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# An Investigation on the Noctuid Moths (Lepidoptera) of Botan Valley, Southeastern Turkey

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**Abstract**

Noctuidae fauna of Botan Valley is investigated for the first time. In total, 83 noctuid moth species are discovered from the research area and, 11 of them are new recorded from Siirt province. Adult figures of *Aegle nubila* (Staudinger, 1892), *Deltote delicatula* (Christoph, 1882), *Plecoptera inquinata* (Lederer, 1857), and *Zekelita ravalis* (Herrich-Schäffer, [1852]) are presented. The distributions of the species according to localities are discussed and comparison of the species number in Siirt and neighbouring provinces are given.

**Keywords:** Botan Valley, Fauna, Lepidoptera, Noctuidae, Turkey.

# Botan Vadisi Noctuid Güveleri (Lepidoptera) Üzerine Bir Araştırma, Güneydoğu Türkiye

**Öz**

Botan Vadisi Noctuidae faunası ilk kez araştırılmıştır. Toplamda çalışma alanından 83 tür keşfedilmiş olup, bunların 11'i Siirt ili için yeni kayıttır. *Aegle nubila* (Staudinger, 1892), *Deltote delicatula* (Christoph, 1882), *Plecoptera inquinata* (Lederer, 1857) ve *Zekelita ravalis* (Herrich-Schäffer, [1852]) türlerinin ergin bireylerinin resimleri sunulmuştur. Türlerin lokalitelere göre yayılışları tartışılmış ve Siirt ile bazı komşu illerin noktuid türlerinin karşılaştırılması verilmiştir.

**Anahtar Kelimeler:** Botan Vadisi, Fauna, Lepidoptera, Noctuidae, Türkiye.

## 1. Introduction

The noctuid moths are the largest group, in the superfamily Noctuoidea, among the order Lepidoptera with wide geographic distribution. Most species of the noctuids are medium sized, others are small to large in size. Noctuidae species are typically and mostly nocturnal, although some species are diurnal. They larvae feed on plants and are important and serious pests in forestry and agriculture, therefore some of them are great economic importance (Fibiger, 1990; Leraut, 2019).

More than 25.000 species of noctuid moths have been described worldwide and in Europe nearly 1400 species are known, representing 14 families. Zoographically, in the Palearctic region, Europe is one of the most explored areas (Fibiger, 1990). Turkey is also rich regarding the noctuid moths and includes about 1242 species (Koçak and Kemal, 2018). Besides, there are extensive studies on the noctuid moths of Siirt province and 382 noctuid moths are known in the area (Kemal et al., 2008, 2011; Kemal and Seven, 2008; Seven, 2014, 2016a; Seven et al., 2015, 2019). However, there is no study on Lepidoptera fauna of the Botan Valley until now. Therefore, studies have been carried out to determine the moth fauna of the area. With this study, 83 noctuid moths are discovered from the study area and also, 11 of them are new recorded from Siirt province: *Apamea ferrago* (Eversmann, 1837); *Caradrina gilva* (Donzel, 1837); *Caradrina inumbrata* (Staudinger, 1900); *Catocala lupina* Herrich-Schäffer, [1851]; *Chazaria incarnata* (Freyer, 1838); *Cucullia argentina* (Fabricius, 1787); *Dichagyris flammatra* ([Denis & Schiffermüller], 1775); *Eremobia asiatica* Draudt, 1936; *Euchalcia emichi* (Rogenhofer, 1873); *Hadena perplexa* ([Denis & Schiffermüller], 1775); *Peridroma saucia* (Hübner, [1808]).

## 2. Materials and Methods

The study is conducted between the years of 2015-2016 in Botan Valley, Siirt province, southeastern Turkey. The nocturnal samples collected by UV light traps and diurnal specimens gathered by a sweep net in 3 localities, which determined by vegetation types (see the localities described below) and 11 field researches with irregular intervals. The light traps are formed of UV strip led, battery (12 volts and 7 ampere), poison bottle (Ethyl acetate) and a vowel box. The traps left the localities before it gets dark and were taken in the early hours of the morning. The samples were identified after being pinned and labelled. Genital preparations were performed under Nikon SMZ1000 stereomicroscope for unidentified species with external morphology. The method applied by Robinson (1976) was followed while preparing the genital structures. The specimens are photographed with Fujifilm Finepix HS30EXR (16 megapixel 30x optical zoom) and stored in the

Zoology Research Laboratory of Batman University and special collection of the author. The resources utilized in the diagnosis of the species are including: Kornoşor (1982a, b), Seven (1996), Fibiger (1990, 1997), Fibiger and Hacker (2007), Hacker et al. (2002), Ronkay et al. (2001), Zilli et al. (2005), Koçak and Kemal (2018), Seven et al. (2019).

Research localities, altitudes, coordinates, dates of the field studies and the habitat types are as follows:

**1.** Botan road, 12 km SW, 700 m a.s.l., 37°52'29" N 41°53'07" E, 25.IV.2015, 09.VII.2015, 10.VIII.2015, 07.IX.2015, 24.V.2016. Habitat. Rocky area, containing sparse *Quercus* and *Paliurus* plant species.

**2.** Uluçay, 555 m a.s.l., 37°51'26" N 41°53'09"E, 12.VIII.2015, 28.X.2015, 21.VIII.2016. Habitat. Rocky Mountains, containing sparse *Quercus* and *Paliurus* plant species.

**3.** Sağlarca crossroad, 465 m a.s.l., 37°39'17" N 41°52'03" E, 20.V.2015, 28.III.2016, 20.X.2016. Habitat. Riverside, including *Salix*, *Juniperus* and *Quercus* plant species.

The Botan River is mostly situated in Siirt province from south east of Turkey (Fig. 1) and the upstream of the river is flows in Van province. It originates in the high mountains around the Norduz Plateau, near the border of Van and Hakkâri, and flows westwards before it turns to the northwest. The river is firstly joined to the Büyükdere River in Çukurca and, it joins the Tigris River, after which the Tigris sharply turns southwards (Alkan, 2018).

**Figure 1.** The Botan River and Valley in Siirt province, south-eastern Turkey, 02.09.2018, photo: E. Seven

The Botan Valley is very curved and rotating and commonly consists of rocky mountainous areas. Therefore, in recent years, nature tourism activities such as paragliding, hiking and mountain biking have increased in the valley. In the upper parts of the mountains, oak trees are common vegetation while on the slopes of the mountains contains *Paliurus* and *Juniperus* plants. And, along the edge of the Botan River *Salix*, *Platanus, Junglans* and *Tamarix* species are seen with rich herbaceous vegetation (Alkan, 2018).

## 3. Results

In total, 83 species are collected in the family Noctuidae from the research region, presented in alphabetically order and, new records for Siirt province are marked with an asterisk (*). Moreover, locality of the species is written with the number codes, as given in the material and methods.

**Family Noctuidae Latreille, 1809**

1. ***Acantholipes regularis*** (Hübner, [1813])
Material examined: 6♂♂, 1, 10.VIII.2015.

2. ***Acontia titania*** (Esper, [1798])
Material examined: 1♀, 1, 24.V.2016.

3. ***Acronicta rumicis*** (Linnaeus, 1758)
Material examined: 1♂, 2, 12.VIII.2015; 2♂♂, 1, 09.VII.2015.

4. ***Aegle nubila*** (Staudinger, 1892) (Fig. 2. a)
Material examined: 1♂, 1, 09.VII.2015.

5. ***Agrochola consueta*** (Herrich-Schäffer, [1852])
Material examined: 2♂♂ 1♀, 2, 28.X.2015.

6. ***Agrochola pistacina*** (Goeze, 1781)
Material examined: 4♂♂ 1♀, 2, 28.X.2015.

7. ***Agrotis biconicus*** Kollar, [1844]
Material examined: 2♀♀, 3, 20.X.2016

8. ***Agrotis bigramma*** (Esper, [1790])
Material examined: 1♂ 2♀♀, 3, 20.X.2016; 5♂♂, 2, 28.X.2015

9. ***Agrotis ipsilon*** (Hufnagel, 1766)
Material examined: 2♀♀, 3, 20.X.2016; 6♂♂ 3♀♀, 1, 10.VIII.2015

10. ***Agrotis puta*** (Hübner, [1803])
Material examined: 1♂, 2, 28.X.2015; 4♂♂, 3, 20.X.2016

11. ***Agrotis segetum*** ([Denis & Schiffermüller], 1775)
Material examined: 2♀♀, 2, 12.VIII.2015; 1♂, 1, 09.VII.2015; 1♂, 1, 25.IV.2015.

12. ***Apamea ferrago*** (Eversmann, 1837)*
Material examined: 2♂♂, 1, 10.VIII.2015.

13. ***Apamea syriaca*** (Osthelder, 1933)
Material examined: 5♂♂, 3, 20.V.2015.

14. ***Aporophyla australis*** (Boisduval, 1829)
Material examined: 3♂♂ 2♀♀, 2, 28.X.2015.

15. ***Aporophyla canescens*** (Duponchel, 1826)
Material examined: 3♀♀, 2, 28.X.2015.

16. ***Autographa gamma*** (Linnaeus, 1758)
Material examined: 3♂♂, 3, 20.V.2015; 4♂♂, 1, 24.V.2016.

17. ***Bena bicolorana*** (Fuessly, 1775)
Material examined: 1♀, 3, 20.V.2015.

18. ***Calophasia opalina*** (Esper, [1796])
Material examined: 1♂, 1, 24.V.2016.

19. ***Caradrina bodenheimeri*** (Draudt, 1934)
Material examined: 2♂♂, 3, 20.X.2016; 1♂, 2, 28.X.2015.

20. ***Caradrina clavipalpis*** (Scopoli, 1763)
Material examined: 1♀, 3, 20.X.2016; 6♂♂, 2, 28.X.2015.

21. ***Caradrina draudti*** (Boursin, 1936)
Material examined: 1♂, 3, 20.X.2016; 1♂, 2, 28.X.2015.

22. ***Caradrina flavirena*** (Guenée, 1852)
Material examined: 2♀♀, 3, 20.X.2016.

**2**3. ***Caradrina gilva*** (Donzel, 1837)*
Material examined: 1♂, 1, 10.VIII.2015; 1♂, 2, 12.VIII.2015.

24. ***Caradrina inumbrata*** (Staudinger, 1900)*
Material examined: 1♂, 2, 12.VIII.2015; 1♂, 2, 21.VIII.2016.

25. ***Catocala lesbia*** Christoph, 1887

Material examined: 2♂♂, 2, 28.X.2015.

26. ***Catocala lupina*** Herrich-Schäffer, [1851]*
Material examined: 2♂♂ 1♀, 2, 21.VIII.2016.

27. ***Catocala mesopotamica*** Kuznesov, 1903
Material examined: 1♂ 1♀, 3, 20.X.2016.

28. ***Catocala nymphagoga*** (Esper, [1787])
Material examined: 1♀, 1, 24.V.2016.

29. ***Cleonymia opposita*** (Lederer, 1870)
Material examined: 1♂ 3♀♀, 1, 25.IV.2015.

30. ***Clytie distincta*** (A.Bang-Haas, 1907)
Material examined: 1♀, 2, 12.VIII.2015.

31. ***Chazaria incarnata*** (Freyer, 1838)*
Material examined: 3♂♂ 1♀, 1, 24.V.2016; 2♂♂, 3, 20.V.2015.

32. ***Cornutiplusia circumflexa*** (Linnaeus, 1767)
Material examined: 1♂, 1, 24.V.2016; 1♂, 1, 25.IV.2015, 2♂, 1, 07.IX.2015.

33. ***Cryphia raptricula*** ([Denis & Schiffermüller], 1775)
Material examined: 1♂, 3, 20.V.2015; 1♂ 4♀♀, 1, 09.VII.2015; 1♂, 1, 10.VIII.2015; 2♀♀, 2, 21.VIII.2016.

34. ***Cucullia argentina*** (Fabricius, 1787)*
Material examined: 1♂, 1, 10.VIII.2015; 2♂, 1, 07.IX.2015.

35. ***Dichagyris erubescens*** (Staudinger, 1892)
Material examined: 7♂♂ 2♀♀, 1, 24.V.2016; 9♂♂ 6♀♀, 3, 20.V.2015.

36. ***Dichagyris flammatra*** ([Denis & Schiffermüller], 1775)*
Material examined: 2♀♀, 3, 20.X.2016.

37. ***Dichagyris singularis*** (Staudinger, 1877)
Material examined: 3♂♂ 1♀, 3, 20.X.2016.

38. ***Dicycla oo*** (Linnaeus, 1758)
Material examined: 1♂ 3♀♀, 1, 24.V.2016, 2♂, 1, 07.IX.2015.

39. ***Deltote delicatula*** (Christoph, 1882) (Fig. 2. b)
Material examined: 1♂, 1, 07.IX.2015.

40. ***Drasteria sesquilina*** (Staudinger, 1888)
Material examined: 2♂♂, 1, 10.VIII.2015.

41. ***Dysgonia algira*** (Linnaeus, 1767)
Material examined: 2♂♂ 1♀, 1, 09.VII.2015; 1♀, 1, 10.VIII.2015.

42. ***Earias insulana*** (Boisduval, 1833)
Material examined: 1♂, 3, 20.X.2016.

43. ***Egira anatolica*** (Hering, 1933)
Material examined: 1♂, 3, 28.III.2016.

44. ***Episema korsakovi*** (Christoph, 1885)
Material examined: 3♂♂ 2♀♀, 3, 20.X.2016.

45. ***Episema tersa*** ([Denis & Schiffermüller], 1775)
Material examined: 1♂ 1♀, 3, 20.X.2016.

46. ***Eremobia asiatica*** Draudt, 1936*
Material examined: 1♂, 2, 12.VIII.2015.

47. ***Eublemma ostrina*** (Hübner, [1808])
Material examined: 1♂, 1, 25.IV.2015, 1♂, 1, 07.IX.2015.

48. ***Euchalcia emichi*** (Rogenhofer, 1873)*

Material examined: 1♂, 1, 10.VIII.2015.

49. ***Grammodes stolida*** (Fabricius, 1775)
Material examined: 2♂♂, 2, 12.VIII.2015; 3♂ 3♀, 2, 21.VIII.2016; 1♂, 1, 09.VII.2015; 1♀, 1, 10.VIII.2015; 2♂♂ 2♀♀, 1, 24.V.2016.

50. ***Hadena perplexa*** ([Denis & Schiffermüller], 1775)*
Material examined: 2♂♂, 2, 12.VIII.2015; 1♀, 2, 21.VIII.2016.

51. ***Helicoverpa armigera*** (Hübner, [1808])
Material examined: 1♂, 1, 10.VIII.2015; 2♂, 1, 07.IX.2015.

52. ***Heliothis peltigera*** ([Denis & Schiffermüller], 1775)
Material examined: 1♂, 2, 12.VIII.2015; 1♂, 3, 28.III.2016.

53. ***Hoplodrina ambigua*** ([Denis & Schiffermüller], 1775)
Material examined: 3♂♂, 1, 24.V.2016; 1♂, 3, 20.X.2016.

54. ***Hypena munitalis*** Mann, 1861
Material examined: 22♂♂ 5♀♀, 2, 12.VIII.2015.

55. ***Hypeuthina fulgurita*** Lederer, 1855
Material examined: 3♂♂, 3, 20.X.2016.

56. ***Leucochlaena muscosa*** (Staudinger, 1892)
Material examined: 2♂♂, 2, 28.X.2015; 2♂♂, 3, 20.X.2016.

57. ***Leucania punctosa*** (Treitschke, 1825)
Material examined: 6♂♂ 1♀, 3, 20.X.2016.

58. ***Lygephila craccae*** (Fabricius, 1787)
Material examined: 3♂♂, 2, 12.VIII.2015; 1♂, 2, 21.VIII.2016; 1♀, 1, 09.VII.2015.

59. ***Mesoligia literosa*** (Haworth, [1809])
Material examined: 1♀, 2, 12.VIII.2015.

60. ***Metalopha gloriosa*** (Staudinger, 1892)
Material examined: 1♂, 1, 25.IV.2015.

61. ***Mythimna alopecuri*** (Boisduval, 1840)
Material examined: 7♂♂ 4♀♀, 3, 20.X.2016; 2♀♀, 2, 28.X.2015.

62. ***Mythimna l-album*** (Linnaeus, 1767)
Material examined: 3♂♂ 2♀♀, 1, 24.V.2016; 2♂♂, 3, 20.V.2015.

63. ***Mythimna vitellina*** (Hübner, [1808])
Material examined: 5♂♂ 7♀♀, 3, 20.V.2015; 1♀, 3, 20.X.2016; 2♂♂, 2, 12.VIII.2015; 1♂, 1, 09.VII.2015; 3♀♀, 1, 24.V.2016.

64. ***Noctua orbona*** (Hufnagel, 1766)
Material examined: 3♂♂ 2♀♀, 1, 24.V.2016; 3♂♂, 3, 20.V.2015; 1♂, 3, 28.III.2016.

65. ***Noctua pronuba*** (Linnaeus, 1758)
Material examined: 26♂♂ 4♀♀, 3, 20.V.2015, 2♂, 3, 07.IX.2015.

66. ***Pericyma albidentaria*** (Freyer, 1842)
Material examined: 1♂ 2♀♀, 2, 12.VIII.2015; 1♀, 2, 21.VIII.2016; 1♂, 1, 09.VII.2015.

67. ***Pericyma squalens*** Lederer, 1855
Material examined: 2♂♂ 1♀, 2, 12.VIII.2015; 2♀♀, 2, 21.VIII.2016; 1♂ 1♀, 1, 10.VIII.2015.

68. ***Peridroma saucia*** (Hübner, [1808])*
Material examined: 1♂, 3, 20.X.2016.

69. ***Plecoptera inquinata*** (Lederer, 1857) (Fig. 2. c)
Material examined: 1♂, 1, 10.VIII.2015.

70. ***Polymixis rufocincta*** (Geyer, 1828)
Material examined: 3♂♂, 2, 28.X.2015.

71. ***Polypogon schwingenschussi*** (Wagner, 1937)
Material examined: 3♂♂ 1♀, 1, 24.V.2016; 2♂♂, 3, 20.V.2015.

72. ***Recophora beata*** (Staudinger, 1892)
Material examined: 1♂, 3, 20.V.2015.

73. ***Scotochrosta pulla*** ([Denis & Schiffermüller], 1775)
Material examined: 1♂, 2, 28.X.2015.

74. ***Spodoptera exiguum*** (Hübner, [1808])
Material examined: 4♂♂, 3, 20.V.2015; 3♂♂, 3, 20.X.2016; 2♂♂, 1, 10.VIII.2015; 14♂♂ 5♀♀, 2, 21.VIII.2016.

75. ***Stilbina hypaenides*** Staudinger, 1892
Material examined: 1♂, 3, 20.X.2016.

76. ***Trichoplusia ni*** (Hübner, [1803])
Material examined: 2♂♂ 1♀, 3, 20.V.2015; 5♂♂, 1, 24.V.2016, 2♂, 1, 07.IX.2015.

77. ***Tyta luctuosa*** ([Denis & Schiffermüller], 1775)
Material examined: 1♂, 3, 20.V.2015.

78**.** ***Ulochlaena hirta*** (Hübner, [1813])
Material examined: 3♂♂, 3, 20.X.2016.

79. ***Xestia cohaesa*** (Herrich-Schäffer, [1849])
Material examined: 2♂♂, 3, 20.X.2016.

80. ***Xestia palaestinensis*** (Kalchberg, 1898)
Material examined: 4♂♂, 3, 20.X.2016.

81. ***Zekelita antiqualis*** (Hübner, [1809])
Material examined: 3♂♂ 2♀♀, 2, 12.VIII.2015.

82. ***Zekelita ravalis*** (Herrich-Schäffer, [1852]) (Fig. 2. d)

Material examined: 2♂♂, 2, 12.VIII.2015.

83. ***Zethes insularis*** Rambur, 1833

Material examined: 1♀, 2, 12.VIII.2015; 1♂, 2, 21.VIII.2016.

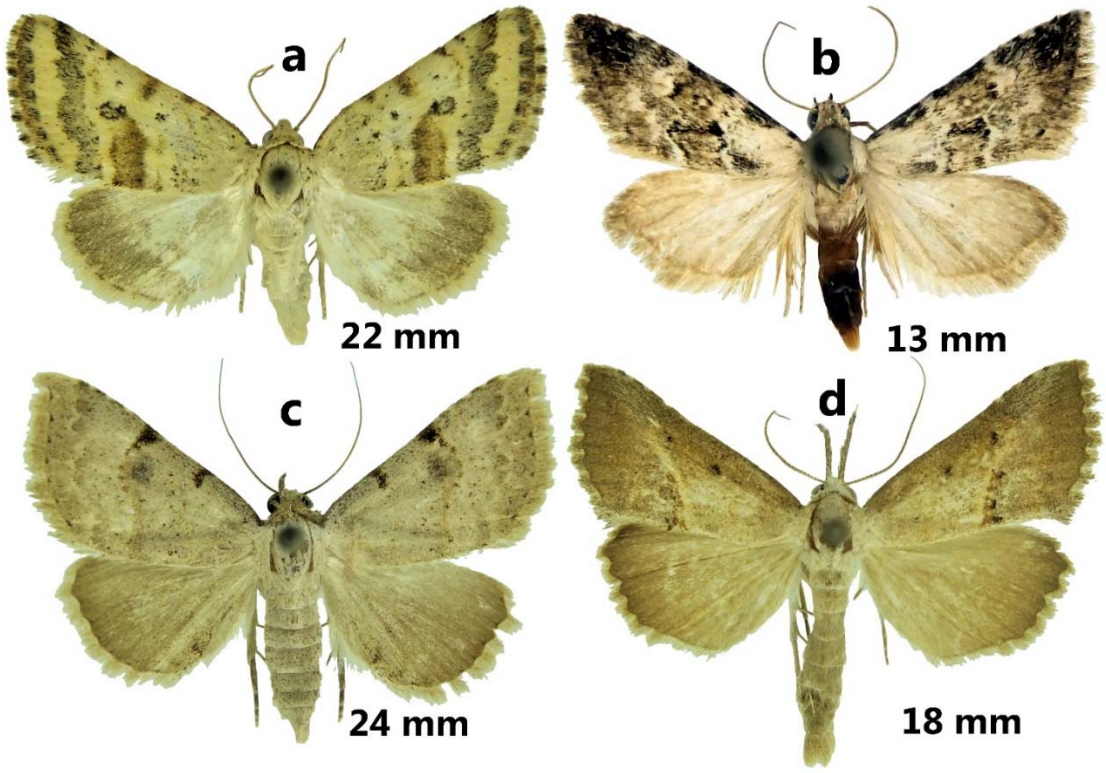


**Figure 2.** The adult photos of some species with wingspan sizes. **a.** *Aegle nubila* (Staudinger, 1892), **b.** *Deltote delicatula* (Christoph, 1882), **c.** *Plecoptera inquinata* (Lederer, 1857), **d.** *Zekelita ravalis* (Herrich-Schäffer, [1852])

## 4. Discussion and Conclusions

The moths of the Botan Valley have not been studied by now. As a result, 83 noctuid moths are reported from the study area and, 11 of them are newly recorded from Siirt province: *Apamea ferrago* (Eversmann, 1837); *Caradrina gilva* (Donzel, 1837); *Caradrina inumbrata* (Staudinger, 1900); *Catocala lupina* Herrich-Schäffer, [1851]; *Chazaria incarnata* (Freyer, 1838); *Cucullia argentina* (Fabricius, 1787); *Dichagyris flammatra* ([Denis & Schiffermüller], 1775); *Eremobia asiatica* Draudt, 1936; *Euchalcia emichi* (Rogenhofer, 1873); *Hadena perplexa* ([Denis & Schiffermüller], 1775); *Peridroma saucia* (Hübner, [1808]). With this study, noctuid moths of Siirt province reached to 393 species (Kemal et al., 2008, 2011; Kemal and Seven, 2008; Seven, 2014, 2016a, 2019; Seven et al., 2015).

When the number of the noctuid moths in Siirt province are compared to some nearby neighbouring provinces (Seven, 2019, 2016b; Koçak and Kemal, 2018), contribution of the studies in the region on Noctuidae (Lepidoptera) fauna, is clearly seen (Fig. 3).

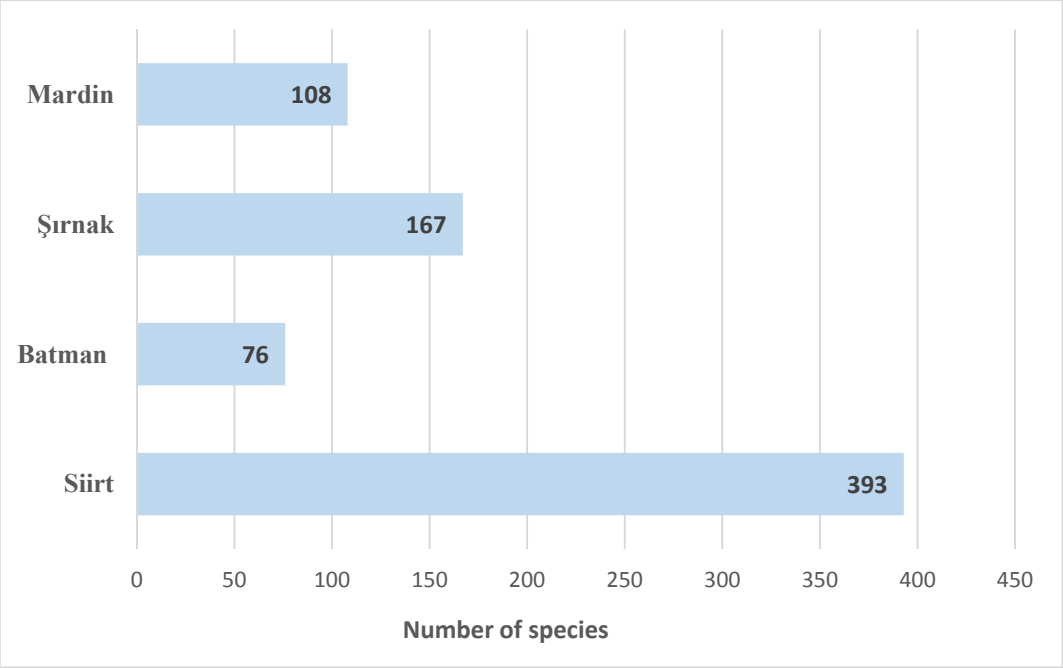


**Figure 3.** Comparison of the species number in Siirt and neighbouring provinces

Moreover, when the studied 3 localities in Botan Valley: Botan road, Uluçay and Sağlarca crossroad, are compared, it is seen that the species numbers are close to each other (Fig. 4). The maximum noctuid moths are found in the locality of Sağlarca crossroad that is riverside and including *Salix*, *Juniperus* and *Quercus* plant species.

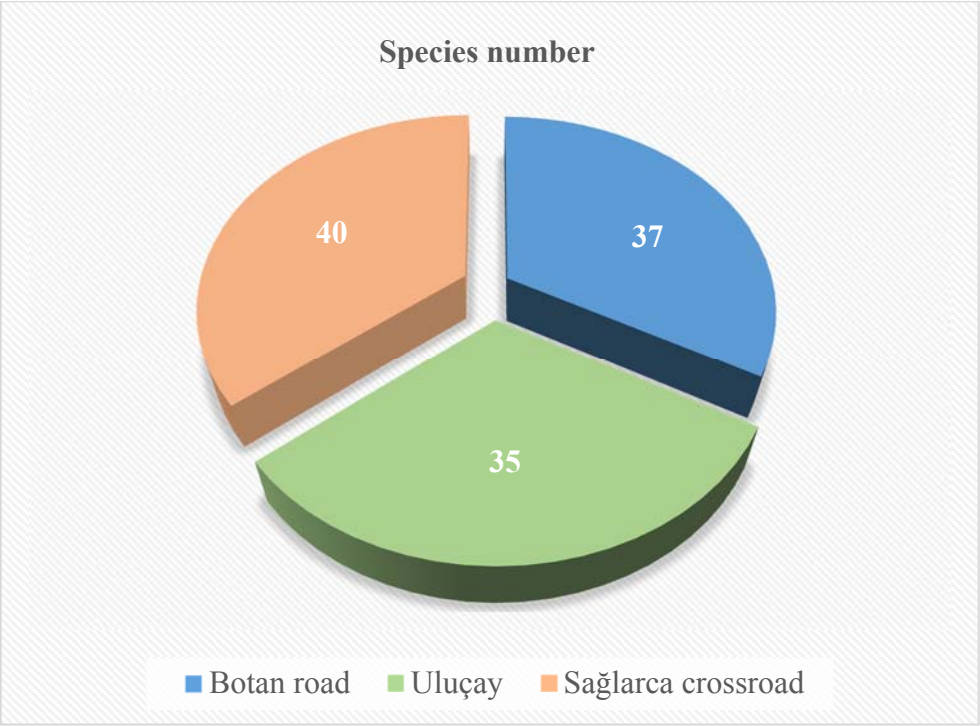


**Figure 4.** The number of the species according to the studied localities

Rare species, which represented by a single specimens, in the studied region are including: *Acontia titania* (Esper, [1798]); *Aegle nubila* (Staudinger, 1892); *Bena bicolorana* (Fuessly, 1775); *Calophasia opalina* (Esper, [1796]); *Catocala nymphagoga* (Esper, [1787]); *Clytie distincta* (A.Bang-Haas, 1907); *Deltote delicatula* (Christoph, 1882); *Earias insulana* (Boisduval, 1833); *Egira anatolica* (Hering, 1933); *Eremobia asiatica* Draudt, 1936; *Euchalcia emichi* (Rogenhofer, 1873); *Mesoligia literosa* (Haworth, [1809]); *Metalopha gloriosa* (Staudinger, 1892); *Peridroma saucia* (Hübner, [1808]); *Plecoptera inquinata* (Lederer, 1857); *Recophora beata* (Staudinger, 1892); *Scotochrosta pulla* ([Denis & Schiffermüller], 1775); *Stilbina hypaenides* Staudinger, 1892; *Tyta luctuosa* ([Denis & Schiffermüller], 1775).

Most of the noctuid moths are nocturnal, but some of them are also diurnal. The diurnal species determined in the area are: *Agrotis ipsilon* (Hufnagel, 1766)*; A. segetum* ([Denis & Schiffermüller], 1775)*; Autographa gamma* (Linnaeus, 1758)*; Cornutiplusia circumflexa* (Linnaeus, 1767)*; Heliothis peltigera* ([Denis & Schiffermüller], 1775)*; Trichoplusia ni* (Hübner, [1803]).

This preliminary study reveals the richness of the insect fauna of the Botan Valley. And, it is obvious that the number of moths in the area will increase with the comprehensive studies to be carried out in the future.

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