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THE BUTTERFLIES OF THE ISTRIA COUNTY (ISTRIA, CROATIA): A REVIEW OF THEIR DISTRIBUTION, STATUS AND CONSERVATION REQUIREMENTS (LEPIDOPTERA, RHOPALOCERA)

LE FARFALLE DELLA REGIONE ISTRIANA (ISTRIA, CROAZIA): UNA REVISIONE DELLA LORO DISTRIBUZIONE, STATUS E REQUISITI DI CONSERVAZIONE (LEPIDOPTERA, RHOPALOCERA)

Abstract - Records of butterflies observed in the Croatian County of Istria have been compiled from published articles; these have been supplemented by unpublished records from the authors and their associates over the last few decades, and by a programme of field surveys in 2014 and 2015 to fill the gaps in the localities visited. A total of 136 species were recorded from 252 localities - 69 % of the Croatian butterfly fauna. Five of these from the literature have not been seen again. A full list of the species and localities is given in the appendices. Several species are of conservation interest in Europe - 6 are listed in the European Habitats Directive: *Lycaena dispar* (Haworth, 1802), *Euphydryas aurinia* (Rottemburg, 1775), *Coenonympha oedippus* (Fabricius, 1787), *Zerynthia polyxena* (Denis & Schiffermüller, 1775), *Phengaris arion* (Linnaeus, 1758) and *Lopinga achine* (Scopoli, 1763). The habitat preferences of some rarer species are described. Changes in land-use in recent decades have resulted in the loss of meadows - important habitats for many species. An urgent requirement for conservation measures is identified, as well as the need for future surveys.
Key words: Lepidoptera, Rhopalocera, Butterfly diversity, Natura 2000, Istria, Croatia.

Riassunto breve - *Sono stati raccolti i dati di letteratura relativi ai ropaloceri osservati nella Regione Istriana. Tali dati sono stati integrati con rilievi inediti degli autori e dei loro collaboratori relativi agli ultimi decenni, supportati da un progetto di indagini sul campo condotte nel 2014 e nel 2015. Sono state complessivamente registrate 136 specie da 252 località, che corrispondono al 69% delle specie di ropaloceri presenti in Croazia. Di queste, cinque specie presenti in letteratura non sono state più rilevate. Diverse specie rinvenute risultano essere di interesse conservazionistico in Europa - sei specie sono elencate negli allegati della Direttiva 92/43 CEE "Habitat"*: Lycaena dispar *(Haworth, 1802)*, Euphydryas aurinia *(Rottemburg, 1775)*, Coenonympha oedippus *(Fabricius, 1787)*, Zerynthia polyxena *(Denis & Schiffermüller, 1775)*, Phengaris arion *(Linnaeus, 1758) e* Lopinga achine *(Scopoli, 1763). Vengono descritte le preferenze di habitat di alcune specie particolarmente rare. Viene analizzata la perdita degli habitat prativi in seguito ai recenti cambiamenti nell'uso del suolo e vengono indicati i requisiti più urgenti per le misure di conservazione, nonché la necessità di indagini future.*
Parole chiave: *Lepidoptera, Rhopalocera, Diversità di ropaloceri, Natura 2000, Istria, Croazia.*

Introduction

The Istrian peninsula is located in the northern part of the Adriatic Sea, between the Gulfs of Trieste and Kvarner. It extends over three countries: Croatia, Slovenia and Italy. Only a small part in the north lies in Italy, and the north-western part is in Slovenia. The main part of the peninsula lies in Croatia and belongs to two administrative units. The largest of these (2.800 km^2) is Istria County, which is the subject of this review. The remainder (360 km^2) is in Primorsko-Goranska County, which is not part of this work.

Along the northern border of the County the countryside is hilly, including part of the mountain massif of Ćićarija in the north east. In general, Istria is a mosaic of different habitat types and small villages. One third of the peninsula is covered by woodland, while the remaining open land comprises agricultural areas with grasslands, meadows and arable land.

Istria can be divided into three different geological areas. The northern and north-eastern part, with relatively scarce vegetation and bare Karst surfaces, is called 'White Istria'. South-west of this is an area of lower flysch tracts consisting of impermeable marl, clay and sandstone known as 'Grey Istria'. Most of the coastline is comprised of limestone terraces covered with red earth, giving it the name 'Red Istria'.

According to climate classification, the whole of Istria has a moderately warm climate, although the highest regions in the north-east approach the climatic characteristics of mountain climates. The coastal zone between Novigrad and Rabac belongs to the Mediterranean climate (Cs according to the Köppen climatic classification), and has the highest temperatures and the lowest precipitations. The rest of the coastal areas and the western and north-western parts of the peninsula have a moderately hot wet climate with hot summers (Cfa), while the inner part of the peninsula has a moderately warm, humid climate with hot summers (Cfb) (Šegota & Filipčić 2003).

The European ecological network Natura 2000 is very well represented in the County with 64 declared sites. Three Natura 2000 qualification species of butterflies occur in the county: *Lycaena dispar* on one site, *Euphydryas aurinia* on three sites and *Coenonympha oedippus* also on three sites (Croatian Agency for the Environment and Nature 2019).

The first published contributions on the butterfly fauna of Istria were made in the beginning of the 20th century by Galvagni (1909), Rebel (1910, 1912, 1913) and Stauder (1919, 1922, 1923). Later, only occasional records were published for the peninsula (Lipscomb 1959, 1961; Mladinov 1973, 1975; Withrington 1984; Kučinić et al. 1999; Šašić & Mihoci 2007; Lorković 2009; Koren 2012; Koren & Jugovic 2012; Koren et al. 2013). Recently a more systematic overview was made of the butterfly fauna in the central part of Istria (Koren & Ladavac 2010).

The present paper gives the results of butterfly surveys carried out on different occasions by a number of observers, with a detailed overview of previously published records from Istria County.

Materials and methods

Field surveys were carried out during the last few decades by the authors and their colleagues. We decided to carry out a programme of surveys in 2014 and 2015 to fill in the gaps in coverage; topography and habitat types were used to select the most suitable localities in the region. The overall coverage is 252 localities. The most productive and best preserved localities

Fig. 1 - Grasslands around Jelovice village in northern Istria. Photo by Toni Koren.
- *Aree prative presso il paese di Jelovice, nell'Istria settentrionale. Foto T. Koren.*

were visited several times (Figs 1-3, Appendix I). As many localities were visited only once, because most of the data was gathered on different field trips and vacations, the flight period of many species in the area has not been fully covered.

Field data were entered into an Excel table and basic statistics were calculated. The spatial processing and visualisation of data were done in the program ARC GIS desktop. The EEA 10x10 km reference grid was used in order to present species diversity. Some previously unpublished records from the Istria County collected by Ljiljana Ladavac 30 years ago are also included. Butterflies were identified using standard field guides. A few specimens of the genera *Pyrgus*, *Leptidea*, *Colias*, *Melitaea* and *Plebejus* were collected and their genitalia examined for correct identifications. The nomenclature of the butterflies is given according to Wiemers et al. (2018).

The literature review only considered data belonging to the present-day borders of Istria County. Records from Mt. Učka were omitted, as only part of the mountain lies within the County. The data from the *Red Book of butterflies of Croatia* (Šašić et al. 2015) were taken into account, but only for the presence of species in Istria County. The *Provisional distribution maps of the butterflies of Yugoslavia* (Jakšić 1988) was not taken into account when creating the species list, as it is mainly based on the original references already used in the preparation of this paper, and it contains some data (e.g. records of *Leptidea morsei*, *Neptis rivularis* and *Boloria euphrosyne*), the origin of which could not be verified.

Results

More than 4,100 records were collected across the County in the unpublished field surveys, representing 131 butterfly species. The previously published data records 122 butterfly species (Tab. I), five of which were not found during the field surveys. This represents a total of 136 butterfly species found in Istria County, amounting to 69% of the known butterfly fauna of Croatia (Šašić et al. 2015).

The five previously recorded species not found during our surveys are *Pyrgus alveus*, *Papilio*

Fig. 2 - Dry karstic grasslands at the southernmost point of Istria, Donji Kamenjak. Photo by Toni Koren.
- Praterie carsiche aride presso il punto più meridionale dell'Istria, Donji Kamenjak. Foto Toni Koren.

alexanor, *Phengaris arion*, *Apatura iris* and *Nymphalis xanthomelas*. On the other hand our surveys found 14 species not previously recorded in the county: *Carcharodus flocciferus*, *Carcharodus lavatherae*, *Leptidea juvernica*, *Aricia artaxerxes*, *Brenthis ino*, *Polyommatus daphnis*, *Polyommatus escheri*, *Limenitis populi*, *Coenonympha glycerion*, *Erebia aethiops*, *Erebia ligea*, *Hyponephele lycaon*, *Pyronia cecilia* and *Satyrus ferula*.

For recording purposes, we used the 10x10 km European Environment Agency (EEA) reference grid squares. The region is covered by 40 squares, 6 of which are border squares containing small areas of Istria County for which we have no butterfly records (Fig. 4). An overview of the number of species by square shows that most are occupied by 31-45 species. A single square had less than 15 species. In only two squares were more than 60 species recorded: an area of central Istria, where a systematic butterfly survey was recently conducted (Koren & Ladavac 2010), and the north-westernmost part of Istria - a diverse area which has been visited many times by the authors and other naturalists.

The most widespread species by number of localities reported are: *Coenonympha pamphilus* (153), *Maniola jurtina* (143), *Polyommatus icarus* (118), *Iphiclides podalirius* (97), *Lysandra bellargus* (96), *Leptidea sinapis* (96), *Aporia crataegi* (91), *Pieris rapae* (91) and *Melanargia galathea* (87). The butterflies recorded in the fewest localities - just one each - are: *Leptidea juvernica*, *Parnassius mnemosyne*, *Lycaena dispar*, *Satyrium w-album*, *Aricia artaxerxes*, *Phengaris arion*, *Cupido decoloratus*, *Brenthis ino*, *Melitaea britomartis*, *Apatura iris*, *Nymphalis xanthomelas*, *Pyronia cecilia*, *Aphantopus hyperantus*, *Erebia ligea* and *Chazara briseis*.

Discussion

The butterfly fauna of Istria is influenced by its geographical position at the junction of central Europe and the Mediterranean region. It is an important area for butterflies and deserves more conservation effort, both in monitoring and in action to maintain the key habitats. Our survey has revealed a much greater butterfly diversity in Istria County than had previously been recorded and has significantly increased our knowledge of butterfly distribution. From the 10x10 km grid analysis, it is evident that the areas receiving most visits - like the north-western parts - have the largest number of recorded species, while the areas with only occasional visits, e.g. most of the southern parts of the County, have lower species numbers. Future systematic surveys should help to reduce these differences.

Of the butterfly species recorded from Istria County, 23 are in the Croatian national Red Data list: *C. oedippus* as Critically endangered (CR), *Phengaris arion* and *Phengaris alcon* as Vulnerable (VU), and the species listed as Near threatened (NT) are *Heteropterus morpheus*, *Papilio machaon*, *Zerynthia polyxena*, *Parnassius mnemosyne*, *Glaucopsyche alexis*, *Lycaena dispar*, *Pseudophilotes vicrama, Scolitantides orion, Polyommatus thersites, Apatura iris, Apatura ilia, Limenitis populi, Euphydryas aurinia*, *Erebia medusa* and *Lopinga achine;* a further five are considered Data deficient (DD): *Thymelicus acteon, Papilio alexanor, Pieris brassicae, Melitaea aurelia* and *Melitaea britomartis* (Šašić et al. 2015).

Additionally, 12 species are listed in the European Red List of Butterflies: *Coenonympha oedippus* as 'endangered' and *Thymelicus acteon, Carcharodus flocciferus*, *Carcharodus lavatherae, Cupido decoloratus, Pseudophilotes vicrama, Polyommatus dorylas, Chazara briseis, Hipparchia statilinus, Melitaea britomartis, Melitaea aurelia* and *Parnassius mnemosyne* as 'near threatened' (Van Swaay et al. 2010).

Three species recorded in the area are protected by the European Habitats Directive Annexes II and IV: *Lycaena dispar, Euphydryas aurinia* and *Coenonympha oedippus*. *L. dispar* has been recorded in Istria only recently (Šašić et al. 2015), and our record from 27.5.2012 is the second for the County. Several males and a single female were observed on the shorelines of the Mirna river, near the village of Livade. The same locality was visited several times before and after these observations, but *L. dispar* was not seen. The habitat consists of a meadow, bordered on one side by a forest and on the other by the Mirna river. The grasslands of the valley are regularly mown and are fairly butterfly-rich habitats, with species like *C. oedippus* and *L. achine* present in the vicinity. Systematic surveys of the Mirna river valley are needed in order to establish the current status and distribution of *L. dispar* in the area. The addition of *L. dispar* to the ecological network locality HR2000637 Motovunska šuma should ensure its inclusion in the management programme for this biologically important area.

In Croatia, *E. aurinia* has been included in 33 Natura 2000 sites, of which three are within Istria County: HR2001322 - Vela Traba, HR2001349 - Dolina Raše and HR2000544 - Vlažne livade uz potok Malinska. During this survey, we recorded the species at 25 localities across the peninsula including the confirmation of the species occurrence in HR2001322 - Vela Traba and HR2001349 - Dolina Raše. In general, it is widespread in the County but not very numerous. The main threat to this species is natural succession, which is taking place on many small patches of suitable habitat across the peninsula.

For *C. oedippus*, six Natura 2000 sites are designated in Croatia, all of them within the Istria county. All our

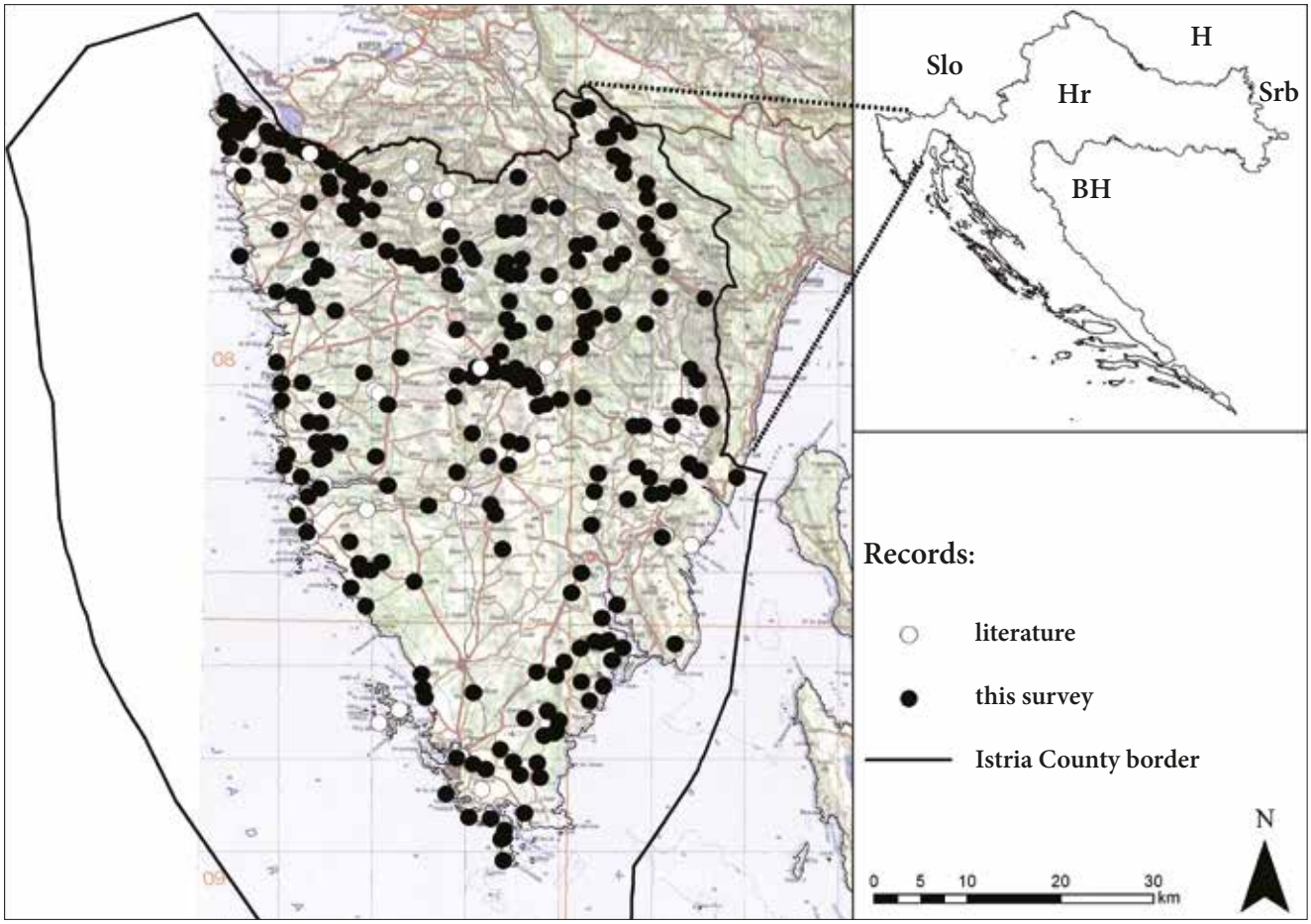

Fig. 3 - Surveyed area of Istria County.
- *Il territorio della Regione istriana oggetto di studio.*

records of *C. oedippus* are located within or close to the designated sites. New localities were found to the north and west of the Natura 2000 site HR2000545 - Vlažne livade kod Marušića which may indicate the need to adjust the borders of this site. In most localities this species is not numerous, and only single individuals may be observed in several hours. The state of its habitat differs from locality to locality, but vegetation succession and construction work on river basins are the main threats to the survival of the species in this area. While specific conservation measures have been suggested in the past (Šašić 2010) and the action plan has been created (Šašić 2013), their implementation is still needed.

Additionally, three species listed in Annex IV of the Habitats Directive as requiring strict protection across their entire natural range within the EU were recorded during this survey: *Zerynthia polyxena*, *Phengaris arion* and *Lopinga achine*. Of these, the most significant is *L. achine*. In addition to Mirna valley, *L. achine* was recorded near Buje village, as well as at several localities in north-western Istria, where it was observed flying in good numbers along a path through mixed oak-hornbeam forest and on forest edges. This species has been recorded in Istria only twice before (Šašić & Mihoci 2007; Koren & Ladavac 2010).

Istria County is the border area for two sister species, *Spialia orbifer* and *Spialia sertorius,* with *S. orbifer* being connected to the southern part of the peninsula (Lorković 2009). Our records show that the species is more widespread and mostly occurring in coastal areas (Fig. 5). *S. sertorius* seems to be present mainly in the eastern part of the peninsula. Its westernmost records in Istria, from the Brijuni islands (Rebel 1912), may actually be of *S. orbifer*, which at the time was not recognised as a valid species. *S. orbifer* is common in some localities in Istria, for instance in the area of Donji Kamenjak, where it is the dominant hesperid species.

Regarding hesperid species, we should mention the records of *Pyrgus carthami* from the north-western parts of the County. In Croatia, this species is mainly present in mountainous areas, from Gorski Kotar, across Velebit and Lika, to Mts. Dinara and Biokovo (Lorković 2009). While the species is known to occur in the Slovenian part of Istria (Verovnik et al. 2012), there is only a single record from Savudrija (Salvore) in Istria county (Stauder 1923). During our study it was recorded in the same area, in the northernmost parts of Istria, and can be found on karstic grasslands.

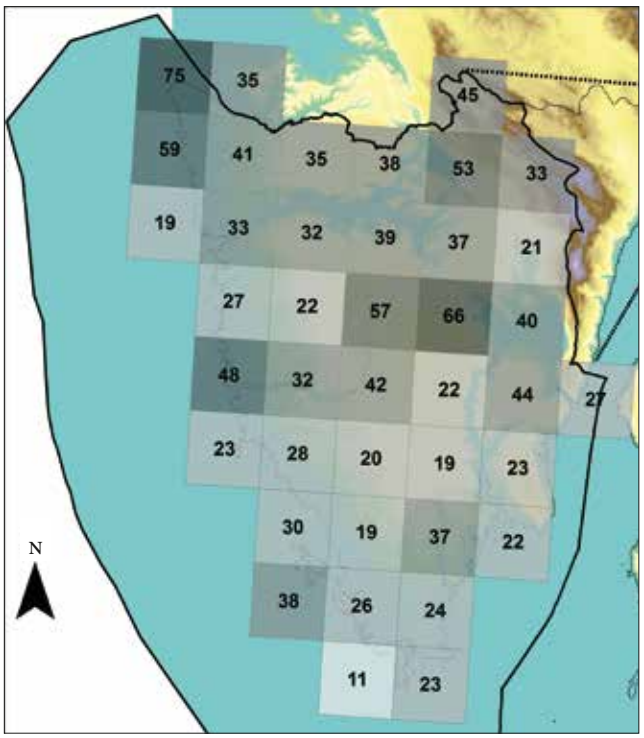

Fig. 4 - 10x10 km EEA reference grid with the number of species recorded within each square.
- *La griglia di riferimento 10x10 km EEA con il numero di specie registrate in ciascun quadrato.*

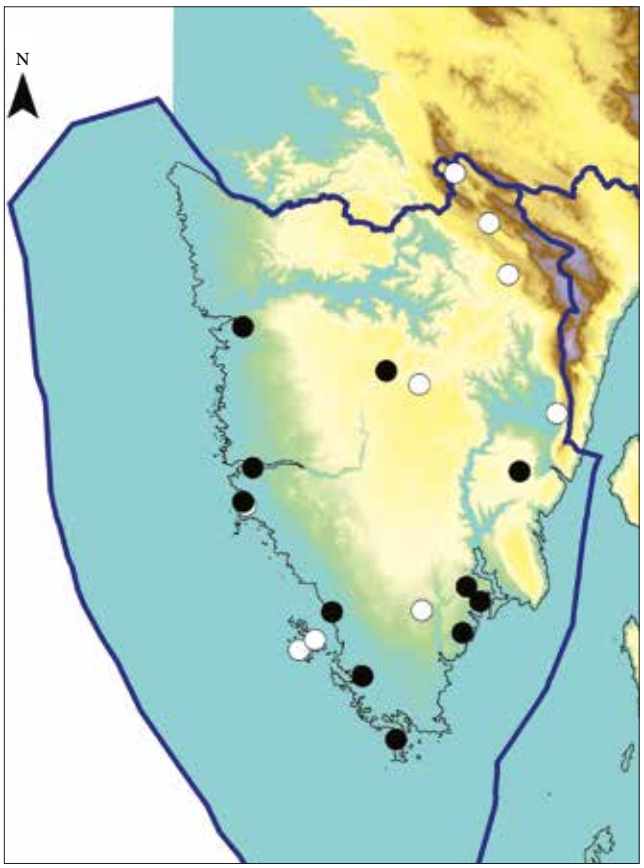

Fig. 5 - Occurrence of the genus *Spialia* in Istria County. Black dots represent *S. orbifer* while white dots represent *S. sertorius*.
- *Presenza del genere* Spialia *nella Regione istriana. I punti neri rappresentano* S. orbifer *mentre i punti bianchi* S. sertorius.

Even there, it is very rare and has only been observed on two occasions in the surveyed county.

Of the genus *Parnassius*, only *P. mnemosyne* was recorded - at Lanišće, Jelovice on grasslands near the road. Several individuals were observed flying over wet meadows and forest edge. While this is the only recorded locality for Istria County, on the neighbouring Mt. Učka the species is quite common and widespread (Koren, pers. obs). In Croatia this species is present in most of the montane areas, as well as some lowland areas like Baranja (Lorković 2009; Koren et al. 2012).

Only a single specimen of *Leptidea juvernica* was identified - based on the examination of the male genitalia. This species has a wide distribution in Croatia, but this was its first record in Istria. The closest record was from island of Krk (Habeler 2008). It has also been recorded in the Slovenian part of Istria (Verovnik et al. 2012). Our record was from the village of Finida, near Buzet recorded on March 28th 2012. In the area, a mosaic of arable land, small patches of wet meadows and forest edges occur. We expect that examination of more specimens of the genus *Leptidea* will result in additional records for Istria County.

One of the most interesting records in our survey is that of *Pyronia cecilia*. According to Jakšić (1988) it is present along the Adriatic coastline, as far up as Slovenia. However, this species has never been recorded in Slovenia (Verovnik et al. 2012). Also, there are no reliable previous records for Istria (Stauder 1923), the closest being from the island of Cres (Koren et al. 2015). Our record from July 2012 at Červar on the west coast significantly increases its known distribution in Croatia. The bay of the Limski Canal does not appear to be a barrier for *P. cecilia*, as it may be to the distribution of some other Mediterranean butterflies, such as *Charaxes jasius* (Koren 2012). Several specimens were observed at Červar, indicating a resident population. Further surveys are needed along the coastlines of Istria in order to map the current distribution of the species.

Within the borders of Istria county, *Erebia ligea* has so far been recorded from only one locality - Vodice,

along the road between Klenovšćak and Paproće. While seemingly rare in Istria, in bordering Mt. Učka and Gorski Kotar it is one of the commonest nymphalid species, inhabiting forest edges and clearings. As its preferred habitats, flower-rich forest edges, are widespread in the north-eastern part of the County, we expect it to be recorded from more localities in the future.

With recent surveys, the knowledge about the ocurrence of *Brenthis ino* in Croatia has been greatly expanded (e.g. Mihoci & Šašić 2005; Španić 2002; Koren & Zadravec 2010; Koren & Letić 2014). We recorded this species on only one locality, Vodice, along the road between Klenovšćak and Paproće. With future surveys, new localities within the County can be expected.

The occurrence of *Hipparchia statilinus* in different parts of Istria County is well documented in the literature (Galvagni 1909; Rebel 1912, 1913; Stauder 1922; Lipscomb 1959; Lorković 1974). Here we provide another record of the species observed in the surroundings of Potpićan village in 1985. After that, no observations from Istria County are known to us. In neighbouring Slovenia it has also become extremely rare and has in the last decade been found on only three sites (Verovnik et al. 2012). However, on the coastal areas of Dalmatia as well as most Adriatic islands, the species is widespread and numerous.

Before now, there were no records of *Polyommatus escheri* from Istria county, though it is well-known in the Slovenian parts of Istria (Verovnik et al. 2012). We recorded this species on 20.6.2010 in Zambratija and on 4.6.2011 in Crveni Vrh near road verges, usually around sloping terrain on which its larval host plant *Astragalus monspessulanus* grows. Further records from north and north-eastern parts of Istria County are expected, due to the presence of the host plant in those areas.

The occurrence of *Papilio alexanor* in the vicinity of Pazin was discussed in Bollino & Sala (2004) and Koren & Ladavac 2010. However, this species has recently been recorded in several places in Croatia, after several decades of absence (Kačírek 2017; Verovnik & Švara 2016). The foodplant, *Opopanax chironium*, is also present in Istria (Nikolić 2015), usually in very warm places. In view of this, it is likely that the historical record from central Istria (Stauder 1913) is correct. Further surveys across Istria, as well as other parts of Croatia, would help to assess its current status and distribution.

In addition to the butterfly species that have been recorded to date in Istria County, further species are expected to be recorded in the future. *Iolana iolas* and *Cupido osiris* are habitat specialists which occur in Slovenia near the Croatian border. Their occurrence is connected to the presence of their larval host plants. For *I. iolas* this is *Colutea arborescens*, a thermophilic species present in many parts of Istria, and for *C. osiris* it is *Onobrychis viciifolia*, found in several localities on the peninsula, including the north-western border of Istria (Verovnik et al. 2012). For both species, targeted field surveys are needed to confirm their presence in the County.

Conclusions

The County of Istria is characterised by a mosaic of landscapes, including a variety of natural and semi-natural habitats, small villages and towns. Compared with the remainder of northern Croatia, the land parcels in Istria are relatively small, and the ownership is in many cases undetermined. This has a noticeable influence on the land use, which has changed significantly in the last 50 years. Open landscapes that were once used as a pastures or hay meadows are now abandoned, and left to succession. In some parts, like the surroundings of Buje and a lot of coastal areas, butterfly-rich meadows and forest edges have been completely destroyed and turned into olive groves or vineyards. One additional very noticeable trend has been the disappearance of cattle from the open pastures. Some decades ago, each village had several dozen cows or horses which grazed pastures and kept meadows from becoming overgrown. Nowadays, cows on a pasture are a rare sight in Istria. Only in the northern part, close to Buzet, are such pastures still quite common, but even these are gradually becoming overgrown. For example, near Jelovice in the northernmost part of the County, former pastures are slowly becoming overgrown by bushes and grasses. But still, they remain some of the most butterfly-rich sites in the area, with species like *P. alcon*, *M. britomartis* and *Z. polyxena* a common occurrence.

Very noticeable is the lack of Lycaenid butterflies in most localities. Only grassland generalists like *P. icarus*, *P. bellargus* and *A. agestis* are still common and numerous across the peninsula, while more specialised meadow species like *P. idas*, *P. argyrognomon* and *L. tityrus* are extremely local and rare. In some areas, like north-western Istria, it is almost impossible to find any of the habitat specialist species of meadows.

Sadly, we witnessed habitat destruction during our surveys. It involved a small meadow north of Buje, bordering an oak forest, which was formerly rich in butterfly species, as well as *Zygaenidae*. The locality was first visited in 2011, and a population of *L. achine* was recorded in the immediate surroundings. On the meadow itself, several species like *P. idas* were present in large numbers. The meadow was visited on several occasions, but a couple of years ago it was completely destroyed, together with part of the forest edge, and

turned into a large vineyard. As there are no other suitable meadows in the surroundings, the open-landscape butterfly species have disappeared from this area.

In order to maintain the butterfly diversity in the future, conservation measures are needed across the County, especially in the butterfly-rich areas that were identified during this study. Whilst our study represents the largest piece of butterfly research in Istria County, our knowledge about the butterflies and their conservation status is less than comprehensive. Therefore, we hope that our survey will be used as a baseline study that will encourage other lepidopterists to visit the area and help compile further butterfly records. An online database for Croatian butterfly records will soon be available. Meanwhile, records may be sent to the first author.

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Appendix 1. List of recorded species within Istria County with locality numbers and species data from literature. Locality numbers correspond to those given in App. 2.

	List of species	Locality number	Observed flight period in Istria county	Literature
1.	*Erynnis tages* (Linnaeus, 1758)	1, 3, 7, 16, 17, 18, 19, 21, 40, 55, 65, 71, 72, 88, 111, 112, 118, 121, 125, 126, 127, 129, 131, 140, 144, 156, 161, 168, 172, 173, 175, 178, 179, 181, 183, 184, 188, 191, 192, 198, 202, 206, 211, 220	27.III.-17.VIII.	Galvagni (1909), Rebel (1913), Stauder (1923), Koren & Ladavac (2010)
2.	*Carcharodus alceae* (Esper, 1780)	2, 5, 19, 21, 23, 35, 38, 42, 64, 65, 71, 79, 83, 84, 89, 92, 116, 119, 152, 156, 161, 163, 167, 172, 179, 180, 183, 193, 195, 202, 216, 231, 244, 250	26.III.-15.IX.	Rebel (1913), Stauder (1923), Lipscomb (1959), Koren & Ladavac (2010)
3.	*Carcharodus lavatherae* (Esper, 1783)	7, 209	26.V.-6.VI.	
4.	*Carcharodus flocciferus* (Zeller, 1847)	123, 147, 215	12.VI.-28.VIII.	
5.	*Spialia sertorius* (Hoffmannsegg, 1804)	3, 36, 70, 159, 222	23.5.-11.VII.	Rebel (1912), Rebel (1913), Stauder (1923), Koren & Ladavac (2010)
6.	*Spialia orbifer* (Hübner, [1823])	3, 111, 126, 189, 190, 199, 215, 220, 222, 224, 230, 250	17.V.-28.VIII.	Galvagni (1909), Lorković (2009)
7.	*Pyrgus carthami* (Hübner, [1813])	2, 7, 21, 195, 222	23.V.-25.VI.	Stauder (1923)
8.	*Pyrgus malvae* (Linnaeus, 1758)	1, 3, 16, 43, 49, 55, 56, 76, 118, 131, 140, 161, 184, 192	1.IV.-12.VII.	Lipscomb (1959), Koren & Ladavac (2010), Koren et al. (2012)
9.	*Pyrgus malvoides* (Elwes & Edwards, 1897)	13, 19, 21, 23, 31, 33, 35, 37, 48, 49, 61, 108, 109, 113, 149, 169, 170, 180, 190, 191, 199, 203, 208, 219, 223	23.III.-24.VIII.	Koren et al. (2013)
10.	*Pyrgus armoricanus* (Oberthür, 1910)	17, 46, 53, 82, 159, 167, 172, 191, 215, 216	22.V.-1.IX.	Rebel (1924), Koren & Ladavac (2010)
11.	*Pyrgus alveus* (Hübner, [1803])			Mladinov (1975)
12.	*Heteropterus morpheus* (Pallas, 1771)	2, 12, 13, 15, 18, 19, 20, 23, 25, 28, 29, 32, 36, 43, 44, 45, 49, 50, 64, 67, 87, 102, 103, 111, 117, 126, 142, 161, 194, 228	23.V.-23.VII.	Stauder (1923), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac (2010)
13.	*Carterocephalus palaemon* (Pallas, 1771)	43, 129	1.V.-14.V.	Koren & Ladavac (2010)
14.	*Thymelicus lineola* (Ochsenheimer, 1808)	2, 3, 7, 13, 15, 18, 20, 21, 23, 25, 28, 29, 32, 33, 36, 37, 43, 44, 47, 49, 51, 57, 59, 66, 67, 70, 75, 78, 80, 83, 87, 90, 91, 104, 108, 117, 121, 123, 126, 133, 140, 152, 156, 159, 162, 166, 168, 177, 182, 184, 187, 189, 193, 194, 201, 202, 207, 209, 223, 232, 233, 240	18.V.-30.VI.	Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
15.	*Thymelicus sylvestris* (Poda, 1761)	2, 3, 7, 12, 21, 22, 28, 31, 35, 41, 43, 44, 59, 67, 69, 83, 90, 104, 111, 152, 156, 162, 166, 177, 185, 201, 202, 207, 209, 210, 232	21.V.-27.VI.	Withrington (1984), Koren & Ladavac (2010)
16.	*Thymelicus acteon* (Rottemburg, 1775)	2, 15, 25, 35, 40, 131, 140, 183, 248	14.VI.-27.VI.	Withrington (1984), Koren & Ladavac (2010), Šašić et al. (2015)
17.	*Hesperia comma* (Linnaeus, 1758)	3, 72, 167, 173	23.VIII.-14.IX.	Koren & Ladavac (2010)
18.	*Ochlodes sylvanus* (Esper, 1777)	2, 7, 12, 13, 15, 18, 19, 20, 21, 22, 23, 24, 25, 29, 31, 32, 33, 35, 36, 40, 41, 45, 47, 49, 57, 59, 64, 67, 79, 82, 87, 92, 94, 101, 111, 117, 118, 123, 126, 147, 152, 166, 173, 177, 187, 193, 195, 199, 206	23.V.-15.IX.	Rebel (1913), Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
19.	*Zerynthia polyxena* ([Denis & Schiffermüller], 1775)	3, 16, 43, 60, 61, 63, 76, 131	30.III.-28.V.	Stauder (1919), Koren & Ladavac (2010), Šašić et al. (2015)
20.	*Parnassius mnemosyne* (Linnaeus, 1758)	3	28.V.	Šašić et al. (2015)
21.	*Iphiclides podalirius* (Linnaeus, 1758)	3, 4, 7, 13, 15, 16, 17, 19, 20, 21, 36, 40, 43, 45, 49, 55, 56, 59, 61, 62, 63, 64, 67, 76, 81, 83, 84, 89, 90, 94, 96, 99, 102, 111, 112, 113, 117, 118, 121, 122, 123, 124, 125, 126, 127, 129, 135, 136, 138, 140, 145, 151, 152, 154, 155, 156, 157, 161, 164, 168, 169, 170, 172, 175, 176, 179, 183, 184, 187, 188, 192, 193, 195, 196, 198, 199, 200, 202, 207, 209, 211, 213, 215, 216, 218, 220, 226, 227, 228, 231, 238, 239, 242, 244, 245, 247, 251	23.III.-30.VIII.	Rebel (1912), Rebel (1913), Stauder (1919), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
22.	*Papilio machaon* Linnaeus, 1758	2, 3, 4, 7, 12, 16, 19, 36, 40, 43, 48, 60, 64, 69, 71, 76, 114, 117, 121, 128, 136, 138, 140, 146, 156, 161, 167, 172, 175, 178, 179, 181, 183, 184, 187, 188, 192, 193, 194, 195, 197, 198, 199, 200, 202, 207, 216, 220, 221, 225, 228, 241	23.III.-1.IX.	Stauder (1919), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010), Šašić et al. (2015)
23.	*Papilio alexanor* (Esper, 1800)			Stauder (1913), Stauder (1919), Šašić et al. (2015)

Pieridae

24. *Leptidea sinapis* (Linnaeus, 1758)	2, 3, 7, 11, 12, 13, 15, 17, 19, 20, 21, 23, 25, 28, 37, 44, 48, 49, 52, 55, 57, 59, 60, 61, 62, 63, 64, 67, 69, 70, 71, 72, 76, 77, 78, 79, 80, 81, 83, 86, 87, 90, 97, 101, 111, 112, 114, 117, 118, 119, 121, 123, 126, 127, 129, 131, 134, 139, 140, 148, 149, 152, 155, 156, 157, 161, 166, 167, 170, 172, 173, 177, 178, 179, 181, 183, 184, 187, 192, 193, 194, 195, 198, 202, 203, 204, 206, 211, 213, 215, 216, 220, 221, 227, 228, 231	27.III.-15.IX.	Rebel (1912), Rebel (1913), Stauder (1919), Lipscomb (1959), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac (2010)
25. *Leptidea juvernica* Williams, 1946	42	28.III.	
26. *Anthocharis cardamines* (Linnaeus, 1758)	3, 16, 19, 43, 48, 49, 60, 61, 90, 113, 129, 131, 140, 156, 169, 175, 178, 179, 187, 188, 192, 198, 211	25.III.-28.V.	Rebel (1913), Stauder (1919), Koren & Ladavac (2010)
27. *Aporia crataegi* (Linnaeus, 1758)	3, 7, 8, 13, 17, 18, 20, 21, 23, 24, 25, 28, 29, 31, 32, 33, 35, 36, 37, 41, 43, 44, 45, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 62, 66, 67, 70, 72, 78, 79, 80, 83, 86, 91, 95, 98, 100, 107, 108, 111, 112, 117, 121, 123, 126, 133, 140, 152, 153, 157, 166, 168, 176, 177, 178, 179, 181, 182, 184, 185, 186, 187, 189, 190, 191, 194, 195, 198, 199, 201, 207, 209, 210, 219, 223, 232, 233, 236, 240, 242, 243	11.V.-12.VII.	Rebel (1913), Stauder (1913), Withrington (1984), Koren & Ladavac (2010)
28. *Pieris brassicae* (Linnaeus, 1758)	7, 15, 20, 25, 43, 45, 152, 156, 157, 189, 190, 199, 216, 228, 244, 250	15.V.-19.VIII.	Rebel (1913), Stauder (1919), Withrington (1984), Koren & Ladavac (2010), Šašić et al. (2015)
29. *Pieris mannii* (Mayer, 1851)	7, 15, 19, 25, 43, 48, 49, 61, 67, 79, 87, 91, 111, 141, 152, 156, 157, 161, 167, 168, 183, 185, 187, 192, 193, 195, 198, 202, 206, 216, 217, 221, 228, 232, 247, 248, 250, 251	30.III.-9.X.	Rebel (1913), Stauder (1913), Stauder (1919), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac (2010)
30. *Pieris rapae* (Linnaeus, 1758)	2, 4, 7, 10, 11, 12, 13, 17, 18, 19, 21, 23, 25, 32, 36, 38, 40, 42, 43, 55, 64, 66, 67, 70, 71, 79, 80, 82, 83, 84, 87, 89, 91, 92, 95, 100, 104, 111, 112, 113, 123, 126, 127, 129, 134, 136, 137, 139, 140, 145, 146, 147, 149, 150, 151, 154, 155, 156, 160, 161, 163, 164, 167, 170, 172, 173, 178, 179, 183, 184, 187, 188, 199, 201, 202, 203, 204, 206, 213, 215, 216, 220, 228, 231, 232, 238, 239, 240, 243, 246, 250	23.III.-9.X.	Rebel (1912), Rebel (1913), Stauder (1919), Koren & Ladavac (2010)
31. *Pieris ergane* (Geyer, 1828)	13, 109, 192, 217, 220, 226, 229, 235, 246, 250, 251	26.III.-28.IX.	Stauder (1919)
32. *Pieris napi* (Linnaeus, 1758)	2, 3, 7, 13, 14, 21, 23, 24, 26, 29, 31, 35, 38, 43, 55, 65, 66, 67, 71, 73, 75, 80, 82, 83, 91, 104, 121, 126, 131, 138, 140, 141, 156, 157, 161, 166, 167, 169, 175, 184, 189, 196, 198, 202, 203, 223, 233, 236, 239, 243, 244, 246	20.III.-15.IX.	Rebel (1912), Rebel (1913), Stauder (1919), Mladinov (1973), Koren & Ladavac (2010)
33. *Pontia edusa* (Fabricius, 1777)	3, 7, 19, 23, 38, 40, 48, 51, 70, 78, 84, 88, 91, 111, 113, 123, 126, 134, 136, 150, 152, 156, 161, 167, 170, 172, 179, 183, 187, 195, 198, 199, 203, 220, 227, 246, 250	27.III.-9.X.	Rebel (1912), Rebel (1913), Rebel (1913/1912), Stauder (Stauder, 1921), Lipscomb (1959), Daniel (1971), Koren & Ladavac (2010)
34. *Colias crocea* (Geoffroy, 1785)	3, 7, 13, 15, 19, 23, 25, 28, 32, 38, 40, 59, 64, 65, 67, 72, 74, 79, 80, 81, 83, 84, 87, 90, 91, 92, 94, 96, 97, 101, 111, 121, 122, 123, 126, 127, 134, 135, 136, 139, 140, 145, 146, 150, 152, 154, 156, 160, 161, 167, 169, 170, 172, 173, 181, 187, 188, 193, 198, 199, 202, 204, 207, 210, 211, 215, 216, 220, 221, 223, 227, 228, 229, 231, 232, 236, 239, 240, 242, 243, 244, 250	27.III.-28.IX.	Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1919), Lipscomb (1959), Daniel (1971), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac (2010)
35. *Colias hyale* (Linnaeus, 1758)	19, 36, 39, 55, 58, 65, 134, 140, 161	14.V.-27.VIII.	Rebel (1913), Stauder (1919), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
36. *Colias alfacariensis* (Ribbe, 1905)	2, 12, 19, 36, 40, 65, 70, 72, 89, 111, 117, 118, 139, 167, 172, 173 178, 187, 192, 194, 207, 211, 215, 216, 217, 220, 221, 226, 231	10.IV.-29.VIII.	Koren & Ladavac (2010)
37. *Gonepteryx rhamni* (Linnaeus, 1758)	3, 7, 9, 10, 12, 13, 16, 17, 19, 20, 21, 26, 27, 36, 43, 48, 55, 56, 60, 61, 64, 67, 68, 70, 76, 78, 79, 83, 87, 88, 90, 91, 92, 105, 131, 132, 140, 156, 157, 161, 166, 172, 185, 187, 193, 199, 202, 211, 228, 232, 250	21.II.-9.X.	Rebel (1913), Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
38. *Gonepteryx cleopatra* (Linnaeus, 1767)	2, 152, 161, 187, 189, 193, 199, 204, 213, 219, 235, 244, 248	25.III.-20.VIII.	Galvagni (1902), Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1922), Mladinov (1967), Mladinov (1973), Koren & Ladavac (2010)
39. *Hamearis lucina* (Linnaeus, 1758)	43, 49, 55, 80, 88, 118	27.III.-17.VII.	Stauder (1923), Koren & Ladavac (2010)

40.	*Lycaena phlaeas* (Linnaeus, [1760])	2, 4, 5, 7, 13, 15, 19, 21, 22, 23, 25, 28, 33, 37, 42, 44, 47, 48, 49, 67. 77, 83, 94, 107, 109, 111, 135, 140, 145, 152, 159, 160, 161, 167, 169, 172, 173, 175, 176, 199, 203, 210, 216, 229, 232, 240, 246, 250, 252	23.III.-9.X.	Rebel (1912), Rebel (1913), Stauder (1923), Rebel (1924), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)170,
41.	*Lycaena dispar* ([Haworth], 1802)	80	27.V.	Šašić et al. (2015)
42.	*Lycaena tityrus* (Poda, 1761)	3, 17, 19, 77, 80, 92, 94, 126, 134, 167, 168, 184, 191	14.V.-1.IX.	Koren & Ladavac (2010)
43.	*Lycaena alciphron* (Rottemburg, 1775)	19, 44, 184	14.V.-8.VI.	Koren & Ladavac (2010)
44.	*Favonius quercus* (Linnaeus, 1758)	19, 30, 161, 172, 195, 216	16.VI.-23.VIII.	Galvagni (1909), Stauder (1923), Lipscomb (1961), Koren & Ladavac (2010)
45.	*Callophrys rubi* (Linnaeus, 1758)	7, 16, 18, 19, 20, 21, 23, 25, 44, 48, 59, 72, 76, 113, 114, 155, 169, 170, 178, 183, 184, 187, 192, 203, 211, 248, 250, 251	23.III.-22.VI.	Rebel (1913), Withrington (1984), Koren & Ladavac (2010)
46.	*Satyrium w-album* (Knoch, 1782)	83	30.VI.	Koren & Ladavac (2010)
47.	*Satyrium pruni* (Linnaeus, 1758)	19, 126	24.V.-20.VI.	Koren & Ladavac (2010)
48.	*Satyrium spini* ([Denis & Schiffermüller], 1775)	3, 7, 12, 19, 21, 30, 35, 193, 195, 248	27.V.-23.VII.	Stauder (1923), Koren & Ladavac (2010)
49.	*Satyrium ilicis* (Esper, 1779)	2, 3, 7, 15, 19, 20, 21, 22, 25, 26, 32, 36, 44, 49, 59, 65, 67, 72, 80, 83, 103, 111, 117, 123, 152, 159, 166, 177, 182, 183, 189, 93, 204, 219, 221, 236, 239, 240	28.V.-12.VII.	Stauder (1923), Lipscomb (1961), Koren & Ladavac (2010)
50.	*Satyrium acaciae* (Fabricius, 1787)	7, 19, 20, 21, 22, 36, 44, 65, 67, 83, 102, 111, 126, 143, 182	2.VI.-18.VII.	Withrington (1984), Koren & Ladavac (2010)
51.	*Lampides boeticus* (Linnaeus, 1767)	19, 183	1.VII.-17.VIII.	Rebel (1924), Koren & Ladavac (2010)
52.	*Leptotes pirithous* (Linnaeus, 1767)	13, 19, 65, 92, 123, 134, 149, 161, 172	17.VII.-15.IX.	Rebel (1913), Stauder (1923), Lipscomb (1959), Koren & Ladavac (2010)
53.	*Cacyreus marshalli* (Butler, 1898)	5, 183, 199, 200, 229	29.VI.-28.9.	Gros (2010)
54.	*Cupido minimus* (Fuessly, 1775)	1, 2, 3, 7, 16, 20, 21, 28, 36, 43, 55, 70, 74, 111, 141, 175, 178, 179, 183, 193, 194, 195	9.V.-12.VII.	Rebel (1913), Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
55.	*Cupido argiades* (Pallas, 1771)	2, 7, 19, 20, 21, 25, 28, 44, 45, 52, 57, 59, 62, 64, 65, 71, 78, 81, 83, 94, 97, 118, 134, 140, 143, 172, 182, 188, 194, 195, 198	27.III.-23.VIII.	Stauder (1923), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
56.	*Cupido decoloratus* (Staudinger, 1886)	131	15.VI.	Lipscomb (1961), Koren & Ladavac (2010)
57.	*Cupido alcetas* (Hoffmannsegg, 1804)	2, 7, 13, 14, 16, 19, 64, 65, 67, 72, 77, 79, 81, 83, 90, 92, 94, 111, 117, 118, 119, 121, 123, 126, 134, 141, 146, 151, 152, 158, 163, 165, 172, 173, 182, 183, 213, 215, 231	21.IV.-30.VIII.	Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
58.	*Celastrina argiolus* (Linnaeus, 1758)	7, 15, 19, 25, 64, 65, 67, 78, 79, 80, 87, 97, 109, 111, 117, 123, 125, 146, 149, 151, 152, 155, 163, 167, 169, 170, 172, 179, 183, 187, 188, 193, 195, 196, 198, 203, 215, 216, 223, 233, 244, 246, 248, 250	21.II.-24.IX.	Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
59.	*Pseudophilotes vicrama* (Moore, 1865)	3, 48, 135, 167, 187	13.IV.-23.VIII.	Stauder (1923), Koren & Ladavac (2010), Šašić et al. (2015)
60.	*Scolitantides orion* (Pallas, 1771)	19, 118, 137, 141, 175, 179	9.V.-1.IX.	Stauder (1923), Koren & Ladavac (2010), Šašić et al. (2015)
61.	*Glaucopsyche alexis* (Poda, 1761)	1, 3, 7, 13, 16, 18, 19, 21, 23, 24, 33, 48, 63, 77, 83, 112, 114, 126, 141, 168, 175, 176, 178, 183, 188, 189, 250	17.IV.-7.VI.	Rebel (1913), Stauder (1923), Koren & Ladavac (2010), Šašić et al. (2015)
62.	*Phengaris arion* (Linnaeus, 1758)			Stauder (1923), Koren & Ladavac (2010)
63.	*Phengaris alcon* ([Denis & Schiffermüller], 1775)	3, 12, 43	12.VII.-23.VII.	Koren & Ladavac (2010)
64.	*Plebejus argus* (Linnaeus, 1758)	2, 3, 7, 10, 13, 14, 15, 18, 19, 21, 28, 31, 32, 35, 36, 37, 40, 44, 49, 51, 53, 57, 59, 62, 66, 70, 72, 74, 80, 83, 84, 90, 94, 108, 111, 117, 118, 125, 127, 133, 136, 139, 141, 144, 152, 153, 154, 159, 160, 167, 168, 172, 173, 174, 178, 179, 184, 186, 191, 198, 202, 204, 207, 209, 210, 223, 227, 231, 240, 243, 244	9.V.-27.VIII.	Rebel (1913), Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
65.	*Plebejus idas* (Linnaeus, [1760])	19, 20, 25, 65, 72, 140, 161, 172	30.V.-5.IX.	Stauder (1923), Withrington (1984)
66.	*Plebejus argyrognomon* (Bergsträsser, 1779)	7, 13, 40, 54, 111, 131, 161, 178, 184, 209	11.V.-15.IX.	Lipscomb (1961), Koren & Ladavac (2010)
67.	*Aricia agestis* ([Denis & Schiffermüller], 1775)	3, 7, 10, 13, 16, 18, 19, 21, 24, 33, 35, 36, 40, 41, 45, 55, 65, 72, 77, 83, 98, 107, 111, 118, 123, 125, 126, 135, 144, 146, 149, 154, 160, 161, 163, 168, 173, 175, 178, 179, 182, 184, 187, 189, 190, 194, 195, 196, 202, 204, 207, 209, 221, 223, 227, 231, 232, 239, 240, 244, 250	21.IV.-9.X.	Rebel (1912), Rebel (1913), Stauder (1923), Withrington (1984), Koren & Ladavac (2010)

68.	*Aricia artaxerxes* (Fabricius, 1793)	3	12.VII.	
69.	*Cyaniris semiargus* (Rottemburg, 1775)	2, 3, 17, 29, 32, 36, 43, 62, 72, 126, 141, 190	14.V.-28.VI.	Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
70.	*Polyommatus escheri* (Hübner, [1823])	7, 15	28.V.-20.VI.	
71.	*Polyommatus dorylas* ([Denis & Schiffermüller], 1775)	3, 36	25.V.-11.VII.	Koren & Ladavac (2010)
72.	*Polyommatus amandus* (Schneider, 1792)	3, 17, 29, 36, 43, 70, 126, 131, 184	16.V.-11.VII.	Withrington (1984), Koren & Ladavac (2010)
73.	*Polyommatus thersites* (Cantener, 1835)	12, 7	28.V.-23.VII.	Koren & Ladavac (2010), Šašić et al. (2015)
74.	*Polyommatus icarus* (Rottemburg, 1775)	1, 2, 3, 7, 10, 13, 15, 16, 17, 18, 19, 21, 23, 24, 25, 29, 31, 32, 33, 36, 37, 40, 43, 44, 47, 51, 52, 53, 55, 64, 65, 66, 67, 70, 72, 74, 75, 77, 78, 79, 80, 82, 83, 84, 86, 87, 89, 90, 91, 92, 94, 95, 98, 100, 104, 107, 108, 111, 112, 118, 119, 121, 125, 126, 127, 136, 140, 141, 145, 146, 152, 154, 159, 160, 166, 167, 168, 172, 173, 175, 176, 177, 178, 179, 181, 183, 184, 185, 187, 188, 189, 190, 191, 194, 195, 196, 198, 199, 202, 204, 207, 209, 210, 213, 216, 217, 221, 223, 228, 231, 233, 239, 244, 246, 247, 248, 250, 251	1.V.-9.X.	Rebel (1912), Rebel (1913), Stauder (1923), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
75.	*Polyommatus daphnis* ([Denis & Schiffermüller], 1775)	161, 179, 217	11.VII.-19.VII.	
76.	*Lysandra bellargus* (Rottemburg, 1775)	2, 3, 7, 10, 13, 15, 19, 21, 22, 23, 26, 28, 31, 32, 33, 36, 37, 39, 44, 47, 49, 52, 55, 57, 58, 59, 62, 65, 66, 67, 69, 70, 72, 81, 83, 84, 87, 89, 90, 93, 94, 108, 111, 114, 115, 121, 124, 134, 136, 139, 141, 146, 149, 151, 152, 153, 159, 160, 161, 166, 167, 168, 172, 173, 174, 175, 177, 178, 179, 181, 182, 184, 186, 187, 195, 199, 202, 207, 209, 210, 213, 215, 216, 220, 223, 226, 227, 231, 233, 234, 240, 247, 248, 250, 251, 252	9.V.-24.IX.	Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1923), Lipscomb (1959), Koren & Ladavac (2010)
77.	*Lysandra coridon* (Poda, 1761)	3, 12, 19, 65, 115, 118, 126, 136, 146, 149, 151, 161, 167, 173, 215, 231	17.VII.-14.IX.	Lipscomb (1959), Koren & Ladavac (2010)
78.	*Libythea celtis* (Laicharting, 1782)	2, 21, 22, 61, 72, 75, 79, 83, 126, 138, 152, 159, 164, 183, 187, 194	23.III.-10.VII.	Stauder (1923), Koren & Ladavac (2010)
79.	*Argynnis paphia* (Linnaeus, 1758)	7, 19, 21, 22, 34, 37, 65, 67, 72, 83, 84, 92, 94, 123, 136, 145, 158, 160, 161, 167, 172, 173, 177, 183, 193, 194, 195, 199, 213, 215, 216, 220, 223, 225, 231, 232, 236, 239	23.V.-1.IX.	Rebel (1913), Stauder (1922), Lipscomb (1959), Lipscomb (1961), Koren & Ladavac (2010)
80.	*Argynnis pandora* ([Denis & Schiffermüller], 1775)	15, 140, 152, 177, 179, 183, 184, 187, 193, 195, 196, 199, 202, 238	18.V.-22.VIII.	Stauder (1922)
81.	*Speyeria aglaja* (Linnaeus, 1758)	12, 36, 161, 199	28.VI.-23.VII.	Stauder (1922), Koren & Ladavac (2010)
82.	*Fabriciana adippe* ([Denis & Schiffermüller], 1775)	2, 3, 15, 19, 20, 36, 111, 179	2.VI.-12.VII.	Withrington (1984), Koren & Ladavac (2010)
83.	*Fabriciana niobe* (Linnaeus, 1758)	2, 36, 40, 159, 184, 199	18.V.-28.VI.	Galvagni (1909), Stauder (1922), Lipscomb (1961), Koren & Ladavac (2010)
84.	*Issoria lathonia* (Linnaeus, 1758)	3, 7, 13, 19, 28, 31, 33, 35, 40, 42, 53, 66, 72, 77, 97, 109, 111, 112, 123, 126, 140, 149, 152, 161, 167, 168, 170, 172, 176, 177, 183, 187, 190, 191, 195, 198, 199, 221	27.II.-25.VII.	Lipscomb (1959), Koren & Ladavac (2010)
85.	*Brenthis ino* (Rottemburg, 1775)	36	28.VI.	
86.	*Brenthis daphne* (Bergsträsser, 1780)	2, 7, 12, 13, 15, 18, 19, 20, 21, 25, 28, 32, 36, 37, 40, 45, 47, 65, 66, 67, 72, 75, 80, 83, 87, 102, 111, 117, 126, 140, 156, 159, 163, 166, 177, 195	23.V.-23.VII.	Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
87.	*Brenthis hecate* ([Denis & Schiffermüller], 1775)	2, 3, 20, 21, 22, 32, 36, 37, 44, 45, 49, 57, 64, 108, 111, 133, 161, 166, 168, 177, 184, 186, 190, 191	14.V.-12.VII.	Withrington (1984), Koren & Ladavac (2010)
88.	*Boloria dia* (Linnaeus, 1767)	2, 11, 15, 19, 32, 36, 37, 45, 49, 59, 60, 61, 67, 76, 109, 111, 123, 129, 140, 148, 152, 161, 167, 169, 175, 203, 210, 215, 242	28.III.-1.IX.	Rebel (1913), Stauder (1922), Koren & Ladavac (2010)
89.	*Vanessa atalanta* (Linnaeus, 1758)	2, 7, 13, 19, 21, 23, 24, 29, 36, 58, 66, 72, 84, 87, 89, 98, 99, 120, 129, 132, 137, 145, 147, 157, 161, 166, 167, 172, 175, 180, 183, 200, 202, 207, 209, 216, 220, 226, 244, 245, 246, 250	11.III.-9.X.	Rebel (1913), Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
90.	*Vanessa cardui* (Linnaeus, 1758)	2, 3, 7, 13, 14, 18, 19, 21, 25, 30, 36, 45, 53, 66, 79, 81, 87, 89, 91, 92, 95, 98, 111, 112, 121, 123, 125, 129, 131, 136, 145, 154, 160, 161, 167, 175, 184, 187, 188, 193, 201, 202, 207, 209, 216, 220, 226, 231, 238, 248, 250	13.IV.-9.X.	Rebel (1913), Stauder (1922), Daniel (1971), Withrington (1984), Koren & Ladavac (2010)
91.	*Aglais io* (Linnaeus, 1758)	2, 12, 20, 29, 36, 38, 72, 78, 80, 83, 91, 111, 177, 198	21.II.-28.VIII.	Rebel (1913), Stauder (1922), Withrington (1984), Koren & Ladavac (2010)

92. *Aglais urticae* (Linnaeus, 1758)	2, 3, 7, 12, 16, 19, 21, 29, 36, 55, 70, 169, 183, 184, 198	2.IV.-23.VII.	Koren & Ladavac (2010)
93. *Polygonia c-album* (Linnaeus, 1758)	2, 7, 13, 20, 22, 26, 36, 43, 65, 71, 72, 75, 79, 83, 88, 121, 157, 161, 165, 169, 172, 183, 187, 198, 206, 232, 244	20.III.-22.VIII.	Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
94. *Polygonia egea* (Cramer, 1775)	7, 101, 216	4.VI.-19.VIII.	Galvagni (1909), Stauder (1922), Lipscomb (1959)
95. *Nymphalis antiopa* (Linnaeus, 1758)	102, 198	14.IV.-24.VI.	Stauder (1922), Koren & Ladavac (2010)
96. *Nymphalis polychloros* (Linnaeus, 1758)	2, 7, 19, 20, 21, 23, 25, 26, 59, 61, 71, 78, 91, 103, 120, 121, 123, 131, 156, 166, 169, 182, 183, 187, 189, 194, 198, 203, 206, 221, 239	21.II.-4.IX.	Rebel (1913), Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
97. *Nymphalis xanthomelas* (Esper, [1781])			Šašić et al. (2015)
98. *Euphydryas aurinia* (Rottemburg, 1775)	1, 3, 16, 17, 19, 33, 43, 55, 56, 74, 86, 90, 112, 116, 119, 121, 126, 133, 168, 171, 178, 179, 184, 188, 190	1.V.-31.V.	Stauder (1922), Koren & Ladavac (2010), Šašić et al. (2015)
99. *Melitaea cinxia* (Linnaeus, 1758)	3, 13, 17, 18, 19, 21, 23, 36, 39, 43, 55, 56, 70, 72, 74, 77, 78, 80, 83, 90, 93, 112, 114, 119, 121, 126, 133, 156, 168, 175, 178, 179, 184, 185, 187, 188, 189, 201, 207, 209, 223, 247, 248, 250	18.IV.-12.VII.	Koren & Ladavac (2010)
100. *Melitaea phoebe* ([Denis & Schiffermüller], 1775)	3, 7, 13, 15, 18, 19, 21, 23, 25, 28, 29, 31, 32, 43, 51, 83, 111, 133, 140, 149, 167, 168, 172, 181, 184, 185, 187, 195, 207, 223, 233, 247, 250	14.V.-14.IX.	Rebel (1913), Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
101. *Melitaea trivia* ([Denis & Schiffermüller], 1775)	3, 18, 19, 23, 29, 36, 161, 168	21.V.-12.VII.	Koren & Ladavac (2010)
102. *Melitaea didyma* (Esper, 1778)	2, 3, 14, 19, 20, 21, 25, 28, 32, 36, 40, 44, 45, 57, 59, 62, 65, 67, 72, 78, 79, 81, 83, 84, 85, 87, 92, 94, 96, 102, 108, 111, 121, 123, 126, 134, 136, 139, 153, 157, 161, 166, 167, 172, 173, 177, 182, 187, 193, 195, 204, 207, 210, 215, 216, 219, 220, 223, 231, 232, 236, 240, 242	24.V.-29.VIII.	Rebel (1913), Lipscomb (1959), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac (2010)
103. *Melitaea aurelia* (Nickerl, 1850)	36, 70, 108, 178, 184, 191, 206	11.V.-28.VI.	Koren & Ladavac (2010), Koren & Jugovic (2012), Šašić et al. (2015)
104. *Melitaea britomartis* (Assmann, 1847)	3	28.V.	Koren & Jugovic (2012), Šašić et al. (2015)
105. *Melitaea athalia* (Rottemburg, 1775)	2, 3, 19, 20, 25, 26, 29, 31, 36, 43, 44, 45, 49, 58, 59, 87, 96, 102, 108, 117, 126, 133, 136, 140, 147, 156, 161, 177, 182, 191, 202, 206	21.V.-13.VIII.	Stauder (1922), Withrington (1984), Koren & Ladavac (2010), Koren & Jugovic (2012)
106. *Limenitis camilla* (Linnaeus, 1764)	19, 65, 79, 126, 140	24.V.-12.VII.	Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1922), Koren & Ladavac (2010)
107. *Limenitis populi* (Linnaeus, 1758)	43	30.V.	
108. *Limenitis reducta* (Staudinger, 1901)	2, 7, 12, 13, 18, 19, 20, 21, 23, 25, 33, 35, 45, 66, 72, 92, 101, 104, 111, 118, 119, 126, 127, 140, 149, 153, 156, 157, 158, 161, 166, 167, 168, 172, 173, 175, 176, 183, 187, 189, 190, 193, 196, 198, 202, 204, 209, 210, 213, 215, 216, 217, 219, 220, 223, 226, 227, 231, 232, 233, 234, 235, 237, 239, 240, 244, 250	9.V.-24.IX.	Lipscomb (1959), Lipscomb (1961), Withrington (1984), Koren & Ladavac (2010)
109. *Charaxes jasius* (Linnaeus, 1767)	212, 220, 221, 226, 249	6.VI.-4.IX.	Koren (2012)
110. *Apatura ilia* ([Denis & Schiffermüller], 1775)	67, 75, 79, 81, 118, 130	14.VI.-15.VIII.	Stauder (1922), Koren & Ladavac (2010), Šašić et al. (2015)
111. *Apatura iris* (Linnaeus, 1758)			Šašić et al. (2015)
112. *Pararge aegeria* (Linnaeus, 1758)	3, 7, 13, 15, 18, 19, 21, 23, 24, 25, 26, 30, 35, 38, 41, 43, 48, 55, 56, 60, 61, 64, 76, 79, 97, 103, 117, 118, 121, 126, 131, 132, 140, 144, 161, 163, 167, 170, 172, 178, 183, 184, 187, 189, 192, 196, 198, 199, 202, 205, 209, 211, 223, 228, 233, 239, 244, 248, 251	26.III.-15.IX.	Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1922), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
113. *Lasiommata megera* (Linnaeus, 1767)	2, 3, 7, 10, 11, 13, 15, 16, 19, 20, 21, 23, 31, 35, 39, 40, 41, 48, 55, 59, 60, 61, 63, 64, 65, 67, 71, 72, 75, 83, 84, 89, 90, 91, 103, 111, 113, 121, 126, 131, 141, 146, 161, 163, 175, 178, 179, 183, 184, 186, 187, 202, 218, 227, 235, 240, 250, 251	23.III.-15.IX.	Rebel (1913), Stauder (1922), Withrington (1984), Koren & Ladavac (2010)
114. *Lasiommata maera* (Linnaeus, 1758)	3, 7, 17, 19, 20, 21, 24, 36, 39, 49, 59, 66, 70, 89, 112, 121, 146, 159, 161, 166, 167, 172, 187, 189, 201, 207, 209, 216, 220	19.V.-28.VIII.	Rebel (1913), Stauder (1922), Lipscomb (1959), Koren & Ladavac (2010)
115. *Lopinga achine* (Scopoli, 1763)	36, 59, 67	4.VI.-11.VII.	Šašić & Mihoci (2007), Koren & Ladavac (2010), Šašić et al. (2015)
116. *Coenonympha oedippus* (Fabricius, 1787)	44, 49, 64, 65, 67	8.VI.-6.VII.	Kučinić et al. (1999), Šašić (2010), Šašić et al. (2015)
117. *Coenonympha arcania* (Linnaeus, [1760])	2, 3, 7, 12, 13, 15, 17, 18, 20, 21, 22, 23, 26, 28, 29, 30, 33, 35, 36, 37, 41, 43, 44, 49, 55, 58, 59, 66, 67, 68, 70, 72, 73, 83, 108, 111, 112, 117, 121, 126, 140, 141, 147, 152, 159, 166, 168, 177, 178, 789, 182, 183, 184, 186, 187, 195, 206, 207, 210, 223, 236, 240	11.V.-23.VII.	Stauder (1923), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac (2010)

118. *Coenonympha glycerion* (Borkhausen, 1788)	3, 12, 36, 43	28.VI.-23.VII.	
119. *Coenonympha pamphilus* (Linnaeus, 1758) (2010)	1, 2, 3, 7, 13, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 33, 35, 36, 37, 39, 40, 41, 43, 44, 45, 47, 48, 49, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 64, 66, 67, 68, 70, 71, 72, 74, 78, 79, 80, 81, 83, 84, 87, 90, 91, 92, 93, 94, 95, 96, 100, 101, 102, 104, 107, 108, 111, 112, 113, 114, 117, 119, 121, 123, 126, 134, 135, 136, 137, 139, 140, 144, 146, 147, 149, 152, 159, 160, 161, 162, 163, 166, 167, 168, 170, 172, 173, 174, 176, 177, 178, 179, 181, 182, 184, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 198, 201, 202, 203, 206, 207, 209, 210, 213, 215, 216, 218, 219, 220, 223, 227, 231, 232, 233, 236, 239, 240, 242, 243, 246, 247, 248, 250, 251, 252	26.III.-9.X.	Rebel (1912), Rebel (1913), Stauder (1923), Rebel (1924), Withrington (1984), Kučinić et al. (1999), Koren & Ladavac
120. *Pyronia tithonus* (Linnaeus, 1767)	13, 19, 72, 82, 146, 161, 167, 172, 173, 215, 231, 244	12.VII.-28.VIII.	Lipscomb (1959), Koren & Ladavac (2010)
121. P*yronia cecilia* (Vallantin, 1894)	127	12.VII.	
122. *Aphantopus hyperantus* (Linnaeus, 1758)	29	12.VII.	Stauder (1923)
123. *Maniola jurtina* (Linnaeus, 1758)	2, 3, 7, 8, 12, 13, 14, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 32, 33, 35, 36, 37, 40, 41, 43, 44, 45, 47, 49, 51, 52, 53, 54, 56, 57, 58, 59, 62, 64, 66, 67, 69, 70, 72, 75, 78, 79, 80, 82, 83, 84, 85, 86, 87, 89, 91, 95, 96, 98, 100, 104, 108, 111, 112, 117, 121, 123, 125, 126, 127, 133, 136, 139, 140, 144, 146, 147, 149, 152, 153, 156, 157, 161, 162, 163, 166, 167, 168, 172, 173, 176, 178, 179, 181, 182, 183, 184, 185, 186, 187, 189, 190, 191, 193, 194, 195, 196, 198, 201, 202, 204, 205, 206, 207, 209, 210, 213, 215, 216, 217, 219, 220, 221, 223, 227, 231, 232, 233, 236, 240, 242, 243, 244, 246, 247, 248, 250, 251, 252	11.V:-24.IX.	Rebel (1912), Rebel (1913), Stauder (1923), Withrington (1984), Koren & Ladavac (2010)
124. *Hyponephele lycaon* (Rottemburg, 1775)	2, 14	25.VI.	
125. *Erebia ligea* (Linnaeus, 1758)	36	28.VI.	
126. *Erebia aethiops* (Esper, 1777)	3, 12, 36	11.VII.-23.VII.	
127. *Erebia medusa* ([Denis & Schiffermüller], 1775)	3, 16, 17, 29, 55, 56, 63, 74	14.V.-18.VI.	Šašić et al. (2015)
128. *Melanargia galathea* (Linnaeus, 1758)	2, 3, 6, 7, 12, 13, 15, 18, 19, 20, 21, 22, 25, 28, 29, 30, 31, 32, 35, 36, 37, 40, 41, 43, 44, 45, 49, 51, 52, 59, 64, 66, 69, 73, 75, 80, 83, 96, 101, 102, 108, 111, 117, 121, 123, 126, 127, 133, 140, 152, 154, 156, 157, 161, 163, 166, 174, 177, 179, 183, 184, 186, 187, 191, 193, 194, 195, 196, 199, 201, 202, 204, 206, 207, 209, 210, 219, 223, 227, 232, 233, 236, 239, 240, 242, 243, 244	18.V.-12.VII.	Rebel (1913), Stauder (1922), Lipscomb (1961), Withrington (1984), Kučinić et al. (1999), Lorković (2009), Koren & Ladavac (2010)
129. *Satyrus ferula* (Fabricius, 1793)	28, 36	4.VI.-11.VII.	
130. *Minois dryas* (Scopoli, 1763)	72, 118, 146	2.VIII.-28.VIII.	Stauder (1922), Koren & Ladavac (2010)
131. *Hipparchia fagi* (Scopoli, 1763)	2, 3, 7, 12, 15, 21, 26, 29, 36, 43, 59, 75, 80, 106, 111, 118, 146, 151, 152, 161, 163, 179, 183, 193, 195, 206, 213, 215, 216, 218, 220, 221, 227	4.VI.-14.IX.	Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
132. *Hipparchia semele* (Linnaeus, 1758)	2, 3, 12, 20, 29, 36, 43, 126, 141, 146, 161, 166, 177, 179, 182, 183, 194, 206, 215, 221, 250	19.VI.-24.IX.	Rebel (1913), Stauder (1922), Rebel (1924), Withrington (1984), Koren & Ladavac (2010)
133. *Hipparchia statilinus* (Hufnagel, 1766)	161		Galvagni (1909), Rebel (1912), Rebel (1913), Stauder (1922), Lipscomb (1959), Lorković (1974)
134. *Arethusana arethusa* ([Denis & Schiffermüller], 1775)	3, 19, 44, 136, 139, 161, 167, 173, 186, 213, 215	29.V.-14.IX.	Koren & Ladavac (2010)
135. *Brintesia circe* (Fabricius, 1775)	2, 3, 12, 15, 20, 21, 25, 28, 29, 32, 35, 36, 40, 41, 43, 44, 45, 57, 59, 62, 64, 69, 72, 75, 80, 81, 83, 84, 87, 89, 94, 101, 102, 110, 111, 117, 121, 123, 126, 136, 139, 152, 161, 163, 166, 167, 172, 173, 177, 179, 182, 183, 187, 193, 194, 196, 202, 206, 210, 213, 214, 215, 216, 219, 221, 223, 226, 227, 232, 236, 240, 242, 243, 244	4.VI.-14.IX.	Stauder (1922), Lipscomb (1959), Withrington (1984), Koren & Ladavac (2010)
136. *Chazara briseis* (Linnaeus, 1764)	161	/	Stauder (1922), Lipscomb (1959), Koren & Ladavac (2010)

Appendix 2. List of surveyed localities, geographic co-ordinates, dates and observers.

Locality number and name		WGS N - E	Dates	Observers
1	Lanišće, Jelovice, 500m E, dry grasslands	45,499963-14,014002	14.5.2012	T. Koren
2	Savudrija, V. Stancija	45,499722-13,519444	22-25.6.1982, 22.5.2012.	D. Withrington
3	Lanišće, Jelovice, dry grasslands near the road	45,496971-14,002772	14.5.2012, 25.5.2014, 12.7.2014, 14.9.2014,	
			28.5.2017	T. Koren
4	Volparija village surroundings	45,493026-13,522053	28.3.2012	T. Koren
5	Savudrija, 400m E	45,491722-13,516268	15.9.2011, 26.3.2012	T. Koren
6	Medigija, Crveni Vrh village	45,489308-13,527334	2.6.2011	T. Koren
7	Crveni Vrh - Kanegra, toponym Francenoza	45,4875-13,555556	3-6.6.2011	R. Harold
			22.5.2012	D. Withrington
			23.5.2014	T. Koren
8	Medigija, Crveni Vrh	45,484579-13,531466	21.5.2011	T. Koren
9	Čičarija, Buzet, Vodice village	45,483498-14,054474	12.3.2016	T. Koren
10	Medigija, S of the village	45,482798-13,538275	4.7.2011	T. Koren
11	Medigija, N of Grupija	45,479725-13,548459	28.3.2012	T. Koren
12	Vodice, E of village, toponym Gušta	45,476111-14,070833	23.7.1990	D. Withrington
13	Kanegra, W of Grupija	45,475002-13,540402	26.3.2012	M. Črne
			24.5.2014, 12.7.2014, 15.9.2014	T. Koren
14	Valica, N of the village, Cupilija	45,472222-13,574167	25.6.1985	D. Withrington
15	Zambratija, S of the village	45,471667-13,520833	30.6.1999, 20.6.2010	D. Withrington
16	Buzet, Dane, meadows	45,470959-14,043437	14.5.2012	T. Koren
17	Buzet, Dane, arround the village	45,470078-14,036214	25.5.2014	T. Koren
18	Kolombera, N of the village	45,469836-13,537093	23.5.2014	T. Koren
19	Pazin, Vela Traba	45,468915-13,517807	2.5.2008, 24.5.2008, 2.6.2008, 3.6.2008, 5.6.2008, 8.6.2008, 9.6.2008, 16.6.2008, 19.6.2008, 27.6.2008, 4.7.2008, 7.7.2008, 9.7.2008, 10.7.2008, 11.7.2008, 21.7.2008, 12.8.2008, 4.9.2008, 5.9.2008, 10.4.2009, 13.4.2009, 2.5.2009, 5.6.2009, 20.6.2009, 23.7.2009, 2.4.20119.4.2012, 21.4.2012, 7.9.2012	T. Koren, Lj. Ladavac
20	Valica, E of the village	45,466667-13,578611	22.6.1982	D. Withrington, R. Price
			20.6.2010	D. Withrington
21	between Valica and Sv. Marija na Krasu	45,46466-13,58756	4.6.2011, 4.7.2011, 23.3.2012, 28.3.2012,	
			19.5.2014, 20.6.2014	T. Koren
22	Sveta Marija na Krasu	45,463876-13,59503	4.6.2011	T. Koren
23	Štrika, S Brutija, illegal junkyard	45,462721-13,554734	15.9.2011, 23.3.2012, 23.5.2014	T. Koren
24	Kapitanija	45,457527-13,61147	19.5.2014	T. Koren
25	Umag, Katoro, S of the village	45,455833-13,523333	21.6.1982, 23.6.1982, 25.6.1985	D. Withrington
26	Plovanija, W of the village	45,453889-13,636667	22.6.1982	D. Withrington
			4.6.2011, 19.5.2014	T. Koren
27	Trstenik, Dražica, spring	45,45337-14,051243	13.3.2016	T. Koren
28	Plovanija, 500 m W of the settlement	45,452553-13,626609	4.6.2011	T. Koren
29	Trstenik, surroundings of the village pond	45,448375-14,063035	18.6.2014, 12.7.2014, 14.9.2014	T. Koren
30	Galići	45,448144-13,548589	20.6.2014	T. Koren
31	between Venjerija - Plovanija	45,448045-13,646981	8.6.2011, 28.3.2012, 19.5.2014	T. Koren
32	Buje, Kaštel, N of the village	45,444401-13,661501	12.6.2011	T. Koren
33	Kmeti, S of the village	45,443684-13,578875	19.5.2014	T. Koren
34	Kaštel, Dvorina village	45,443333-13,655833	17.8.2003	P. Gros
35	Kmeti, S of the village, Sv. Lucija	45,44302-13,588106	19.5.2014, 20.6.2014	T. Koren
36	Vodice, road between Klenovšćak - Paproće	45,435833-14,063889	28.6.1985, 11.7.1985, 4.8.1994	D. Withrington
37	Juki, 500m NE of the village	45,435514-13,680422	8.6.2011, 17.4.2012	T. Koren, A. Štih
38	Vilanija, settlement's surroundings	45,433018-13,583948	28.3.2012	T. Koren
39	Momnjan, Kremenje village	45,432222-13,689722	21-22.5.2012	D. Withrington
40	Baredine, settlement's surroundings	45,431381-13,919898	27.6.2012	T. Koren
41	Buje, Grota village	45,429492-13,597045	20.6.2014	T. Koren
42	Umag, Finida village	45,428243-13,541984	28.3.2012	T. Koren
43	Buzet, Račja Vas village	45,426206-14,094954	14.5.2012, 25.5.2014, 18.6.2014, 12.7.2014,	
			14.9.2014, 31.5.2018	T. Koren
44	Marušiči, Brešani, S of the village	45,425539-13,705957	8.6.2011, 16.6.2011	T. Koren
45	Buje, N of the city, toponym Ferfuja	45,424167-13,660278	23.6.1982	D. Withrington
46	Buje, Marušići	45,418-13,73	17.8.1996	F. Grünwald
47	Buje, N of the settlement	45,417458-13,662176	6.6.2012	T. Koren

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48 Buje, Bibali, surroundings of the village	45,416779-13,689713	17.4.2012	T. Koren, A. Štih
49 Šterna, surroundings of the village	45,413422-13,779915	8.6.2011, 17.4.2012	T. Koren, A. Štih
50 Podgače, lokva 300 W of the village	45,412974-14,097214	18.6.2014	T. Koren
51 Gornji Mlun, 500 m NW	45,403653-13,949458	8.6.2013	T. Koren
52 Kršete - Buje	45,403546-13,63329	4.6.2011	T. Koren
53 Buje, Triban village	45,4025-13,699444	22.5.2012	D. Withrington
54 Sv. Ivan - Juričići, 500m W	45,402461-13,973827	8.6.2013	T. Koren
55 Lanišće, 500m S	45,401024-14,126637	14.5.2012, 25.5.2014	T. Koren
56 Buzet, Lanište, surroundings	45,40024-14,122134	25.5.2014	T. Koren
57 Sv. Ivan village, surroundings	45,398872-13,806336	16.6.2011	T. Koren
58 Buje, Ljubići village	45,3975-13,72	22.5.2012	D. Withrington
59 Mužolini Donji, river Mirna, N of the settlement	45,396294-13,683137	4.6.2011, 12.6.2011, 6.4.2012, 13.5.2012, 30.6.2013, 19.5.2014	T. Koren
60 Roč, road towards Hum	45,391187-14,047093	12.4.2009	T. Koren
61 Roč, Rim village	45,389361-14,040667	10.4.2012	M. Črne
	30.3.2014	T. Koren	
62 Krasica N of the village	45,388732-13,693005	12.6.2011	T. Koren
63 Kompanj, 500m E, Buzet	45,38856-14,095349	14.5.2012	T. Koren
64 Rušnjak, moist meadows E of the village	45,38751-13,900783	30.6.2013, 6.7.2013	T. Koren
65 Sovinjak, meadows near Mirna river, N of the settlement	45,387385-13,920476	17.6.2000, 17.6.2001, 16.7.2001, 27.5.2007, 25.6.2007, 17.7.2007, 17.7.2008, 23.7.2008	T. Koren, Lj. Ladavac
66 Sovinjak, hill N of the village	45,382181-13,92041	8.6.2013	T. Koren
67 Pračana, Motovun forest	45,379851-13,901544	14.6.2012	T. Koren
68 Brtonigla, Turini village	45,377006-13,594316	21.5.2012	D. Withrington
69 Benčani, Sv. Helena village	45,373229-13,829193	16.6.2011	T. Koren
70 Ćićarija, Semići, meadows near the road	45,372429-14,099034	28.5.2017	T. Koren
71 Buje, Bijele Zemlje village	45,368565-13,715964	6.4.2012	T. Koren
72 Buzet, Mirna river valley, Kotli village	45,367778-14,016667	28.8.2009	P. Gros
		8.6.2013, 20.5.2014	T. Koren
73 Urihi village	45,365822-14,00154	14.6.2012	T. Koren
74 Lupoglav, Semići, 400m S	45,363918-14,109681	14.5.2012	T. Koren
75 Motovun, Ipši, village surroundings	45,361765-13,851307	30.6.2013	T. Koren
76 Ročko polje, Kras village	45,358722-14,064528	10.4.2012	M. Črne
77 Nova Vas, Medelini village	45,358611-13,636944	21.5.2012	D. Withrington
78 Ponte Porton, S of the village	45,358272-13,74115	6.6.2012, 21.2.2014	T. Koren
79 Bartolići, 500m E of the village, Motovun forest	45,355185-13,856623	20.3.2011, 27.5.2012, 14.6.2012	T. Koren
80 Livade, crossroad near Motovun	45,354679-13,826505	27.5.2012, 8-9.6.2013, 30.6.2013	T. Koren
81 Kostanjica, 1km W of Ponte Porton, Mirna river valley	45,353333-13,760833	15.8.2003	P. Gros
82 Ponte Porton, 500 m E of the village, Motovun forest	45,352797-13,773654	20.3.2011, 27.5.2012, 17.8.2013	T. Koren
83 Ponte Porton, 500 m E, Motovun forest	45,352235-13,774108	7.6.2013, 30.6.2013	T. Koren
84 Buzet, road between Vrh and Barušići, Lukšići village	45,352222-13,926389	15.8.2003	P. Gros
85 Motovun, Butoniga, near Mirna river	45,351832-13,860545	25.5.2011	B. Lauš
86 Cerovlje, Račički Breg village	45,35139-14,002608	20.5.2014	T. Koren
87 Novigrad, Dajla vilage	45,350833-13,54	22.6.1982, 21.5.2012	D. Withrington
		21.6.2013	T. Koren
88 Senj village, stream near the road	45,349231-13,904341	27.3.2011	T. Koren
89 Buzet, Mirna river valley, Hum village surroundings	45,348889-14,049167	28.8.2009	P. Gros
90 Lupoglav, 500m S of village	45,346856-14,116597	17.6.2011, 14.5.2012	T. Koren
91 Trombal, 1.5 km NE of the village, Motovun forest	45,346226-13,801922	27.5.2012, 21.2.2014	T. Koren
92 Motovun, Trombal, Mirna valley E of Trombal	45,344722-13,79	13.8.2003	P. Gros
93 Mirna river valley, Sveti Mihael	45,342778-13,648889	21.5.2012	D. Withrington
94 Motovun, SW Buzet, Butoniga, between Krti and Barušići	45,341111-13,899722	15.8.2003	P. Gros
95 rijeka Mirna, Cendaki, 1km W	45,33884-13,657777	27.5.2012	T. Koren
96 Motovun, Šćulci, 500m W	45,33743-13,923175	14.6.2012	T. Koren
97 Valice-Krti, forest path near the village, Motovun forest	45,336849-13,910153	27.3.2011	T. Koren
98 Cerovlje, Juradi village surroundings	45,336661-13,964078	20.5.2014	T. Koren
99 Motovun, inside the village	45,336007-13,82788	13.8.2003	P. Gros
		11.3.2017	T. Koren
100 Mirna river, 2 km S of Cendaki village	45,331276-13,638372	27.5.2012	T. Koren
101 Motovun, between villages Divjaki - Kanal	45,328333-13,828056	3.7.2007	D. Withrington
102 Motovun, N of village Divjaki	45,326389-13,835278	24.6.1982	D. Withrington
103 Kovačići village	45,31791-14,006968	24.6.2014	T. Koren
104 Antenal, Mirna river mouth	45,317211-13,591633	27.5.2012	T. Koren

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105 Boljun, Staraji village	45,316812-14,116287	13.3.2016	T. Koren
106 Lupoglav, Vranja, Pričejak, Vela Draga	45,316667-14,1775	27.8.2010	P. Gros
107 Poreč, Tar, Tar bay	45,313889-13,614722	21.5.2012	D. Withrington
108 Grimalda, 1km E of the village	45,312013-14,011209	14.6.2012	T. Koren
109 Tar, Stancija Mikatović	45,311556-13,626861	28.7.2012	M. Črne
110 Pazin, road between Bankovci and Kaščerga	45,311389-13,91	15.8.2003	P. Gros
111 Poreč, Tar, near the village	45,302778-13,632778	5.6.1982, 6.6.1982	Lj. Ladavac
		25.6.1982, 13.6.2010, 11.7.2012	D. Withrington
112 Borut, Dausi village	45,300071-14,051631	20.5.2014	T. Koren
113 Rojci, between villages Kaštelir-Labinci	45,299973-13,671483	2.4.2012	T. Koren, A. Štih
114 Bubići, N of Cerovlje	45,29612-14,026762	20.5.2014	T. Koren
115 Pazin, S of Kaščerga, Bravari village	45,293889-13,906667	15.8.2003	P. Gros
116 Greši, N of Cerovlje	45,292694-14,013152	20.5.2014	T. Koren
117 Cerovlje, Paz, village surroundings	45,291337-14,096144	17.6.2011	D. Withrington
118 Cesari, Grdoselski potok	45,291026-13,958173	19.7.2010, 2.8.2010	T. Koren
119 Pazin, Škropeti village	45,283728-13,838021	13.5.2012	T. Koren
120 Grdoselo, Čerišnjevica village	45,283251-13,922279	19.3.2011	T. Koren
121 Cerovlje, Sv. Marija village	45,282582-14,016123	20.5.2014, 24.6.2014	T. Koren
122 Pazin, Butoniga, Ladavci village	45,281389-13,914167	15.8.2003	P. Gros
123 Cerovlje, ponds	45,267721-14,00777	24.8.2013, 24.6.2014	T. Koren
124 Pazin city, Beram, Kirci village surroundings	45,263056-13,898889	15.8.2003	P. Gros
125 Korneda pond, W of Anžići village	45,255762-13,762086	11.7.2014	T. Koren
126 Podberam, Limska Draga	45,250725-13,886156	24.8.2013, 24.5.2014, 11.7.2014	T. Koren, A. Štih
127 Poreč, Červar village	45,249167-13,593056	12.7.2012	D. Withrington
128 Šušnjevica, Nova vas village	45,248333-14,158333	17.6.2011	D. Withrington
129 Pazin, Vela Traba, Polje	45,247224-13,866205	1.5.2009, 27.6.2009	T. Koren
130 Rijavac, Pazinski potok	45,246824-13,920193	2.8.2010	T. Koren
131 Limska Draga, Lokvine	45,243667-13,88146	1.4.2007, 11.4.2009, 13.4.2009, 17.4.2009,	
		15.6.2009, 20.6.2009, 22.6.2009	T. Koren, Lj. Ladavac
132 Vela Traba, road to Limska Draga	45,243292-13,868292	28.3.2010	T. Koren
133 Beram, Belci	45,243049-13,889153	31.5.2009	T. Koren
134 Podberam, meadows S of Gortanov Brijeg	45,242875-13,906663	1.7.2000, 29.8.2007, 30.8.2007	T. Koren, Lj. Ladavac
135 Pazin, Plodine	45,241093-13,913274	21.4.2012	T. Koren
136 Višnjan, road between Pršurići and Bačva	45,240556-13,7125	13.8.2003	P. Gros
137 Pazin city, near Kaštel castle	45,240278-13,936667	1.9.2009	P. Gros
138 Pazin, Šurani, Šuranska lokva	45,238898-13,84002	23.3.2009	T. Koren, Lj. Ladavac
139 Kršnjan, Sušnjevica, Čepičko polje S of Nova Vas	45,238333-14,168611	27.8.2010	P. Gros
140 Pazin, Vela Traba, Limska draga S of the village	45,238001-13,861367	1.6.2000, 27.8.2007, 30.5.2009, 20.6.2009,	
		2.4.2011, 12.7.2013	T. Koren
141 Pazin, 43. Istarske Divizije	45,237429-13,935789	30.6.2010	T. Koren
142 Pazin, Stari Pazin	45,235386-13,923208	30.6.2010	T. Koren
143 Pazin, Drazej	45,234626-13,944495	9.7.2008, 18.7.2008	T. Koren, Lj. Ladavac
144 Poreč, Stancija Portun	45,23-13,628333	10.7.2012	D. Withrington
145 Poreč, Paškiera bay, near the coast	45,229167-13,599722	10-12.8.2003, 16.8.2003,	P. Gros
146 Velanov Brijeg, meadows around the pond	45,22842-13,946388	11.4.2009, 13.4.2009, 24.8.2013	T. Koren
147 Gračišće village	45,219444-14,012222	23.8.2009	P. Gros
		12.6.2010	D. Withrington
148 Tinjan, village surroundings	45,218808-13,83625	3.7.2008	T. Koren, Lj. Ladavac
149 Katun Gračaški, meadows arround the pond	45,217669-13,981422	9.4.2012, 24.8.2013	T. Koren
150 Žbandaj, Buići village	45,213306-13,662443	13.4.2013	T. Koren
151 Lindar, Mačinići pond	45,212782-13,961356	13.4.2009, 24.8.2013	T. Koren
152 Poreč, Plava laguna	45,2125-13,6	13.6.2010, 10-11.7.2012	D. Withrington
153 Čepić, Purgarija Čepić	45,212222-14,145278	18.6.1984	D. Withrington
154 Čepić polje, Pugarija čepić, E of the settlement	45,21132-14,157502	12.8.2009	T. Koren
155 Lindar, Šujevići village	45,210844-13,951155	3.4.2011	T. Koren
156 Baderna, village surroundings	45,210189-13,745869	18.4.2011, 19.6.2011	T. Koren
157 Zagrad, stream near the road	45,205415-14,18292	28.5.2017	T. Koren
158 Kršnjan, Faldovija village, Čepičko polje	45,201111-14,185278	27.8.2010	P. Gros
159 Zagrad, slopes near the railvay	45,200425-14,186858	28.5.2017	T. Koren
160 Čepić polje, Kloštar	45,193069-14,134532	12.8.2009	T. Koren
161 Potpićan, village surroundings	45,192897-14,095147	1.1.1985	Lj. Ladavac
162 Podpićan, Zajci village	45,192754-14,082561	29.5.2012	T. Koren
163 Vrsar, Stancija Bečič	45,192323-13,638495	22.6.2014	T. Koren

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164 Starići village	45,19131-13,654453	2.4.2012	T. Koren, A. Štih
165 Sveti Petar u Šumi	45,183386-13,861424	24.5.1982	T. Koren, Lj. Ladavac
166 Žminj, Žbrlini	45,176581-13,91197	19.6.2014	T. Koren
167 Žminj, Kantun Lindarski village	45,173611-13,928611	22-29.8.2009, 3.9.2009	P. Gros
168 Jasenovica, S of the village	45,173482-13,663431	21.5.2014	T. Koren
169 NW of Flengi village, toponym Brišak	45,172748-13,649344	2.4.2012	T. Koren, A. Štih
170 Vrsat, Delići, W of the settlement	45,172557-13,680721	2.4.2012	T. Koren, A. Štih
171 Kuhari-Pamići, meadows between the villages	45,161676-13,884037	7.5.2012	T. Koren
172 Vrsar, Stancija Valkanela, between Vrsar and Funtana	45,159722-13,609444	22-25.8.1997	P. Gros
173 Vrsar, Stranići kod Lovreča, W of the village	45,159722-13,730556	24.8.1997, 25.8.1997	P. Gros
174 Flengi village, toponym Marinjana	45,159444-13,66	12.7.2012	D. Withrington
175 Vozilići, makadam N of the village	45,156985-14,158459	9.5.2012	T. Koren
176 S of Flengi village, toponym Marinjana	45,1565-13,653903	21.5.2014	T. Koren
177 Žminj village surroundings	45,153388-13,911168	19.6.2014	T. Koren
178 Labin, Fićki-Grašići villages	45,152778-14,086944	11.5.2011	P. Russell
179 Vozilići-Plomin, meadows near the road	45,150309-14,172454	22.8.2009, 10.4.2011, 9.5.2012, 29.5.2012,	
		11.7.2013	T. Koren
		15.5.1975	Lj. Ladavac
		26.5.2011	B. Lauš
180 Vrsar, near the coast	45,149167-13,605278	11.8.1978	G. Stangelmaier
		1.7.1986	M. Trasischker
		3.9.2009	P. Gros
181 Dolina Raše, Ružići, NW of the village	45,146639-14,033986	14.5.2011	T. Koren
182 Valjon, Limska Draga	45,145683-13,841635	19.6.2014	T. Koren
183 Brestova, ferry port	45,1445-14,223658	9.5.2012, 19.6.2012, 20.6.2013, 30.6.2012, 27.2.2013,	
		17.4.2013, 10.7.2012, 2.8.2013, 17.8.2012	T. Koren
		9.6.2010	D. Withrington
184 Nedešćina, W of the village	45,143056-14,104167	14.5.2011, 16.5.2011, 18.5.2011	P. Russell
185 Vrsar, Crljenka	45,139163-13,629055	21.5.2014	T. Koren
186 Labin, Štrmac, NE of the settlement	45,134405-14,143976	29.5.2012	T. Koren
187 Limski kanal, Jural, SW of the village	45,132065-13,747362	13.4.2013, 25.3.2012, 24.5.2014, 11.7.2014	T. Koren
188 Raški kanal	45,129341-14,029587	1.5.2009	T. Koren
189 Šankarer, W of Valalta	45,128124-13,65472	21.5.2014, 22.6.2014	T. Koren
190 Labin, Ravnići village	45,128056-14,1225	14.5.2011	P. Russell
		29.5.2012	T. Koren
191 Labin, Vrećari village	45,12684-14,107936	29.5.2012	T. Koren
192 Labin, Markoci village	45,122113-14,074822	10.4.2011	T. Koren
193 Rovinj, S of Valalta	45,12-13,639167	16.6.2011	D. Withrington
194 Lucijani, pond near the village	45,114877-13,887986	19.6.2014	T. Koren
195 Kanfanar, Okreti village	45,113333-13,803333	16.6.2011	D. Withrington
196 M. Kardijol, surroundings of the Kardrijol pond	45,10576-13,894799	8.7.2014	T. Koren
197 Rovinj, Rorik coast	45,101944-13,625	16.6.2011	D. Withrington
198 Veli Turini, river Raša valley	45,096498-14,025735	17.4.2013, 10.4.2011, 30.4.2011, 14.5.2011	T. Koren
199 Rovinj, sjeverna luka, near the coast	45,085928-13,638627	17.5.1966	F. Daniel
		6.6.1994, 23-24.5.1995, 3.6.1996	E. Haas
		28.6.2012, 29.6.2012	T. Koren
200 Labin city, old square	45,085556-14,122361	30.8.2009	P. Gros
201 Rovinj, Kokuletovica, temporary lakes	45,077119-13,696577	26.5.2016	T. Koren, A. Štih
202 near Pajkovići village	45,072562-13,905024	14.6.2012, 14.5.2014, 16.7.2014	T. Koren
203 Bale, NW of the settlement	45,058083-13,740721	2.4.2012	T. Koren, A. Štih
204 Rovinj, Sarizol	45,056247-13,709985	28.6.2012	T. Koren
205 Buršići, near the village	45,050247-13,713322	21.5.2014	T. Koren
206 Puntera, W of the village	45,050236-14,012792	21.6.2014	T. Koren
207 Rovinj, Stancija Gati	45,050074-13,725835	26.5.2016	T. Koren, A. Štih
208 Bale village	45,040052-13,785672	24.4.1993	unknown
209 Rovinj, Bale, Palud	45,032622-13,699114	26.5.2016	T. Koren, A. Štih
210 Bornići, W of the village	45,03107-14,00017	16.6.2012	T. Koren
211 dolina Raše, Trget	45,02007-14,062458	10.4.2011	T. Koren
212 Barbariga, settlement surroundings	45,01552-13,719858	6.6.2010	T. Koren
213 Barban, Rebići, bays Lovrešćica-Blaž	45,006944-14,041389	20.8.2010	P. Gros
214 Marčana, Rakalj, Bolkovići village	44,985833-14,051389	27.8.2010	P. Gros
215 Marčana, Rakalj, Golubičina, W of the village	44,984444-14,032222	28.8.2010	P. Gros
216 Marčana, Rakalj village	44,983611-14,041389	17.8.2010, 19.8.2010	P. Gros

Locality number and name	WGS N - E	Dates	Observers
217 Skitača	44,983016-14,141943	19.7.2008	T. Koren
218 Marčana, Rakalj, near Sveti Nikola church	44,978611-14,070833	19.8.2010	P. Gros
219 Pula, Krnica	44,977813-14,012583	2.4.2012	D. Trkov
		16.6.2012	T. Koren
220 Marčana, Rakalj, Kakavojna, Zavlica village	44,966389-14,055833	19.8.2009	T. Koren
		17.8.2010, 23.8.2010	P. Gros
221 lokva Lamuč, Mutvoran	44,964292-13,990959	21.6.2014	T. Koren
222 Marčana, village surroundings	44,954352-13,953955	23.5.1998	C. Wieser
223 Cokuni, Mandalena pond	44,951371-13,980191	21.6.2014, 27.5.2017	T. Koren
224 Peroj, S of the village towards Fažana	44,950829-13,797084	17.5.1997	C. Wieser
225 Marčana, Krnica, Peruški village	44,945278-14,014722	29.8.2010	P. Gros
226 Krnica, Peruški village, Pt Sočaja	44,941389-14,045	31.8.2009, 4.9.2009, 29.8.2010	P. Gros
227 Pula, Fažana, N of the village	44,936389-13,799444	17.7.2010	T. Koren
		12.7.2012	D. Withrington
228 Pula, Galižana village	44,933524-13,868317	1.6.2012	T. Koren
229 Pula, Fažana port	44,928042-13,802481	28.9.2016	T. Koren, A. Štih
230 Pavčini village, Uvala Duga	44,927012-14,026008	21.5.1998	C. Wieser
231 Ližnjan, Valtura, Nesactium	44,916667-13,969444	18.8.2010, 23.8.2010	P. Gros
232 Pula, Muntić, 1,5km N	44,909383-13,938455	16.6.2012	T. Koren
233 Kavran, valley W of the village	44,90741-13,98484	27.5.2017	T. Koren
234 Ližnjan, Valtura, Uvala Bodava, Salaruga	44,897778-13,981944	23.8.2010	P. Gros
235 road towards the bay Mala Burtera, SE of Valtura	44,895467-13,978304	15.7.2014	T. Koren
236 Pula, Ušićovi Dvori	44,892851-13,964928	16.6.2012	T. Koren
237 Pula, Jadreški, W of Pule	44,878943-13,905596	24.5.2007	T. Koren
238 Pula, Povijesni muzej Istre	44,870278-13,846389	26.8.2009	P. Gros
		12.7.2012	D. Withrington
239 Pula, Jadreški, Šišan village	44,867444-13,922963	23.6.2014	T. Koren
240 Pula, Šišan, 800m NE	44,866619-13,956072	16.6.2012	T. Koren
241 Pula, Gregovica, Šišanska cesta	44,864722-13,868889	18.8.2010	P. Gros
242 Pula, Šikići, 1,5km NW	44,85975-13,886162	16.6.2012	T. Koren
243 Pula, Šišan	44,854888-13,933207	16.6.2012	T. Koren
244 Pula, Šišan, road NE of pond Sveti Lovrenc	44,852522-13,960067	14-15.7.2014	T. Koren
245 Pula city, Verudela	44,835278-13,832778	18.8.2010	P. Gros
246 Medulin, Medulinska pond	44,817869-13,940077	24.5.2016, 24.9.2016	T. Koren, A. Štih
247 Gornji Kamenjak, Monte Kope	44,813203-13,864531	16.5.2017	T. Koren
248 Gornji Kamenjak, karstic grasslands	44,812052-13,893671	15.5.2017, 27.5.2017, 14.6.2017	T. Koren
249 Pula, 800m E	44,801269-13,91306	14.7.2009	T. Koren
250 Premantura, Donji Kamenjak, grasslands	44,793942-13,912243	31.7.2015, 9.10.2015, 23-24.5.2016, 27.5.2016,	
		24.9.2016, 15.5.2017, 27.5.2017	T. Koren
251 Premantura, Donji Kamenjak, dinosaur road	44,79244-13,908517	16.5.2017	T. Koren
252 Premantura, Donji Kamenjak, point Kamenjak	44,772056-13,911695	27.5.2016	T. Koren, A. Štih
		27.5.2017	T. Koren

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