Zerynthia polyxena ([Dennis et Schiffermuller], 1775) AND *Zerynthia cerisyi ferdinandi* Stichel, 1907 (LEPIDOPTERA, PAPILIONIDAE), IN THE COLLECTIONS OF THE NATURAL HISTORY MUSEUM IN SIBIU, ROMANIA

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Abstract. The Romanian Lepidopterological Society nominated the species *Zerynthia polyxena* as the insect of the year 2021. This is the reason why the present paper is dedicated to this species. The present paper has as a purpose to publish the data of collecting of the *Zerynthia polyxena* and *Zerynthia cerisyi ferdinandi* in the following Lepidoptera collections, preserved at the Natural History Museum in Sibiu, Romania: Daniel Czekelius, Eugen Worell, Viktor Weindel, Heinrich Hann von Hannenheim, Rolf Weirauch and Eckbert Schneider. Alltogether 82 specimens of the *Zerynthia polyxena* and 17 specimens of the *Zerynthia cerisyi ferdinandi* were found. The most numerous are specimens from Transylvania and Banat, but they are also samples collected from the other historical regions of Romania (Crishana, Dobrudja, Maramures, Moldova, Muntenia and Oltenia). In the studied collections there are also specimens originating from other European countries: Austria, Serbia, North Bulgaria and North Macedonia.

Key words: *Zerynthia polyxena*; *Zerynthia cerisyi ferdinandi* (Lepidoptera, Papilionidae).

INTRODUCTION

Zerynthia polyxena is butterfly species widespread from Southern France, Central and Southern Europe to South of Rusia and Central Asia [16, 17, 21, 30, 31, 33, 50, 52, 53, 57, 58]. It was recorded in Transylvania, Romania, before the 1900s [11]. In Romania, information about the species had been published in diverse papers since 1897 [1-9, 11-20, 23, 25-27, 31-49, 53, 54] but specimens from Transylvania, Romania have been safeguarded in collections since 1909 throughout 1974. According to some authors the species was seldom found between 1950 and 1990, and was even declared extinct [24, 55].

Information about the distribution of *Z. polyxena* in Romania divided into the nine regions (Banat, Bucovina, Crișana, Dobruja, Maramureș, Moldova, Muntenia, Oltenia and Transylvania), 41 counties and the Capital City–Bucharest were published in the monographic paper by Levente Szekely [49] where he mapped the then known collecting places (Fig. 1). In this paper 50 collecting localities were found in eight regions of (Banat, Crișana, Dobrudja, Maramureș, Moldova, Muntenia, Oltenia and Transylvania). Rákosy *et al*. [28] mention that the species was recorded between the years 1850-1900 in Dobruja; also in Crișana between 1901 and 1980, and during the years 1981-2001 the species was recorded in the regions Banat, Transylvania, Maramures, Oltenia, Muntenia and. The same authors also mentioned the degrre of endangerment, as recommended by IUCN, which included the species into the endangered (EN) category [28].

Information about the distribution of *Z. cerisyi ferdinandi* Stichel, 1907 in Romania (Fig. 2) are is mentioned by different authors [14, 22, 24, 25, 27-29, 31]. As a subspecies with limited distribution, it has been recorded only in Dobruja between 1981 and2002. Currently, it is considered as a critically endangered taxon (CR), regionally and nationally [28, 49]. Szekely [49] mentions that the species is distributed only in the South of Dobruja, where it inhabits habitats such as wooden steppe, bush areas, limestone areas, steppe meadows, karst canyons, and limestone gorges.

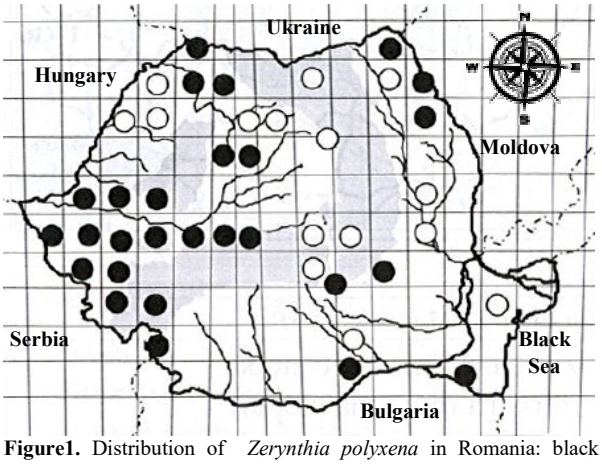

Figure1. Distribution of *Zerynthia polyxena* in Romania: black circle - sure records, white circle-old and not sure records (after Székely, 2008 [49])

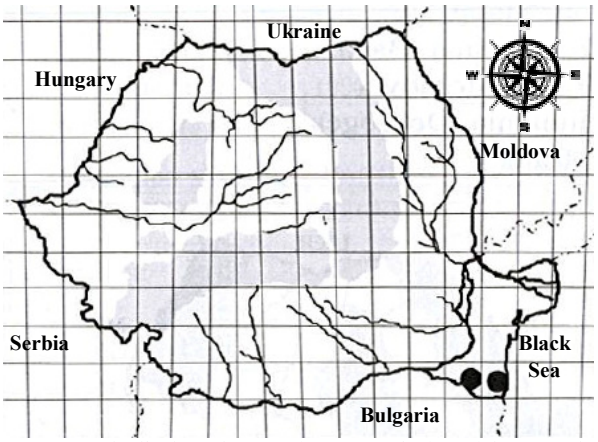

Figure 2. Distribution of *Zerynthia cerisyi ferdinandi* in Romania: black circle - records (after Székely, 2008 [49])

The aim of this work is to present information of *Zerynthia polyxena* and *Zerynthia cerisyi ferdinandi* collected in the past and present in six collections of Lepidoptera preserved at the Natural History Museum in Sibiu (Romania). The Romanian distribution data of both species is based on information provided by different authors [1-9, 11-15, 18, 19, 23, 25-27, 29, 31-43, 44-49, 53] as well as found in in the Natura 2000 sites [54, 55].

MATERIAL AND METHODS

The information presented in this paper originates from the literature, and reports of species in the Natura 2000 site [55] as well as data found in the collecting labels in specimens belonging to the the six collections of Lepidoptera preserved at the Natural History Museum in Sibiu. The collections are those of Daniel Czekelius, Eugen Worell, Viktor Weindel, Heinrich Hann von Hannenheim, Rolf Weirauch and Eckbert Schneider. Specimens containe in them were studied and the obtained information was enhanced by that found in several published papers [16-20, 23, 31, 34, 36-40, 54].

Specimens of *Zerynthia polyxena* and *Zerynthia cerisyi ferdinandi* identified in the above mentioned collections were analysed and listed (Table 1, 2), including collecting (with geographical coordinates) (Table 3, 4), date of collecting, collector's name (legit) and the preserved specimens were photographed.

Upon close examination of the collections, we found that some specimens don't have labels. We registered the information we could understand from every sample, but sometimes we could not read what was written, thus we reproduced information, as it was presented on the labels. Some times we recorded the uncertain data with a question mark.

The species are presented depending on collector, in chronological order, of the month, of the year and of the collecting day.

RESULTS

Based on label information from specimens at the revised insect collections, new and previously unpublished information is presented. Such data is complemented with that found in literature [1-9, 11-19, 23, 25-27, 31-43, 44-49, 53, 54]. Fifty collecting sites of *Z. polyxena* and *Z. cerisyi ferdinandi* were found in Romania. The largest amount of data comes from Transylvania with 15 collecting sites, followed by Banat with 10 sites (Table 3) and with less sites found in other regions of Romania. Specimens and details are as follows:

1. Dr. D. Czekelius's collection (Fig. 3)

Zerynthia polyxena

Material examined: April 30, (two specimens), Neppendorf, leg. Czekelius; without day of collecting, (one specimen), Broos, leg. Czekelius; without data, (one specimen), Bistrița, leg. Czekelius; April 16, 1922, (three specimens), Kiprosdorf, leg., Hannenheim; April 13, 1948, (two specimens), Hermanstadt, Hammepsd. Bg., leg. Worell.

Figure 3. *Zerynthia polyxena* in Dr. D. Czekelius' collection

2. Dr. Eugen Worell's collection (Fig. 4)

Zerynthia polyxena

Material examined: May 13, 1958, Canaraua Fetii-Dobrudja; May 18, 1958 Valea Iormac-Dobrudja; May 12, Ivești Forest, Tecuci, leg. A. Popescu-Gorj; April 29, 1943, Furceni Forest, Tecuci leg. A. Popescu-Gorj; May, 1946, Furceni Forest, Tecuci, leg. A. Popescu-Gorj; April 13, 1948 Sibiu; April 8, 1948, Sibiu; April 30, 1948 (two specimens), Hammersdorf, leg. Worell; April 8, 1948 Sibiu, leg. Worell; April 16,

Figure 4. *Zerynthia polyxena* in Dr. Eugen Worell's collection

1944, Hammersdorf, April 9, 1947, Sibiu, April 9, 1947, Hammersdorf, July (four specimens), (900), Schneeberg bei Wien, April 22, 1911, BeHN A. NBankoB3 (?); May 3, 1930, Veliko Tarnovo, North Bulgaria, leg. Ivan Buresh; April 16, 1946, April 20, 1949 HRE (?), Sibiu, Haymm HR (?); May 7, 1933, Svaganti (?), without labels (three specimens).

3. Dr. V. Weindel's collection (Fig. 5)

Zerynthia polyxena

Material examined: May 8, 1916 Serbia (two specimens); May 9, 1916 (two specimens); May 25, 1916 (one specimen) Serbia; April 30, 1950, Hammersdorf (three specimens) and two specimens without data of collecting.

Zerynthia cerisyi ferdinandi

Material examined: Băneasa (SV Dobrogea), May 13, 1958, Canaraua Fetei, leg. Popescu-Gorj A.

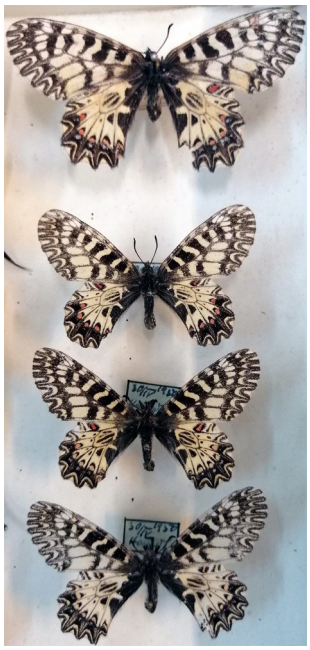

Figure 5. *Zerynthia polyxena* in Dr. V. Weindel's collection

4. Heinrich Hann von Hannenheim's collection

Zerynthia polyxena (Fig. 6)

Material examined: May 14, 1909 (two specimens), Băile Herculane, leg. Prall.

Figure 6. *Zerynthia polyxena* in Heinrich Hann von Hannenheim's collection

5. Rolf Weyrauch's collection (Fig. 7)

Zerynthia polyxena

Material examined: May 9, 1954, Sibiu; May 1, 1954 (two specimens); Sibiu; May 6, 1956, NB (?); 1♀, May 7, 1933, Drăgănești Forest, Tecuci; June 4, 1974, Verde Forest, Timișoara, leg. H. Pelits; June 5, 1974, Verde Forest, Timișoara, leg. H. Pelits; June 6, 1974, Verde Forest, Timișoara, leg. H. Pelits; January 20, 1974, Verde Forest, Timișoara, leg. H. Pelits; January 21, 1974 (two specimens), Verde Forest, Timișoara, leg. H. Pelits; January 22, 1974, Verde Forest, Timișoara, leg. H. Pelits; January 26, 1974, Verde Forest, Timișoara, leg. H. Pelits; June 4, 1974, Verde Forest, Timișoara, leg. H. Pelits; June 5, 1975, Verde Forest, Timișoara, leg. H. Pelits; June 6, 1975, Verde Forest, Timișoara, leg. H. Pelits; June 13, 1975, Verde Forest, Timișoara, leg. H. Pelits; June 18, 1975 (two specimens), Verde Forest, Timișoara, leg. H. Pelits; June 19, 1974, Verde Forest, Timișoara, leg. H. Pelits.

Zerynthia cerisyi ferdinandi

Material examined: May 13, 1958, Canaraua Fetii, Dobrogea, leg. A. Popescu-Gorj; June 5-9, 1974, (13 exemplare), Canaraua Fetii, Dobrogea, leg. A. Popescu-Gorj; June 16, 1954, Macedonia (700m), J. Thurner.

Figure 7. *Zerynthia polyxena* in Rolf Weyrauch's collection

6. Dr. E. Schneider's collection (Fig. 8)

Zerynthia polyxena

Material examined: April 4, 1974 (one specimen), Verde Forest, Timișoara, leg. Schneider; April 20, 1971, (one specimen), Verde Forest, Timișoara, leg. Schneider; April 21, 1974 (one specimen), Verde Forest, Timișoara, leg. Schneider; May 1, 1960 (two specimens), Șiria,Arad, leg. Schneider; May 2, 1979, (one specimen), Șiria, Arad, leg. Schneider; May 16, 1960, (one specimen), Șiria, Arad, leg. Schneider; June 14, 1974, (two specimens), Verde Forest, Timișoara, leg. Schneider; June 16, 1974, (one specimen), Verde Forest, Timișoara, leg. Schneider; May 7, 1976 (three specimens), Botanical Garden, Iași, leg. Schneider;

June 19, 1970 (two specimens), Sibiu (Hammerdorf Tal), leg. Schneider.

Figure 8. *Zerynthia polyxena* in Dr. E. Schneider's collection

After organizing all gathered information, we identified 82 specimens of *Zerynthia polyxena* collected from 1909 to 1974, in the following regions of Romania: Banat, Dobruja, Moldavia and Transylvania (Table 1). Some specimens were also from other countries (Austria and Serbia).

We identified *Zerynthia cerisyi ferdinandi* in only two collections: Viktor Weindel and Rolf Weyrauch, amounting to 17 specimens; collected between 1954 and 1974, from Dobrudja. Included was also a specimen from North Macedonia (Table 2).

In order to offer a complete information about these two species in Romania, we added the data published up to date [28], including the geographical coordinates of each site of collection (Romanian counties and regions of Romania).

According to Table 3, it can be noticed that *Zerynthia polyxena* was found in eight (out of nine) Romanian historical regions, Bucovina excepted. These records are from 22 counties of Romania and 51 collecting sites.

Table 1. The Lepidoptera collections where the species *Zerynthia polyxena* was identified

Crt. No.	Collection	Specimens	Period of collection	The area of collection
1	Daniel Czekelius	9	1922-1948	Transylvania
2	Eugen Worell	24	1911-1958	Transylvania, Dobrudja, Austria, North Bulgaria
3	Viktor Weindel	10	1916-1950	Transylvania, Serbia
4	Heinrich Hann von Hannenheim	2	1909	Banat
5	Rolf Weyrauch	22	1933-1974	Moldavia, Transylvania
6	Eckbert Schneider	15	1960-1974	Banat, Moldavia, Transylvania
Total		**82**	1909-1974	

Table 2. The Lepidoptera collections where we identified the species *Zerynthia cerisyi ferdinandi*

Crt. No.	Collection	Specimens	Period of collection	The area of collection
1	Viktor Weindel	2	1958	Dobrudja
2	Rolf Weyrauch	15	1954-1974	Dobrudja, North Macedonia
Total		**17**	1954-1974	

Table 3. The sites of collection, coordinates, distributed to counties and regions in Romania, of the species *Zerynthia polyxena* (after Szekely, 2008, completed)

Crt. No.	Locality	Coordinates	County	Historical Region
0	**1**	**2**	**3**	**4**
1	Băile Herculane	44°52′43″N 22°24′51″E	Caraș-Severin	Banat
2	Ciclova	45°1′33″N 21°43′47″E	Caraș-Severin	
3	Timișoara	45°45′35″N 21°13′48″E	Timiș	
4	Ghiroda	45°45′50″N 21°18′0″E	Timiș	
5	Fibiș	45°58′05″N 21°24′33″E	Timiș	
6	Pădureni	45°35′50″N 21°13′2″E	Timiș	
7	Pădurea Bistra	45.75806°N 21.33250°E	Timiș	
8	Pădurea Verde	45°46′51″N 21°16′01″E	Timiș	
9	Pișchia	45°54′54″N 21°19′24″E	Timiș	
10	Remetea Mare	45°47′01″N 21°23′00″E	Timiș	
11	Ineu	46°26′N 21°50′E	Arad	Crișana
12	Lipova	46°05′N 21°41′E	Arad	
13	Șiria	46°16′2″N 21°38′18″E	Arad	
14	Munții Bihorului	46°26′27″N 22°41′20″E	Bihor	
15	Canaraua Fetii	44.05333°N 27.67417°E	Constanța	Dobrogea
16	Enisala	44°52′42″N 28°49′7″E	Tulcea	
17	Măcin	45°14′44″N 28°7′23″E	Tulcea	
18	Tulcea	45°11′24″N 28°48′0″E	Tulcea	

0	1	2	3	4
19	Maramureș	47°40′22″N 24°00′18″E	Maramureș	Maramureș
20	Munții Rodnei	47°34′54″N 24°57′18″E	Bistrița Năsăud	
21	Herina	47°1′13″N 24°24′51″E	Bistrița Năsăud	
22	Bobulești	47°45′11″N 27°13′29″E	Botoșani	Moldova
23	Săveni	47°57′N 26°51′E	Botoșani	
24	Tecuci	45°50′48″N 27°25′40″E	Galați	
25	Iași	47°9′44″N 27°35′20″E	Iași	
26	Valea David	47.23444°N 27.44444°E	Iași	
27	Istrița	45°3′13″N 26°33′59″E	Buzău	Muntenia
28	Valea Mare	44°46′44″N 25°14′18″E	Dâmbovița	
29	Comana	44°10′30″N 26°08′35″E	Giurgiu	
30	Giurgiu	43°53′28″N 25°57′26″E	Giurgiu	
31	București	44°26′7″N 26°6′10″E	Ilfov	
32	Bușteni	45°24′42″N 25°32′14″E	Prahova	
33	Sinaia	45°21′00″N 25°32′33″E	Prahova	
34	Alion	44°27′44″N 22°40′57″E	Mehedinți	Oltenia
35	Eșelnița	44°44′31″N 22°16′11″E	Mehedinți	
36	Orșova	44°43′31″N 22°23′46″E	Mehedinți	
37	Turnu Severin	44°37′24″N 22°40′04″E	Mehedinți	
38	Brașov	5°39′N 25°36′E	Brașov	Transylvania
39	Rupea	46°02′20″N 25°13′21″E	Brașov	
40	Săcele	45°37′12″N 25°42′35″E	Brașov	
41	Cheile Turului (Tureni)	46°37′23″N 23°41′59″E	Cluj	
42	Călan	45°44′10″N 23°00′31″E	Hunedoara	
43	Cheile Crăciunești	46°0′52″N 22°52′13″E	Hunedoara	
44	Ciclovina	45°35′25″N 23°8′39″E	Hunedoara	
45	Zam	46°00′N 22°24′E	Hunedoara	
46	Zau de Câmpie	46°36′49″N 24°07′50″E	Mureș	
47	Turulung	47°55′57″N 23°5′3″E	Satu Mare	
48	Sibiu	45°47′45″N 24°9′8″E	Sibiu	
49	Bungard	45°46′31″N 24°13′23″E	Sibiu	
50	Gușterița	45°48'39"N 24°11'12"E	Sibiu	
51	Șelimbăr	45°46′13″N 24°11′19″E	Sibiu	

Table 4. The sites of collection, coordinates, distributed to counties and regions in Romania, of the species *Zerynthia cerisyi ferdinandi* (after Szekely, 2008, completed)

Crt. No.	Locality	Coordinates	County	Historical Region
1	Băneasa	44°4′12″N 27°42′0″E	Constanța	Dobrogea
2	Bugeac	44°5′51″N 27°25′58″E	Cosntanța	
3	Canaraua Fetii	44.05333°N 27.67417°E	Constanța	
4	Esechioi	44°1′53″N 27°25′16″E	Constanța	
5	Oltina	44°09′21″N 27°38′56″E	Constanța	
6	Șipotele	44°2′41″N 27°57′34″E	Constanța	
7	Negureni	44°5′57″N 27°45′13″E	Constanța	
8	Valea Iortmac	44.22556°N 27.76167°E	Constanța	

DISCUSSIONS

Currently, *Zerynthia polyxena* is considered an extinct species (EX) in Romania and an endangered species (EN) at the regional level. According to some authors [28, 49] it could still be found in calcareous areas, bush areas, gallery forests, abandoned vineyards, rocky slopes and ruderal ecosystems near villages.

The protection status of this species in Romania is due to the rare or uncommon local frequency, and to the altitude of its flights (between 200 and 800 m); it is due also to the extremely short flight period in April, May and middle of June [44].

If the details on the collecting labels in Rolf Weyrauch‘s collection are correct, we noticed the presence of this species in the Verde Forest near Timisoara during the 20, 21, 22, and 26 of January 1974. These collecting days contradict the usual period of flight of this species as is acknowledged in the literature [49].

In the map published by Szekely (2008), which details the distribution of this species in Romania, it was found in Satu Mare, Transylvania and Banat, Northern Moldavia, Muntenia and Dobruja (Fig. 1, 2). As concerns Crișana, the records are considered very old or comprising uncertain data [28].

The oldest data which certify the presence of this species in Romania are from 1909; the oldest records are to be found in Heinrich Hann von Hannenheim’s collection; they were collected in Băile Herculane, Banat region. In the same site, *Zerynthia polyxena* was recorded also on May 9, 1963, a male [9]. In Sibiu county, the species was recorded in Bungard [11, 12, 51], Gusterita [12, 31, 32, 53, 56] and in the city of Sibiu, according to the data written on the labels [12, 28, 31, 32, 53, 56].

The most common collecting sites are in Transylvania (15), Banat (10), Muntenia (7), Moldova (5), Oltenia (4), Dobruja (4). Material from Crișana (3) and Maramures (2) are less common (Table 3).

After analyzing the data from the six studied collections, even thouh the specimens were collected at different years, three forests near Tecuci (Moldova region) are frequently mentioned. These forests, Draganesti, Ivesti, and Furceni are located on the map (Fig. 1) [28].

According to some authors, one of the main reasons for population decrease of the species is the preference of the larva for some host plants [*Aristolochia clematitis, A. pallida, A. pistolochia* (Aristolochiaceae)] whose populations have diminished over time also. The species overwinters as pupa [24].

After studying the 435 sites mentioned by Natura 2000 [56], we found *Zerynthia polyxena* in the following places: Băile Herculane ROSCI0069, Caraș-Severin county [55]; Bucegi ROSCI0013, an area under the administration of the counties Dambovița, Prahova and Brasov) [56]; Canaraua Fetii ROSCI0172, Constanta county [55]; Cheile Turenilor ROSCI0034, Cluj county [55]; Istrita Hill ROSCI0057, Buzau county [55]; Domogled-Valea Cernei ROSCI0069, an area under the administration of the counties Caraș-Severin, Mehedinti, Gorj [55]; Jassy ROSCI0171 (Jassy county); Ineu ROSCI0069, Arad county [55].

Taking into consideration its frequency, *Zerynthia cerisyi ferdinandi* could be considered a very localized species, which flies at altitudes of 0-200 m and has a flight period from mid May to mid June [47, 49]. It is a protected species in Romania, due to its reduced geographic distribution; the larva prefers the host plant *Aristolochia pistolochia* and it overwinters as pupa.

After studying the two collections where *Z. cerisyi ferdinandi* was found, we noticed that is was collected from only eight sites in Dobruja, Constanta county (Table 4) confirming its known distribution in the country as mentioned in the literature [49]. Two other specimens were collected in Canaraua Fetii on May 27, 1973, and are in Nicolae Delvig's collection in Brasov [10].

Considering the importance in studying the distribution of this protected species in Romania, our paper forms a new baseline for future surveys and studies on *Zerynthia polyxena.*

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Conflict of interest. There is no actual or potential conflict of interest in relation to this article.

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