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Survey of the Butterflies (Lepidoptera, Rhopalocera) Associated with some Brassicaceae Plants in Basrah Provence, Iraq

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Abstract. Butterflies were collected from two regions of Basra south of Iraq during November 2021 to March 2022. This survey showed ten species belong to ten genera under four families: Nymphalidae, Pieridae, Lycaenidae and Hesperidae. The species *Vanessa cardui* showed the highest level of distribution while the lowest one was *Pieria rapae*.

Keywords. Basra, Brassicaceae, Butterflies, Lepidoptera, Rhopalocera.

1. Introduction

The order of Lepidoptera is one of the important economic insects that spreads in various regions of the world, which includes about 180,000 species, 126 families and 46 subfamily's, 10% of the total described species of living organisms [1]. Butterflies are considered adequate ecological representative for the invertebrates [2-5], and clear evidence of changes in the environmental quality. Butterflies also play important ecological roles in natural and agricultural habitats; they perform basic ecosystem services [6,7].

The Brassicaceae or Cruciferae is known as the Mustard family, it consist of 338 genera and about 3709 species through the world[8]. The family is an important of human health [9] and source of many food plants such as, (Cabbage, *Brassica rapa* var. *capitata* L, white radish, *Raphanus sativus* L. and others, as well as some species of ornamental plants such as *Shabuy repandum* L., silver rose, *Lobularia maritime* Des [10]. In Iraq the family represented by 80 genera and 177 species [11].

This family includes a large number of vegetable crops including *Brassica oleracea* Var *capitata* and *Brassica oleracea* var. *italica*, *Brassica oleracea* Var. *botrytis*, radish and watercress, cabbage crop is one of the most important crops of the cruciferous family, which is cultivated in large areas in Iraq and throughout the year almost. This is due to its nutritional value [12].

Host plant play one of critical point which are as shelter and larval host plants. Diversity Lepidoptera was influenced by environmental conditions. Environmental factors that affect the altitude, temperature, humidity, intensity of light, weather and seasons. Thus the Lepidoptera are as bio-indicators that one can be used to measure the effect of climate change on biodiversity.



Cruciferous plants are angiosperms that require obligatory cross-pollination or facultative cross-pollination [14-16], and that pollinators have an important role in food production and conservation. On plant biodiversity [17,18], more than 78% of angiosperm species depend on pollinators. Compulsory and optional pollination makes insect pollination necessary, or at least a positive factor in improving the process of fertilization in flowers [19]. Cruciferous plants attract a variety of pollinators, including honey bees such as *Apis mellifera* L. (Hymenoptera: Apidae), and solitary bees, such as *Andrena* spp. (Hymenoptera: Andrenidae), and syrphid flies, such as *Eristalis tenax* L. (Diptera: Syrphidae) [20].

2. Materials and Methods

The current survey was conducted at two regions of Basra (Karmat Ali and Al-Zubair). The total garden area was (12x 60) m². The areas were made up of vegetation, include seven species of the family Brassicaceae crops (*Arugula Eurica sativa*, White radish *Raphanus sativus* subsp. *acanthiformis*, cabbage *Brassica oleracea*, variety *capitata*, rapeseed *Brassica napus*, mustard *Brassica carinata*, cauliflower *Brassica oleracea*, variety *botrytis* and broccoli *Brassica oleracea*, variety *italic*), during September 2021. The plants were identified at the botanical herbarium of the College of Agriculture / University of Basrah. The specimens of butterflies were collected weekly during the flowering times of brasicus crops (November 2021 to March 2022) by the aid of air and sweeping nets. Butterflies were killed by freezing about 10-15 minutes. Then the specimens were mounted by insect pins and storage in insect boxes.

The identification of butterflies (Families, genera and species) by using several taxonomic keys such as: [21-29]. The synonyms of species were according to (GBIF) 2022.

3. Results and Discussions

The survey showed ten species belonging to ten genera under four families. The specimens were collected from cruciferae plants at Basra provinces, from two regions during November 2021 to March 2022. The number of material examined of species showed the specimens which seen and few killed for identification.

3.1. Family, Nymphalidae

- Common name: Brush footed Butterflies
- Synonyms: Acraeidae
- Amathusiidae
- Brassolidae
- Danaidae
- Heliconidae
- Heliconiidae
- Ithomiidae
- Libytheidae
- Morphidae

3.1.1. Genus: *Danaus* Kluk. 1802

- Common name: Tiger Milkweeds Butterflies
- Synonyms: *Danaida* Latreille, 1804
- *Danais* Latreille, 1807
- *Danaomorpha* Kremky, 1925
- *Danaus* Latreille, 1809
- *Danaus* Linnaeus, 1758
- *Danis* Lucas, 1889
- *Danus* Mitchell, 1872
- *Diogas* d'Almeida, 1938
- *Festivus* Crotch, 1872

- *Nasuma* Moore, 1883
- *Panlymnas* Bryk, 1937
- *Salatura* Moore, 1880
- *Tasitia* Moore, 1883

3.1.2. *Danaus Chrysippus* (Linnaeus, 1758)

- Common Name: Plain Tiger
- Synonyms: *Danais chrysippus* (Linnaeus, 1758)
- *Danais chrysippus limbata* Matsumura, 1929
- *D. chrysippus subpurpurea* Matsumura, 1929
- *D. chrysippus vigelii* Heylaerts, 1884
- *D. cratippus* Felder, 1860
- *D. fuscippus* van Eecke, 1915
- *D. lemeemagdalena* Lemeé, 1950
- *Danaus aegyptius* Schreber, 1759
- *D. albinus* Lanz, 1896
- *D.alcippoides* Moore, 1883
- *D. alcippus* Cramer, 1777
- *D. anomala* Dufrane, 1948
- *D. asclepiadis* Gagliardi, 1811
- *D. auriflave* Eecke, 1914
- *D. axantha* Hayward, 1922
- *D. bataviana* Moore, 1883
- *D. bipunctata* Dufrane, 1948
- *D. bowringi* Moore, 1883
- *D.candidata* Hayward, 1922
- *D. chrysipellus* Strand, 1910
- *D. chrysippus aegyptius* (Linnaeus, 1758)
- *D.clarippus* Weymer, 1884
- *D. completa* Dufrane, 1948
- *D. cratippus* Felder, 1862
- *D. deficiens* Dufrane, 1948
- *D. dorippus* Klug, 1845
- *D. duplicata* Dufrane, 1948
- *D. Dupont* Dufrane, 1948
- *D. fuscippus* Eecke, 1915
- *D. gelderi* Snellen, 1891
- *D. hanoiensis* Dufrane, 1948
- *D. impunctata* Dufrane, 1948
- *D. canariensis* Fruhstorfer, 1898
- *D. klugii* Butler, 1886
- *D. lemeemagdalena* Lemeé, 1950
- *D.liboria* Hulstraet, 1931
- *D. limbata* Matsumura, 1929
- *D. luxurians* Dufrane, 1948
- *D. margarita* Ruber, 1926
- *D. orientis* Aurivillus, 1909
- *D.ornata* Dufrane, 1948
- *D. (Anosia) petilea* Linnaeus, 1758
- *D. petilia* Stoll, 1790

- *D. praealbata* Frorich, 1928
- *D. pseudopetilea* Kalis, 1933
- *D. radiata* Dufrane, 1948
- *D. reducta* Dufrane, 1948
- *D. rubra* Eecke, 1915
- *D. semialbinus* Strand, 1910
- *D. subpurpurea* Matsumura, 1929
- *D. subreducta* Dufrane, 1948
- *D. vigelii* Heylaerts, 1884
- *D. yuchingkini* Murayama & Shimonoya, 1960
- *Limnas klugii* Butler, 1886
- *Papilio asclepiadis* Gagliardi, 1811
- *P. chrysippus* Linnaeus, 1758
- *P. petilia* Stoll, 1790
- *Salatura chrysippus canariensis* Fruhstorfer, 1899

Material examined: 347 specimens: 223(♀♀+♂♂) Karmat Ali;(35. Nov. 2021; 33,Des.2021 and 50. Jan. 2022; 45. Feb. 2022; 60. March. 2022). 124(♀♀+♂♂) Al- Zubair: ;(24. Nov. 2021; 25,Des.2021 and 20. Jan. 2022; 25. Feb. 2022; 30. March. 2022).

Distribution: Iraq [30]; New Zealand [31]; Egypt[32]. Northern Africa Morocco, Algeria and Tunisia, Spain, France, Sardinia, Sicily, Italy, Albania, and Greece[33]; Jordon [34] ; Europe [35];Turkey[36]; Pakistan[37] and Azerbaijan [38].

3.1.3. Genus: *Vanessa* Fabricius, 1807

- Synonyms: *Amiralis* Rennie, 1832
- *Cynthia* Fabricius, 1807
- *Fieldia* Nicolescu, 1979
- *Kaniska* Moore, 189
- *Neofieldia* Özdikmen, 2008
- *Neopyrameis* Scudder, 1889
- *Papilio* Hubner, 1821
- *Phanessa* Sodovsky, 1837
- *Pyramides* Hübner, 1826
- *Vanessa* Latrelle, 1804
- *Vanessa* Sodoffsky, 1837

3.1.4. *Vanessa Cardui* (Linnaeus, 1758)

- Common Name: Painted Lady
- Synonyms: *Cynthia cardui* (Linnaeus, 1758)
- *C. eimi* Rambur, 1829
- *C. litoralis* de Souza, 1926
- *Papilio belladonna* Linnaeus, 1758
- *P. carduelis* Cramer, 1775
- *P. carduelis* Seba, 1765
- *P. cardui* Linnaeus, 1758
- *Parameis cardui* (Linnaeus, 1758)
- *Pyrameis martha-maria* Stephan, 1924
- *Pyrameis brunnea-albimaculata* Reuss, 1915
- *Py. carduelina* Alphéraky, 1908
- *Py. carduelis* Cramer, 1775
- *Py. carduelis* Schultz, 1906

- *Py. cardui* (Linnaeus, 1758)
- *Py. elymnias* Rambur, 1829
- *Py. flava* Bandermann, 1928
- *Py. japonica* Stichel, 1908
- *Py. John Fischer de Waldheim*, 1932
- *Py. leachiana* Doubleday, 1849
- *Py. minor* Cannaviello, 1900
- *Py. pallens* Noel, 1881
- *Py. pallida* Schøyen, 1881
- *Py. rogeri* Meilhan, 1929
- *Py. rosacea* Reuss, 1915
- *Py. rosea* Pionneau, 1926
- *Py. schoenfellneri* Hoffmann, 1925
- *Py. subfracta* Stach, 1925
- *Py. takesakiana* Katô, 1925
- *Py. varini* Meilhan, 1929
- *Vanessa albicans* Verity, 1950
- *V. albipuncta* Lempke, 1956
- *V. belladonna* Godart, 1821
- *V. carduelis* Seba, 1765
- *V. elimi* Rambur, 1829

Material examined: 543 specimens: 403(♀♀+♂♂) Karmat Ali;(50. Nov. 2021; 55,Des.2021 and 48. Jan. 2022; 100. Feb. 2022; 150. March. 2022). 140(♀♀+♂♂) Al- Zubair: ;(20. Nov. 2021; 25,Des.2021 and 15. Jan. 2022; 30. Feb. 2022; 50. March. 2022).

Distribution: Iraq[40]; North, Central, and South America[41]; Jordon [42,43]; Turkey [44]; Syria and Armenia [45]. Pakistan[28] Azerbaijan [38] and Kuwait [46].

3.1.5. Genus: *Junonia* Hubner, 1819

- Common : Buckeyes & Pansies
- Synonym: *Alcyoneis* Hübner
- *Aresta* Billberg, 1820
- *Aresta* Dalman, 1820
- *Coryphaeola* Butler, 1878
- *Dunonia* Mabille, 1876
- *Callimula* Holland, 1920
- *Precis* Hubner, 1819

3.1.6. *Junona Orithya* Linnaeus, 1758

- **Common name:** Blue Pansy
- Synonyms: *Junonia albicincta* Butler, 1875
- *J. orithya* Linnaeus, 1758
- *J. albocincta* Linnaeus, 1758
- *J. jacouleti* Watari, 1941
- *J. leechi* Alphéraky, 1897
- *J. orithya* Linnaeus, 1758
- *J. orthyia leechi* Alphéraky, 1897
- *Papilio orithya* Linnaeus, 1764
- *Precis flava* Wichgraf, 1918
- *Precis Jacouleti* Watari, 1941

Material examined: 4 specimens: Karmat Ali; (2♀♀+2♂♂, Feb. 2022).

Distribution: Iraq [40]. Jordon [42] ; Turkey[49]. Pakistan[48]; Florida[47].; and Kuwait[46].

3.2. Family: *Lycaenidae*

3.2.1. Genus: *Lampides* Hubner, 1819

- Synonyms: *Cosmolyce* Toxopeus, 1927
- *Lampidella* Hemming, 1933
- ***Lampides boeticus*** (Linnaeus, 1767)
- Common name: Bean Butterfly
- Synonyms: *Cosmolyce boeticus* (Linnaeus)
- *Hesperia boetica* Fabricius, 1793
- *Lampides anamariae* Gómez Bustillo, 1973
- *L. armeniensis* Gerhard, 1882
- *L. caerulea* Tutt, 1907
- *L. caeruleafasciata* Tutt, 1907
- *L. caeruleamarginata* Tutt, 1907
- *Lampides clara* Tutt, 1907
- *L. clarafasciata* Tutt, 1907
- *L. claramarginata* Tutt, 1907
- *L.fusca* Tutt, 1907
- *L. fuscafasciata* Tutt, 1907
- *L. fuscomarginata* Tutt, 1907
- *L. grisescens* Tutt, 1907
- *L. kawachensis* Hirose, 1934
- *L. leguminis* Scott, 1890
- *L. major* Tutt, 1907
- *L. minor* Tutt, 1907
- *L. typicafasciata* Tutt, 1907
- *L. typicamarginata* Tutt, 1907
- *Lycaena albovittata* Oberthür, 1910
- *Ly. boetica* (Linnaeus, 1767)
- *Ly.boetica armeniensis* Gerhard, 1882
- *Ly. ecaudata* Oberthür, 1910
- *Ly. minor* Pionneau, 1929
- *Papilio boeticus* Linnaeus, 1767
- *P. damoetes* Fabricius, 1775
- *P. pisorum* Fourcroy, 1785
- *Polyommatus boeticus* (Linnaeus, 1767)
- *Tarucus boeticus boeticoides* Stauder, 1925
- *T. boeticus immarginata* Stauder, 1925
- *T.boeticus nigrita* Stauder, 1925
- *T.s boeticus pygmaea* Stauder, 1925

Material examined: 118 specimens: 66(♀♀+♂♂) Karmat Ali;(8. Des. 2021; 12. Jan. 2022; 20. Feb. 2022; 26. March. 2022). 52(♀♀+♂♂) Al- Zubair: (15,Des.2021 and 7. Jan. 2022; 10. Feb. 2022; 20. March. 2022).

Distribution: Iraq [55]; Jordon[42]; Arminia(Dachenko *et al.*,2011); Albaniab(Verovnik and Popovic, 2013); Azerbaijan[38].

3.2.2. Genus: *Tarucus* Moore,1881

- *Tarucus balkanicus* (Freyer, 1845)

- Common name: Little tiger blue
- Synonyms: *Lycaena balkanica* Freyer, 1843
- *Lycaena psittacus* Herrich-Schäffer, 1844
- *Tarucus balkanica* var. *areshana* Bethune-Baker, (1918)
- *Tarucus callinara* f. *nigra* Bethune-Baker, [1918]
- *Tarucus frivaldszkyi* Aigner-Abafi, 1906
- *Tarucus clorinda* Verity, 1938
- *Tarucus balkanica* (Freyer, 1844)

Material examined: 221 specimens: 109(♀♀+♂♂) Karmat Ali;(42. Nov. 2021; 8,Des.2021 and 12. Jan. 2022; 12. Feb. 2022; 37. March. 2022). 112(♀♀+♂♂) Al- Zubair: (32,Des.2021 and 22. Jan. 2022; 24. Feb. 2022; 37. March. 2022).

Distribution: Iraq[40]; Algeria and Tunisia(Tennet, 1996); Jordon[42] Albania(Verovnik and Popovic, 2013); Bangladesh(Neogi et al.,2014); Azerbaijan[38]; India(Basu et al., 2019); Armenia(Langourov, 2019); Serbia [68]; Croatia[70].

3.2.3. Genus: *Zizeeria* Chapman, 1910

- *Zizeeria karsandra* (Moore, 1865)
- Common name: Dark grass blue
- Synonyms: *Lampides neis* Walker, 1870
- *Lycaena brahmina* C.Felder & R.Felder, 1865
- *Lycaena conformis* Butler, 1877
- *Polyommatus karsandra* Moore, 1865

Material examined: 198 specimens: 118(♀♀+♂♂) Karmat Ali;(35. Nov. 2021; 8,Des.2021 and 20. Jan. 2022; 20. Feb. 2022; 35. March. 2022). 80(♀♀+♂♂) Al- Zubair: (25. Nov.; 8Des.2021 and 18. Jan. 2022; 10. Feb. 2022; 12. March. 2022).

Distribution: Iraq [40]; Jordon[42]; Turkey[51], India[67] Sri Lanka[66] ; Iran [38]; Greece [65].

3.3. Family: Pieridae

Common name: Orang-Tips Butterflies

3.3.1. Genus: *Belenois* Hubner, 1819

- Synonyms: *Anaphaeis* Hubner, 1819
- *Glycestha* Billberg, 1820
- *Pseudohuphina* Stoneham, 1940
- *Pseudanaphaeis* Bernard, 1953
- *Belenois aurota* (Fabricius, 1793)
- Common name: Brown-Veined White
- Synonyms: *Anaphaeis aurotota* (Fabricius, 1793)
- *Papilio aurota* Fabricius, 1793

Material examined: 55 specimens: 33(♀♀+♂♂) Karmat Ali (20. Nov.; 2021 ; 3. Jan. 2022 ; 5. Feb. 2022; 5. Mar. 2022). Al- Zubair ;(3.Nov.2021; 5. Jan. 2022; 5. Feb. 2022; 7. Mar. 2022).

Distribution: Iraq [64]; South Africa[62], Pakistan [60]; China[63].

3.3.2. Genus: *Colotis* Hubner, 1819

- Synonyms: *Calais* Boisduval, 1836
- *Cuneacolis* Henning, Henning, Joannou & Woodhall, 1997
- *Idmais* Boisduval, 1836
- *Colotis fausta* (Olivier, 1804)
- Common name: Large Salmon Arab

Material examined: 75 specimens: 50(♀♀+♂♂) Karmat Ali (5. Jan. 2022; 20. Feb. 2022; 25. Mar. 2022). 25(♀♀+♂♂) Al- Zubair ;(5. Jan. 2022;10. Feb. 2022; 10. Mar. 2022).

Iraq [40]; Turkey [59], Pakistan[60], Oman[6]and India [61].

3.3.3. Genus: *Pieris Hübner, 1819*

- Synonym: *Tachyptera* Berge, 1842
- Common name: white garden

3.3.4. *Pieris rapae (Linnaeus, 1758)*

- Common name: Cabbage Butterfly
- Synonyms: *Artogeia Rapae* (Linnaeus, 1758)
- *Papilio rapae* Linnaeus, 1758
- *Pieris brassicae* Var. *Crucivora* Boisduval, 1836
- *Pieris metra* (Stephens, 1827)

Material examined: 3 specimens (2♀+1♂) Karmat Ali, Nov. 2022

Distribution: Iraq [50]; Jordon[42]; Iran[53]; Pakistan [58]. Egypt [54] and Azerbaijan [38].

Family: Hesperidae

3.3.5. Genus: *Pelopidas Walker, 1870*

- Synonym: Chapra Moore, 1881
- Peliophidas Swinhoe, 1913
- Pelopidae thrax(Hübner,1821)
- Common name: Millet skipper
- Synonyms: *Gegenes Thrax* Hübner, 1821
- *Pelopidas midea* Walker, 1870

Material examined: 43 specimens: 27(♀♀+♂♂) Karmat Ali (12Nov.2021, 4. Des.2021 and 3. Jan. 2022; 1. Feb. 2022; 7. Mar. 2022). 16(♀♀+♂♂) Al- Zubair ;(4.Des.2021 and 5. Feb. 2022; 7. Mar. 2022).

Distribution: Iraq [50]. Turkey [51]; Oman[55], Greece [56]; Iran [57]; Egypt [52].

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