago these butterflies were collected from Fars Province in 1863 (Koçak and Kemal, 2008). They have global distribution and Hills up to 2500 m altitude is interested for them (Borror *et al.*, 1998).

According to obtained results in this study, maximum population in Lycaenidae (Figure 1-4) had the highest population that corresponded with its global spread. This family has 5000 spices (Danne and Surholt, 2010) which mostly selected habitat with low altitude (Danne and Surholt,

2002). Enrichment flora in this region and semi-humid and temperate climates provided suitable condition for these beautiful creatures (Mehdi, 2013).

Family Nymphalidae (Brush-footed butterflies) was the second largest group in the research region that conforming previous results related to their widespread habitats (Figure 5-9). It was reported for the first time on Iran on 1887 (Modares, 2002). Observation of the beautiful butterfly (Nymphalidae) in the spring corresponded to previous study (Koçak and Kemal, 2007), due to warm weather and has awakened from hibernation. Abundant vegetation and optimum condition in this season help them to accordance.

Nymphalidae have more than 550 genera and 6,000 species in world and 33 species have been reported in Iran (Naderi, 2013). This family is divided into three categories: blue butterflies, copper-colored butterflies and they have decorative motifs under the wings. In Iran, as in many other parts of the world, blue butterflies are the most of them (Borror *et al.*, 1998). Commonly attacked are vegetable crops (Driesche, 2008). Lycaenidae is the largest family of butterflies they have about 7,000 species around the world. Most of them live in tropical regions, especially Southeast Asia (Sidhu *et al.*, 2011). Radial (R) veins of forewing of them aren't forked (Borror *et al.*, 1998). *Pieris rapae* (Figure 10) is also known as the small white butterfly that can be distinguished by the white color with small black dots on its wings. They are distinguished from the smaller size and lack of the black band at the tip of their forewings (Nazari, 2003). This species is widespread and was seen in all station. The caterpillar of them is seen as a pest for commercial agriculture so identification of their parasitoid is important.

Observation of *Pontia.* Sp (Figure 11, 12) in station 3 showed that these spices fit with open grassy or flowery areas for the habitat although they are seen in over the hills and high altitude (to 1800m). The taxonomic key for identification the spices of Hesperidae (Figure 14 , 15) is curved or hooked end of their antennae and the wing venation pattern that the radius in their forewings consists of five simple (undivided) branches. Although 42 spices of this family was seen in north and south of Iran (Nazari, 2003) but in the research region was not widespread.

37 species of Pieridae family have been reported from Iran (Figure 10- 13). They were collected from north province of Iran for the first time in 1949 and collected from Fars Province (Shiraz) in 1965 (Naderi, 2013).

The taxonomic key for identification of Hesperidae family (Figure 14, 15) is curved or hooked end of their antennae and the wing venation pattern that the radius in their forewings consists of five simple (undivided) branches, each originating from the discal cell. Although this family almost distributed in north region of Iran as Khorasan, Mazandaran Azerbaijan Province, but the numbers of Carcharodus . sp and Thymelicus . sp were observed in this research. This flight in late spring to summer. *Carcharodus*. sp was reported in norten of Iran previously (Naderi, 2013).

Conclusion

The obtained results showed that this region has a high diversity of insects. According to obtained results Bamu National Park is suitable habitat for insect such as moths. Due to of them in limited area, can be predicted that high population and richness fauna exist in overall of Fars Province with four different types of climate. Probably vegetation and climate of this region are operative in the fitness of these animals.

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