

# Annual report 2023

Italian Butterfly Monitoring Scheme





# Annual Report Italian Butterfly Monitoring Scheme

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## Online resources

Further information on the Italian Butterfly Monitoring Scheme, support material and how to participate in the butterfly monitoring scheme can be found at:

<https://butterfly-monitoring.net/it/italy-bms>

Link for Italian Lepidopterological Association (ALI) <https://www.lepidoptera.life>

For online data entry: <https://butterfly-monitoring.net/mydata>

For any doubts or questions write to: [help.itbms@gmail.com](mailto:help.itbms@gmail.com)





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## Summary

The Italian Butterfly Monitoring Scheme (ITBMS) was launched in 2019, although for some transects the first monitoring data date back to 2016.

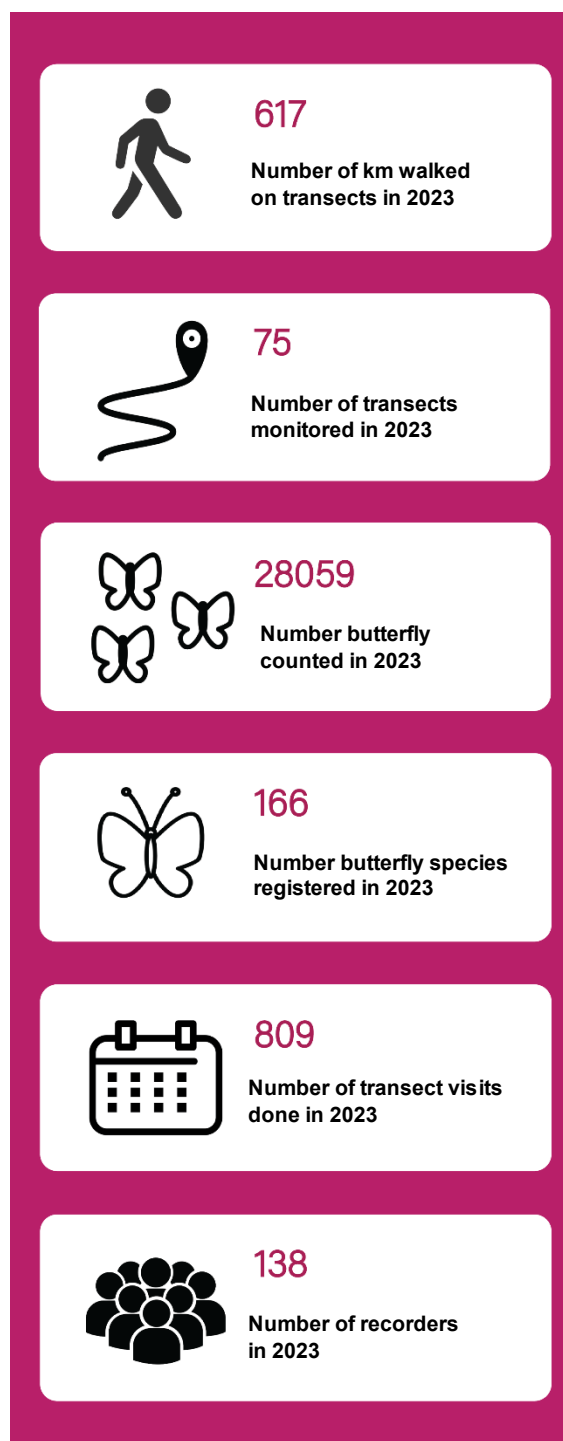
This paper is the second report of the Italian BMS project, summarizing the data from the monitoring conducted in 2023. At the end of 2023 there are 75 active (monitored) transects within the national territory, monitored by 138 volunteers, with a total of 617 km travelled on transects during 809 visits. Since 2019, ITBMS has been following a standardized methodology for monitoring butterflies, and in 2023 it achieved an average of more than 10 visits in all monitored transects.

The biodiversity of butterflies on the Italian peninsula is very high. In 2023, 166 butterfly species were detected on Italian transects, totalling 28,059 individuals. The ITBMS community continues to grow more and more as also evidenced by the expansion of the monitoring network in almost all regions of Italy and also outside the national territory, including the territory of the State of San Marino active with a transect from 2022.

Italian volunteers are making an excellent effort to better understand their natural heritage and the pressures affecting butterflies. Through their contribution to data collection, the European BMS and the Italian BMS can support the conservation of butterflies and other pollinators, as well as their habitats.

## 1. Butterfly Monitoring

Recent years have seen a global decline in the diversity and abundance of terrestrial insects (Van Swaay et al., 2020). Because insects comprise more than half of all described species and play important roles in ecosystem functioning, assessment of their conservation status is urgent in order



to plan and monitor specific conservation objectives over time (Van Swaay et al., 2020, Warren et al., 2020). For this purpose, butterflies seem to be perfect biological indicators, as they are widely (Thomas, 2005). There are 482 species of butterflies in Europe. Butterflies represent

one of the best monitored insect groups in Europe thanks to monitoring programs that have been active in some countries for decades. The first Butterfly Monitoring Scheme (BMS) was established in the United Kingdom in 1976 (UKBMS). Since then, the same goal has been pursued by many other European countries, encouraged in particular by Butterfly Conservation Europe (BCE) and its partners, enabling the collection of essential butterfly data. Standardized data are stored in a central database, the European Butterfly Monitoring Scheme (eBMS)-created by BCE and the UK Centre for Ecology and Hydrology (UKCEH)-and used to assess population dynamics of monitored species and develop useful indicators for conservation policy planning and evaluation. This helps not only to reduce biodiversity loss but also to raise awareness of the importance of butterflies and biodiversity in general. All general information on butterfly monitoring is available on the eBMS website ([www.butterfly-monitoring.net](http://www.butterfly-monitoring.net)). The eBMS is a powerful network created by more than 20 partners, collecting standardized data from 35 BMSs in 30 European countries. So far, the database has collected nearly 15 million counts over 44 years (1976-2020) from more than

10,392 transects. A pilot project, Assessing Butterflies in Europe (ABLE), started in 2018 with the goal of extending the eBMS network and establishing new BMSs across Europe.

Italy was one of the first countries to start its own national BMS (ITBMS) with the help of ABLE. In fact, thanks to the extensive coordination structure, support of materials, workshops and training seminars promoted in many areas of the country, Italy developed a strong network of volunteers, thus enabling the design of a national scheme for systematic butterfly counting. Field monitoring and training of volunteers have been essential to ensure the proper conduct of counts, especially when supported by field guides and an efficient online data recording system. The purpose of this report is to present the 2023 data collected by the Butterfly Monitoring Scheme, including information on monitoring activity and results related to the richness and abundance of major butterfly species. The results also show that monitoring activity has been steadily increasing over the years.



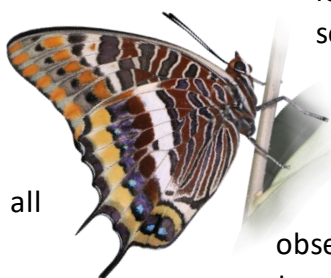
## Butterfly counting transects

The transect method for counting butterflies is the main sampling tool used by Butterfly Monitoring Schemes (BMSs). It is a standardized method, developed by Ernie Pollard in the United Kingdom in 1974 (Pollard and Yates, 1993), which involves counting butterflies along fixed routes (transects), with frequent (ideally weekly) visits in good weather. Transects are typically 1 km long and are divided into

sections represented by areas of different habitat or simply separate components of the same site. During a walk along the established route, only individuals sighted within an imaginary cube 5 m wide, 5 m high and 5 m in front of the observer are counted. The period during which monitoring is carried out varies out varies among different European regions based on regional variability in butterfly activity

period (i.e., the length of the local flight season). If counting on a weekly basis is not possible, it is recommended to visit transects every ten to fifteen days. If it is not possible to monitor during the entire flight period, it should in any case cover at

least the summer season when butterfly abundance is highest. Once all butterfly observations of a



transect have been recorded, for example, using a field sheet or notebook, the data can be entered directly on the eBMS website or sent to the BMS coordinator. The manual with information on the method of monitoring by transects can be downloaded in Italian from [www.butterfly-monitoring.net/bms-materials](http://www.butterfly-monitoring.net/bms-materials).

For an extensive description, refer to Sevilleja et al., 2019.

### ButterflyCount app & 15-minute counts

The new multilingual ButterflyCount application, for Apple (iPhone, iPad) and Android devices, is now available for download from major digital app stores. Launched by Butterfly Conservation Europe and the UK Centre for Ecology & Hydrology as part of the ABLE project, it offers many features to the user:

- a new method for monitoring species: the 15-minute count. This option has a stopwatch and a GPS tracking system that automatically records the route taken. Observations can be easily added by typing in the name of each species and selecting the +1 option each time a new individual is spotted. In addition, the app records the

coordinates for each individual, allowing the data to be downloaded;

- the ability to apply the 15-minute count on an individual species to support monitoring of protected or threatened species;
- access to your own eBMS transects by simply logging into the app with your eBMS account;
- a comprehensive list of the different butterfly species found throughout Europe (about 500 in total) and guides for each country also available offline.

The app is still under development with plans to include new and improved features. The recorded data are extremely useful to scientists and other professionals as a tool for implementing ecological analysis and conservation actions. In addition, eBMS also contributes to the assessment of the conservation status of other insect groups. Also available in the updated version of the ButterflyCount app is the ability to select among moths, bumblebees, and dragonflies. The group to be monitored can be easily selected in the app settings. It is also allowed the simultaneous monitoring of multiple groups within the same 15-minute count. However, it is recommended to select a maximum of 2 groups for practical reasons, especially when monitoring in areas of high biodiversity.



## 2. Italian Butterfly Monitoring Scheme

The Italian Butterfly Monitoring Scheme (ITBMS) is part of the European Butterfly Monitoring Scheme (eBMS), contributing data and knowledge to the assessment of the status of European butterflies. The ITBMS has been active since 2019 through the coordination of expert, butterfly scholars and the recent European project ABLE (Assessing Butterflies in Europe) and still continues its pollinator monitoring work under the coordination of the SPRING (Strengthening Pollinator Recovery through INDicators and monitorinG) project.

The diversity of habitats found in Italy is also reflected in its diversity of butterfly species. After Turkey, in fact, Italy is the European country with the largest number of butterfly species (290 species; Balletto et al., 2014), of which 17 (6.0 percent) are Italian endemics and 20 (7.1 percent) have very narrow ranges (sub-endemics). Italy, because of its wide north-south range (47°29' N to 35°29' N) and altitudinal gradient (0 to 4810 m a.s.l. at Mont Blanc), is characterized by great variability in climate and environmental types. In addition, the location in the centre of the Mediterranean basin favours the presence of

species native to different zoogeographic sub-regions. Nationally, the diversity of butterflies is greatest in the northern regions, as the alpine areas are characterized by an important variety of habitats. For these reasons, the richness in butterflies is not homogeneous over the Italian territory and changes in different transects. The number of species detected within a given transect is also related to the sampling effort and, finally, to the ability of the volunteer to recognize each species.

The Mediterranean climate exerts a dominant influence over much of Italy, which implies a long butterfly monitoring season that can last from February to October in some areas. To cover the entire latitudinal range, coordination of the scheme has been established in northern, central and southern Italy. Several workshops were organized as part of the project to train volunteers on butterfly species identification and transect establishment. The workshops often took place within National and Regional Parks, or protected areas, to strengthen the relationship with these institutions and involve the technical staff of the parks in





monitoring. Two workshops were organized on the territory of two national islands (Elba and Sicily). As supporting materials, volunteers were provided with some ad hoc produced regional butterfly field identification guides and a technician was scheduled to help design transects and identify butterflies. In addition, a species identification evaluation system was planned. Through an iNaturalist project, the ITBMS in fact planned for the intervention of expert taxonomists belonging to the Italian Lepidopterological Association (ALI) to

validate the determinations made by volunteers. Collaboration among different stakeholders, including authorities, associations, and NGOs, proved vital to the development of the ITBMS. Broad participation in the activity by the public and Italian biodiversity are the two pillars of the ITBMS and the reason for the excellent results achieved in a short time. The keys to success are excellent regional coordination and an ever-expanding network thanks to the arrival of new volunteers.

### 3. Monitoring activity

#### Transects

In Italy, butterfly communities have been monitored and included in the eBMS since 2016, starting with a few transects located in the north of the peninsula. However, only since 2019 have counts been made following a standardized method. Therefore, 2019 is considered the year that marks the official start of ITBMS activities.

In total, 75 transects were monitored regularly in 2023, resuming the positive trend seen from 2019 and increasing the sites monitored from the previous year (61 transects in 2022), thus constituting three times the number of transects monitored in the first year of the project (25 transects in 2019). In the future, a further increase in the number of transects monitored can be expected due to an increase in the number of volunteers involved. In fact, the number of registered operators has almost doubled since 2021, from 63 to 138.

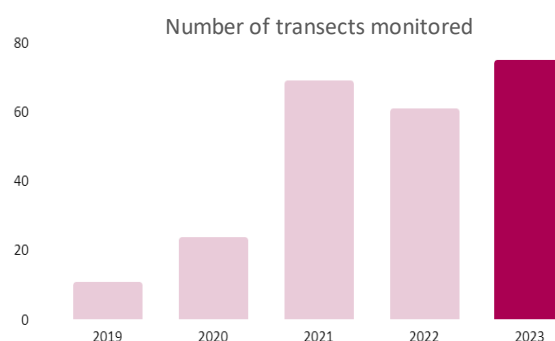


Figure 1. Number of transects monitored from 2019 to 2023

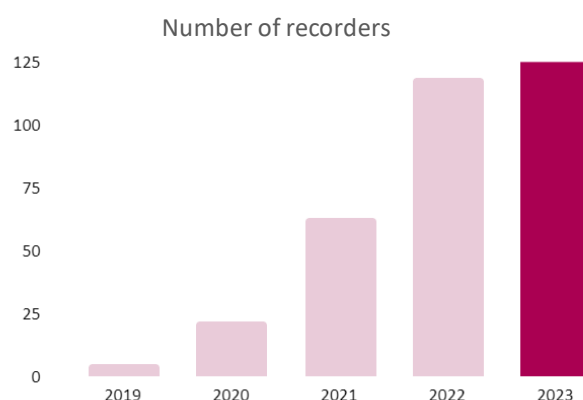


Figure 2. Number of recorders from 2019 to 2023

Figure 3 shows that almost every region in the country has at least one transect within it, with a greater concentration in areas in the northwest.

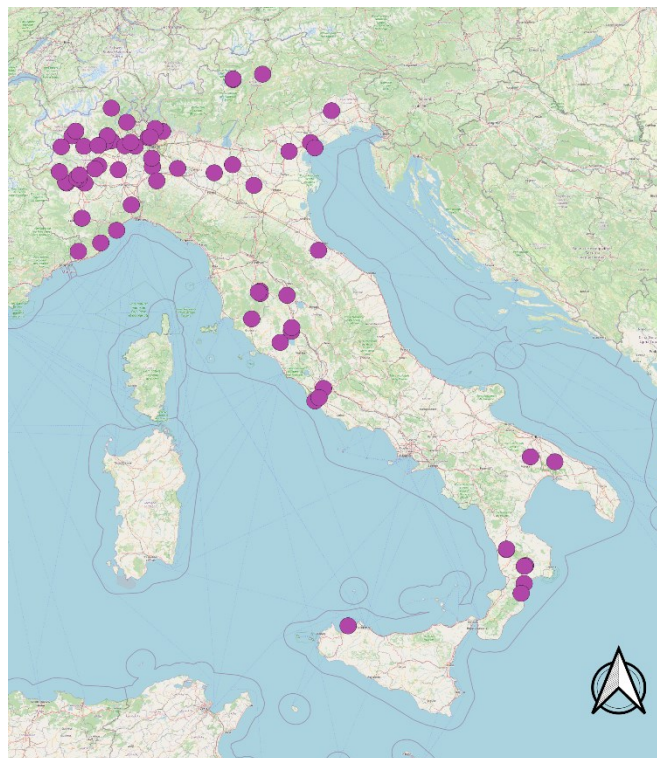


Figure 3. Distribution of ITBMS transects in 2023

Compared to 2022, the year 2023 saw the increased sampling effort by volunteers, which was remarkable in that it covered virtually the entire year, with 48 weeks between the first and last visit, recording the first sampling on January 10.

Since the start of ITBMS, a large number of new transects have been defined and monitored. The complete list of registered operators, with the names of the sites visited, is presented in Annex II. As previously mentioned, the Italian territory has a considerable diversity of habitats in terms of geological and climatic features. The diversity of habitats represented in the monitored transects is shown in Figure 4. The two most represented habitat types are ecotone habitat

(22.2 percent), followed by agricultural areas and grassland (21.6 percent), as they may appear to be the most suitable for conducting a monitoring activity following a transect. Wetlands, which are home to several rare species (e.g. *Lycaena dispar*), are only 2.4 percent of the total. The more we can achieve an equitable distribution of transects among the various regions of Italy, the clearer the view of habitat representation in the ITBMS will be.

Regarding the management of areas within which the monitored Italian transects are developed (Fig. 5), protected areas (19.8 percent) are most represented, while public areas and agricultural lands are slightly lower, accounting for 15.6 percent and 15 percent, respectively, of the total areas sampled.

### Primary habitats of ITBMS transects

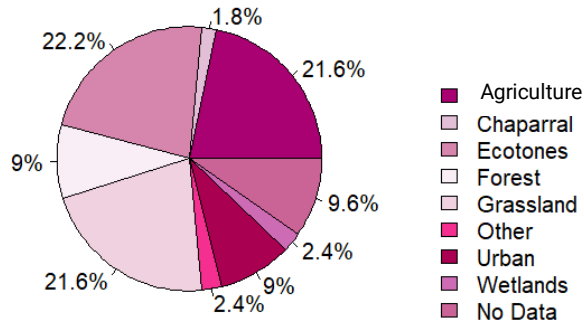


Figure 4a: Primary habitat of ITBMS transects in 2023

### Land tenure of ITBMS transects

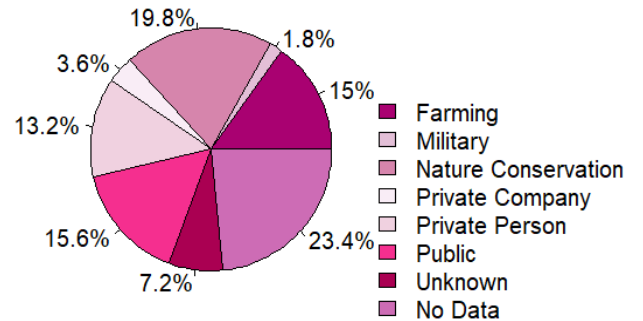


Figure 4b: Land tenure of ITBMS transects in 2023

### Number of visits

The number of visits for each transect and the relative average over the total number of transects monitored each year provide useful information to evaluate the sampling effort of the ITBMS.

Calculating the average of all transects, the average number of visits for each transect is about 10.86 (SD = 8.01, with very high variability among different transects) (Figure 5), thus meeting the requirement of the BMS protocol of at least 10 visits during the butterfly flight season. Two transects, Meisutera and Grotta Sant'Antonio, were monitored most frequently, counting 35 and 32 visits, respectively.

The butterfly monitoring season in 2023 lasted for almost the entire year, with a peak between February and October and occasional visits outside this window as well. The frequency of visits varied throughout the season (Fig. 6), peaking between May and July (between weeks 20 and 30) when more specific butterfly richness could be recorded.

### Average number of visits in each year

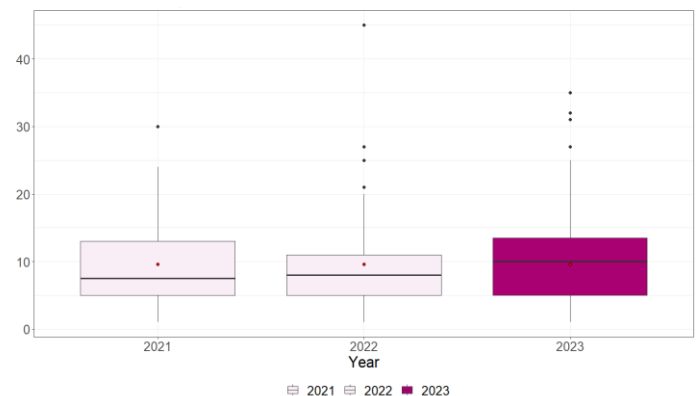


Figure 5: Average number of visits per transect in each year from 2021 to 2023

### Number of visits for each monitoring week

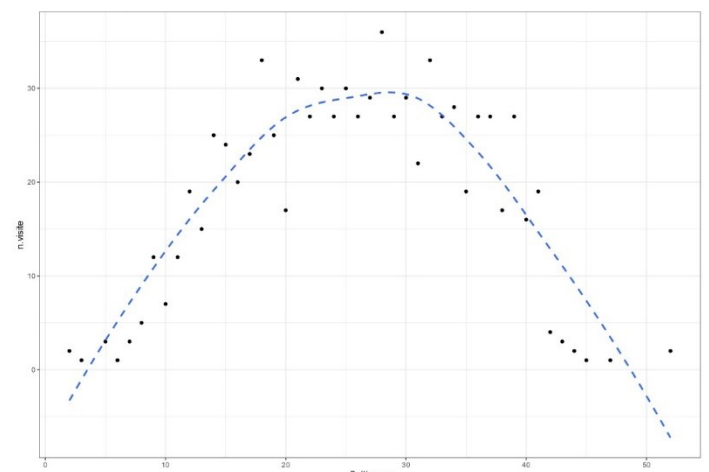


Figure 6: Number of visits in each butterfly monitoring week in 2023

## Butterflies in numbers

As the number of transects and operators has gradually increased over the years, both greater species richness and greater abundance of individuals were detected in 2023 than in previous years (Fig. 7 and Fig. 8). A total of 166 species of butterflies were detected, with more than 28,000 individuals counted in total. During 2022, 140 species and 15,136 individuals were observed. However, 2022 was a very hot and dry year, so the numbers collected are most likely lower than the actual condition of Italian populations.

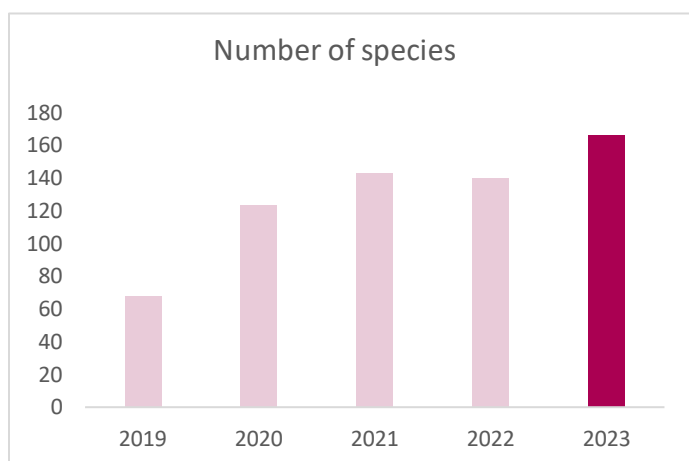


Figure 7. Number of species detected in each year from 2019 al 2023

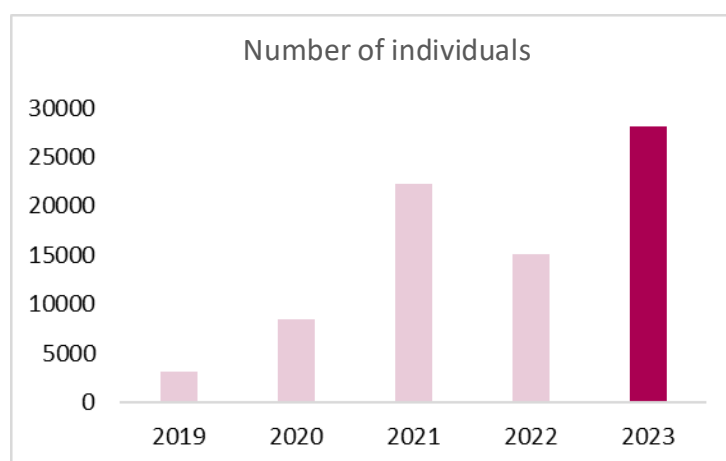


Figure 8. Number of individuals counted in each year from 2019 al 2023





## Species richness

The last graphs summarize the total number of species and abundance of individuals detected during 2019-2023. Italian transects that are distributed in various habitats show great variability in the number of species and abundance of individuals.

An average of about 20 species per transect was recorded in 2023. This result can be considered reliable considering that species-poor transects, such as those located in urban or agricultural areas, were also monitored.

As for the number of species detected in 2023, this figure varies from transect to transect. The map (Fig. 9) shows that some transects are characterized by a high number of species, while others are represented by low specific richness. Areas with higher numbers of species are found mainly in the Alps, with some spots also in other central and southern Italian regions. This confirms a great biodiversity of butterflies throughout Italy. Sampling was carried out both in more species-rich areas and also in other areas with poorer coenoses, but equally important to monitor

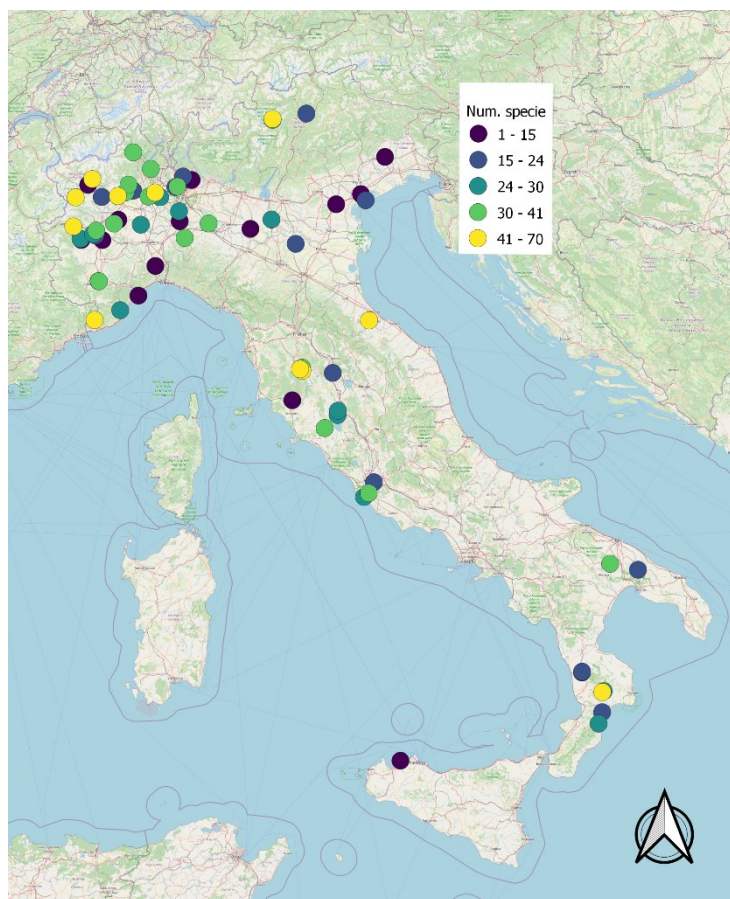


Figure 9: Distribution and species richness of each transect in 2023

The number of detectable species in each transect varies greatly during the butterfly monitoring season.

The greatest number of species was recorded in the weeks between June and July (between the 25th and 35th weeks), whereas fewer and fewer species fly at the end of summer. It is important to remember that the trend described by the curve in Figure 12 is the result of variability in the flight period of different butterfly species. In fact, while some species are characterized by having several generations per year, others have a single spring or summer generation. For this reason, it is necessary to visit transects frequently to cover the flight period of all species.

Figure 10 shows the number of individuals observed for each week of monitoring. The trend is similar to that observed in Figure 11, which considers the number of species observed, with a peak concentrated more toward the summer months. The curve describes how the number of individuals observed increases steadily until it peaks in the early months of the monitoring season, but declines rapidly immediately after the peak at the end of the season.

Appendix I provides the complete list of species observed during the last sampling year. In addition, Table 1 presents the list of the 10 most commonly observed butterfly species recorded during the last six sampling years, from 2019 to 2023. It can be seen that the most common species do not vary much over the years. Among the most commonly observed species are *Polyommatus icarus*, *Coenonympha pamphilus*, *Pieris rapae*, and *Maniola jurtina*.

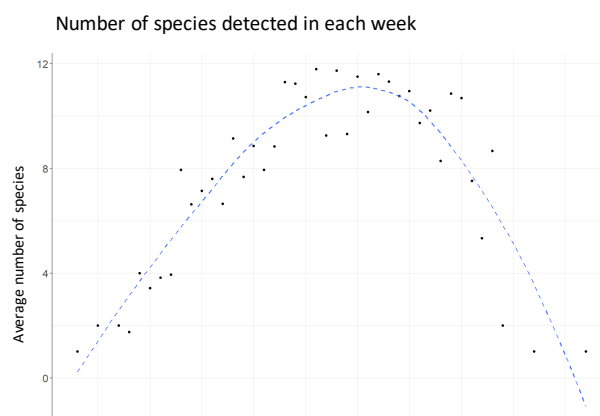


Figure 10: Number of species detected in each butterfly monitoring week in 2023

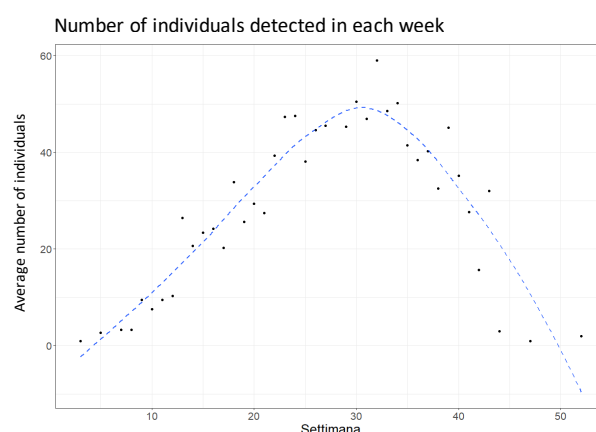


Figure 61: Number of individuals counted in each butterfly monitoring week in 2023

Table 1. Ten most common species from 2019 to 2023

2023	2022	2021	2020	2019
<i>Pieris rapae</i>	<i>Polyommatus icarus</i>	<i>Polyommatus icarus</i>	<i>Polyommatus icarus</i>	<i>Polyommatus icarus</i>
<i>Polyommatus icarus</i>	<i>Maniola jurtina</i>	<i>Pieris rapae</i>	<i>Coenonympha pamphilus</i>	<i>Pieris rapae</i>
<i>Coenonympha pamphilus</i>	<i>Coenonympha pamphilus</i>	<i>Maniola jurtina</i>	<i>Pieris rapae</i>	<i>Coenonympha pamphilus</i>
<i>Maniola jurtina</i>	<i>Pieris rapae</i>	<i>Coenonympha pamphilus</i>	<i>Melanargia galathea</i>	<i>Colias crocea</i>
<i>Colias crocea</i>	<i>Melanargia galathea</i>	<i>Pieris napi</i>	<i>Maniola jurtina</i>	<i>Cupido argiades</i>
<i>Lasiommata megera</i>	<i>Lasiommata megera</i>	<i>Colias crocea</i>	<i>Lasiommata megera</i>	<i>Pieris napi</i>
<i>Melanargia galathea</i>	<i>Melitaea didyma</i>	<i>Pieris</i>	<i>Colias crocea</i>	<i>Melitaea didyma</i>
<i>Melitaea didyma</i>	<i>Aricia agestis</i>	<i>Lasiommata megera</i>	<i>Pieris napi</i>	<i>Thymelicus lineola</i>
<i>Lycaena phleas</i>	<i>Colias crocea</i>	<i>Melanargia galathea</i>	<i>Cupido argiades</i>	<i>Maniola jurtina</i>
<i>Aricia agestis</i>	<i>Pieris napi</i>	<i>Aricia agestis</i>	<i>Papilio machaon</i>	<i>Vanessa cardui</i>

### ***Pieris rapae*: the most counted species of 2023**

During 2023, the most sampled species during Italian Butterfly Monitoring Scheme monitoring was *Pieris rapae*, reaching 11,309 individuals of this species sighted during sampling.

A member of the family *Pieridae*, genus *Pieris*, *Pieris rapae* is certainly one of the most common species throughout Italy (present in all regions, including islands) and Europe.

Together with other similar species belonging to its own family and genus (e.g., *Pieris napi*, *Pieris manni* and *Pieris brassicae*), it is part of the group of "cabbage caterpillars." This name comes from the fact that caterpillars of *Pieris rapae*, as well as other of its congeners, feed on plants belonging to the *Brassicaceae* family (also *Cruciferae*), to which many species commonly grown in vegetable gardens also belong. In fact, caterpillars of these species, in addition to feeding on wild *Brassicaceae* can also be seen on plants of this family that are cultivated, such as cabbage, cauliflower, broccoli, etc... This species lays eggs, which are whitish in colour and elongated in shape that can be found on both the upper and lower pages of the leaves of the feeding plants. The caterpillars are very mimetic, green in colour.

Morphologically, the adult of *Pieris rapae* is not very large in size, with a wingspan of 4 to 5 cm, white on the upper page of the wings, while the lower part of the wings shows a light yellow colour. It is a butterfly that prefers grassland habitats and wide clearings, from sea level up to even 2000 m.



It is polyvoltine, that is, it makes several generations during the year, reaching as many as three generations, and the adult can be seen flying from March to October depending on the altitude.

It is a species that has been assessed by the IUCN as of Least Concern (LC) in both Italy and Europe because of its wide distribution and because there is no evidence of decline or particular threats.

As in many other butterfly species, *Pieris rapae* also exhibits sexual dimorphism, although less obvious than in other species. The female has two black spots in the median area of the forewing, while males have only one.

The most similar species with which it can be confused are *Pieris mannii* and *Pieris napi*. The main difference that can be seen between *P. rapae* and *P. mannii* lies in the apical spots, which in *P. mannii* extends more along the outer edge of the wing with some black scales. In addition, the shape of the black spot in the center of the forewing in *P. rapae* is roundish, while in *P. mannii* it is more square.

In the case of *P. napi*, the substantial difference lies in the veins on the lower page of the wings, which are very pronounced in *P. napi* and much less prominent, if not absent, in *P. rapae*. Even the second generation of *P. napi*, which has the less obvious ribs, remain more evident than in *P. rapae*.

## 4. Milestones of 2023

ITBMS is devoting great efforts in planning to extend the monitoring scheme to all Italian regions and cover the majority of different habitat types. The total transects included within the Italian scheme are now 168, covering 15 of the 20 Italian regions.

Despite the achievement of these important milestones, the monitoring network does not stop and during the next year the goal will be to implement it more and more trying to cover the whole national territory. The effort of volunteers is always very high, and this year we have also recorded the first samplings starting in January. As proof of the great success of the Italian monitoring scheme, sampling outside the national territory also continues, the transect in the State of San Marino is confirmed to be active and has begun with the monitoring of a transect with the support of the Butterfly Monitoring Scheme Italy starting in 2022.

A major driver to the implementation of the monitoring network certainly comes from the continuous workshops that are organized

throughout the country with the aim of engaging new volunteers. In 2023, two national workshops were organized in Central and Southern Italy, areas that are increasingly expanding the monitoring network. One of these took place within the Circeo National Park, thanks to the invaluable help of the Carabinieri Forestali and CREA, while another took place in the Oriented Nature Reserve of Capo Rama, Sicily, thanks to the great involvement of the BMS volunteer who monitors in that area. Thanks to these events, many Carabinieri Forestali stations and some of the WWF Oases within the national territory were also included in the monitoring scheme, committing to increasingly implement the monitoring scheme within the Oases also during 2024.

During 2023, the first national congress of the Citizen Science Italian Association was held where, along with many other projects, the BMS Italia was presented, gaining a lot of interest and thus giving rise to new collaborations.





## Grassland Butterfly Indicator and trends of some sampled species of 2023

The European Grassland Butterfly Indicator shows the population trends of 17 butterflies typical of grassland environments. This indicator is constructed from the estimated population trends of the 17 European species that are considered for calculation for the entire European region or just the 27 EU member states. These trends are calculated for each of the species through a weighted combination of all trends using the year 1990 as a starting point and using data collected through the eBMS project.

The calculation of this indicator is important for understanding the health of butterfly populations at the European level to target conservation policies for butterflies and the environments in which they live. The European Grassland Butterfly Indicator is showing a decrease in particular over the past ten years of 36 percent since 1990 across Europe and 32 percent in EU member states (EU27).

The 17 butterfly species considered for the calculation of this indicator are 7 generalist species (*Ochlodes sylvanus*, *Anthocharis cardamines*, *Lycaena phlaeas*, *Polyommatus icarus*, *Lasiommata megera*, *Coenonympha pamphilus* and *Maniola jurtina*) and 10 specialist species (*Erynnis tages*, *Thymelicus acteon*, *Spialia sertorius*, *Cupido minimus*, *Phengaris arion*, *Phengaris nausithous*, *Polyommatus bellargus*, *Cyaniris semiargus*, *Polyommatus coridon* and *Euphydryas aurinia*).

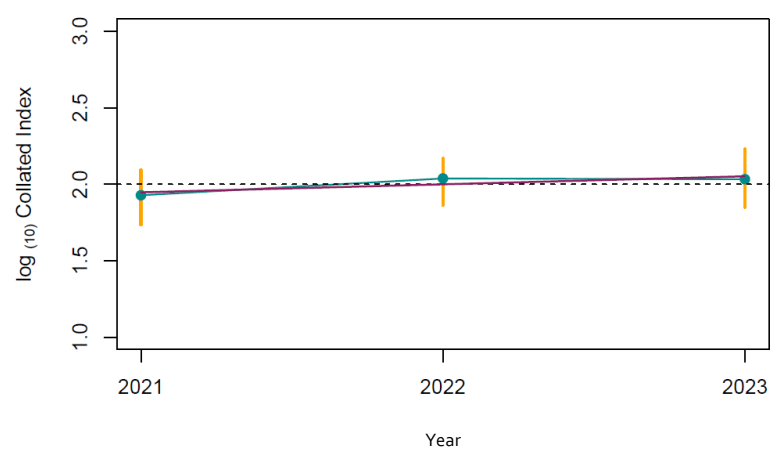
Starting this year, thanks to the data collected with the ITBMS, it was possible to calculate a first Italian Grassland Butterfly Indicator, taking into consideration data from the year 2020. For the Italian Grassland Butterfly Indicator, 10 of the species calculated for the European indicator were considered, due to the lack of some data related to 7 other species that therefore could not be included in the calculation.

The indicator species that were not sampled are: *Cupido minimus*, *Cyaniris semiargus*, *Euphydryas aurinia*, *Lysandra bellargus*, *Lysandra coridon*, *Spialia sertorius*, *Thymelicus acteon*.

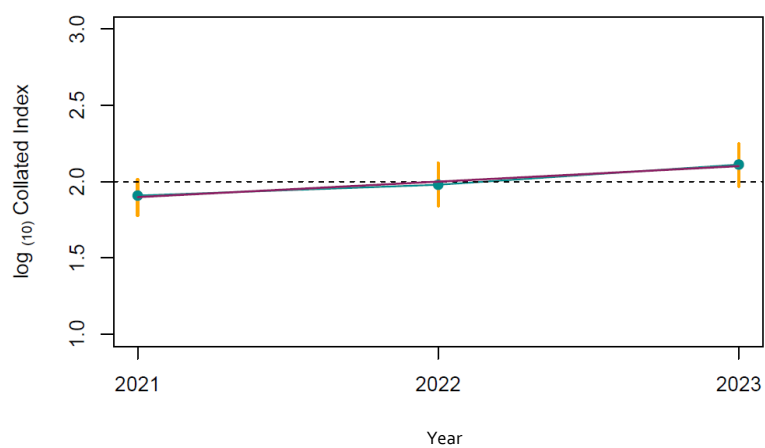
The trends of the 10 Italian species considered for the Grassland Butterfly Indicator from 2021 to 2023 are shown below. Species trends are depicted with a graph showing on the y-axis the Collated Index, i.e., the number of individuals expected for that species, and on the abscissae the year of monitoring.

Except for two species, *Polyommatur icarus* and *Erynnis tages*, a general improvement in the trend of most of the species can be seen, which therefore show slightly increasing populations in 2023 compared to previous years.

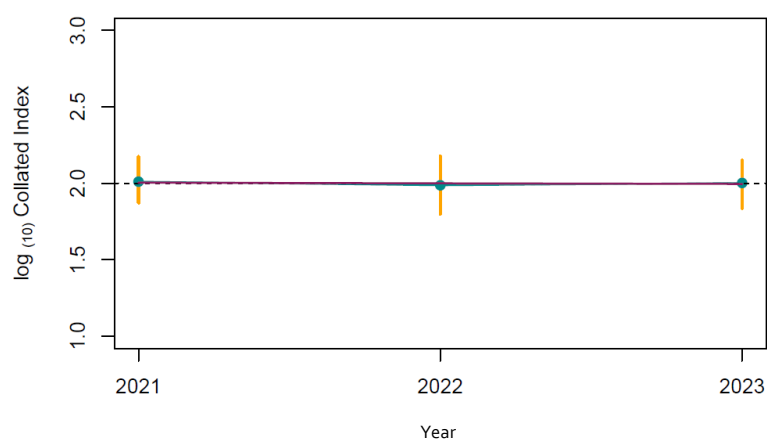
### ***Anthocharis cardamines***

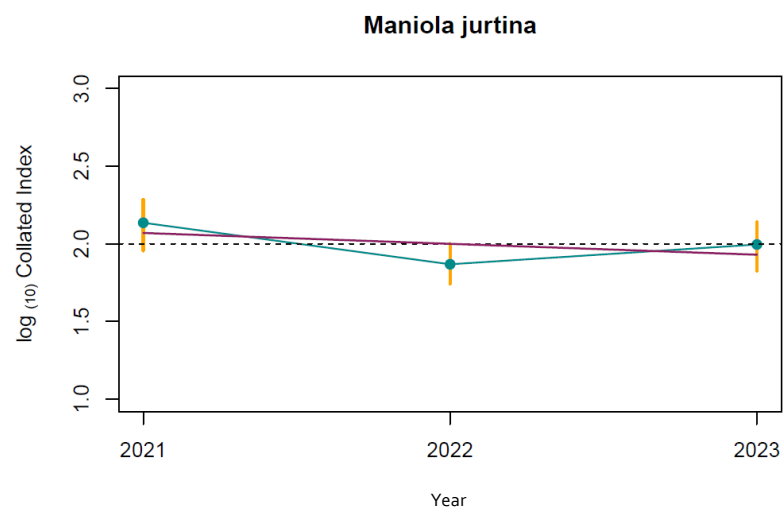
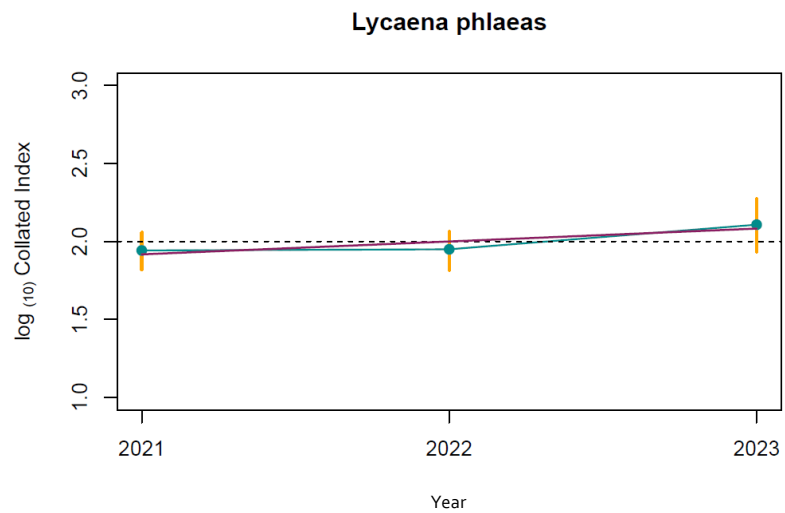


### ***Coenonympha pamphilus***

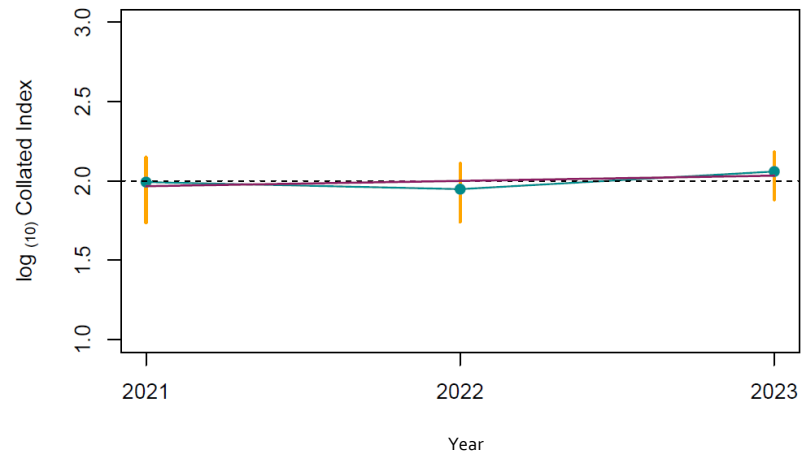


### ***Lasiommata megera***

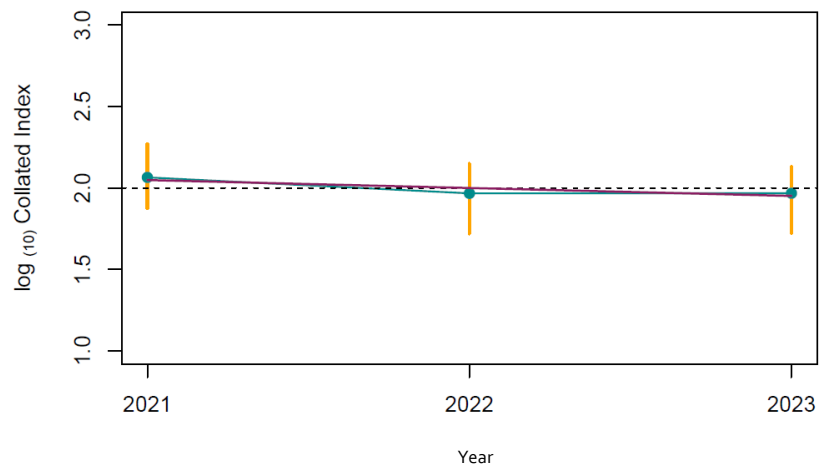




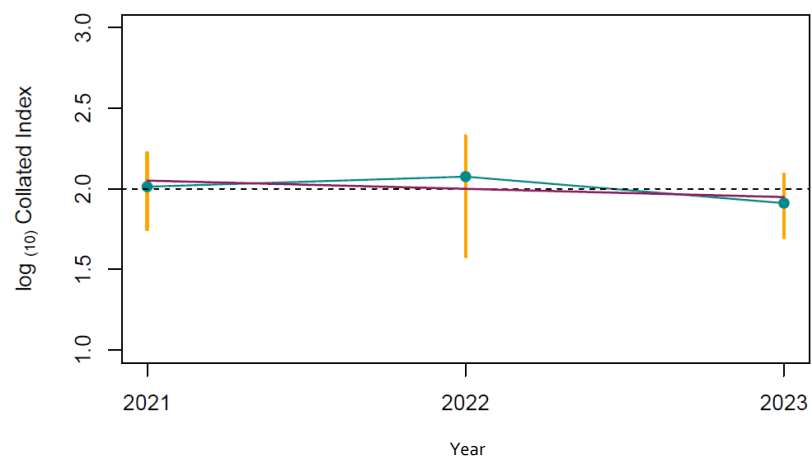
### Ochlodes sylvanus



### Polyommatus icarus



### Erynnis tages





## Join the Italian Butterfly Monitoring Scheme

If you enjoy spending time surrounded by nature and love butterflies, you are welcome to join the Italian Butterfly Monitoring Scheme. Participating in the project is simple:

1. visit our Web site (<https://butterfly-monitoring.net/it>) to create your personal account;
2. choose a location near your home, or a convenient place where you can observe butterflies;
3. contact your national coordinator and propose your transect by writing to [help.itbms@gmail.com](mailto:help.itbms@gmail.com);
4. design your transect together with our technicians;
5. download our App;
6. download our manual and identification guides.

Should you experience any problems with the website or app, please feel free to always contact us at **[help.itbms@gmail.com](mailto:help.itbms@gmail.com)**.

Enjoy your time in nature by monitoring butterflies!

## 5. Acknowledgements

The ITBMS coordination would like to thank all those who contributed to the creation of the national scheme. The beautiful results that have been achieved are the result of the support of the many volunteers, institutions, and all parties involved.

Special thanks also go to the Italian Lepidopterological Association (ALI) which sponsors each BMS Italy national workshop, collaborates in the drafting of recognition materials and specimen determinations.

### 3. References

- Balletto, E., Cassulo, L. A., & Bonelli, S. (2014). An annotated checklist of the Italian butterflies and skippers (Papilionoidea, Hesperioidea).
- Pollard, E., & Yates, T. J. (1994). Monitoring butterflies for ecology and conservation: the British butterfly monitoring scheme. Springer Science & Business Media.
- Sevilleja, C. G., van Swaay, C. A. M., Bourn, N., Collins, S., Settele, J., Warren, M. S., ... & Roy, D. B. (2019). Butterfly transect counts: manual to monitor butterflies. Wageningen: Butterfly Conservation Europe & De Vlinderstichting/Dutch Butterfly Conservation.
- Thomas, J. A. (2005). Monitoring change in the abundance and distribution of insects using butterflies and other indicator groups. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 360(1454), 339-357.
- van Swaay, C. A., Dennis, E. B., Schmucki, R., Sevilleja, C. G., Aghababayan, K., Åström, S., ... & Roy, D. B. (2020). Assessing Butterflies in Europe-Butterfly Indicators 1990-2018: Technical report.
- Warren, M. S., Maes, D., van Swaay, C. A., Goffart, P., Van Dyck, H., Bourn, N. A., ... & Ellis, S. (2021). The decline of butterflies in Europe: Problems, significance, and possible solutions. *Proceedings of the National Academy of Sciences*, 118(2).

## 6. Annex I: Butterfly species counted in 2023

Species monitored in 2023		
<i>Aglais io</i>	<i>Erebia triarius</i>	<i>Melitaea varia</i>
<i>Aglais urticae</i>	<i>Erebia tyndarus</i>	<i>Minois dryas</i>
<i>Agriades glandon</i>	<i>Erynnis tages</i>	<i>Neptis rivularis</i>
<i>Agriades optilete</i>	<i>Euchloe ausonia</i>	<i>Nymphalis antiopa</i>
<i>Agriades orbitulus</i>	<i>Euchloe crameri</i>	<i>Nymphalis antiopa</i>
<i>Anthocharis cardamines</i>	<i>Euphydryas intermedia</i>	<i>Nymphalis polychloros</i>
<i>Apatura ilia</i>	<i>Euplagia quadripunctaria</i>	<i>Ochlodes sylvanus</i>
<i>Aphantopus hyperantus</i>	<i>Fabriciana adippe</i>	<i>Ochlodes venata</i>
<i>Aporia crataegi</i>	<i>Fabriciana niobe</i>	<i>Papilio machaon</i>
<i>Argynnis pandora</i>	<i>Favonius quercus</i>	<i>Pararge aegeria</i>
<i>Argynnis paphia</i>	<i>Gegenes nostrodamus</i>	<i>Parnassius apollo</i>
<i>Aricia agestis</i>	<i>Gegenes pumilio</i>	<i>Parnassius phoebus</i>
<i>Aricia artaxerxes</i>	<i>Glaucopsyche alexis</i>	<i>Phengaris arion</i>
<i>Boloria</i>	<i>Glaucopsyche melanops</i>	<i>Pieris brassicae</i>
<i>Boloria dia</i>	<i>Gonepteryx cleopatra</i>	<i>Pieris bryoniae</i>
<i>Boloria euphrosyne</i>	<i>Gonepteryx rhamni</i>	<i>Pieris mannii</i>
<i>Boloria pales</i>	<i>Hamearis lucina</i>	<i>Pieris napi</i>
<i>Boloria selene</i>	<i>Hesperia comma</i>	<i>Pieris rapae</i>
<i>Boloria thore</i>	<i>Heteropterus morpheus</i>	<i>Plebejus argus</i>
<i>Boloria titania</i>	<i>Hipparchia fagi</i>	<i>Plebejus argyrognomon</i>
<i>Brenthis daphne</i>	<i>Hipparchia hermione</i>	<i>Plebejus idas</i>
<i>Brenthis hecate</i>	<i>Hipparchia neapolitana</i>	<i>Polygonia c-album</i>
<i>Brintesia circe</i>	<i>Hipparchia semele</i>	<i>Polygonia egea</i>
<i>Cacyreus marshalli</i>	<i>Hipparchia statilinus</i>	<i>Polyommatus amandus</i>
<i>Callophrys avis</i>	<i>Hyponephele lycaon</i>	<i>Polyommatus daphnis</i>
<i>Callophrys rubi</i>	<i>Iphiclides podalirius</i>	<i>Polyommatus eros</i>
<i>Camptogramma bilineata</i>	<i>Issoria lathonia</i>	<i>Polyommatus escheri</i>
<i>Carcharodus alceae</i>	<i>Lampides boeticus</i>	<i>Polyommatus icarus</i>
<i>Carcharodus floccifera</i>	<i>Lasiommata maera</i>	<i>Polyommatus thersites</i>
<i>Carterocephalus palaemon</i>	<i>Lasiommata megera</i>	<i>Pontia daplidice</i>
<i>Celastrina argiolus</i>	<i>Lasiommata petropolitana</i>	<i>Pontia edusa</i>
<i>Charaxes jasius</i>	<i>Leptidea sinapis</i>	<i>Pseudophilotes baton</i>
<i>Coenonympha arcania</i>	<i>Leptotes pirithous</i>	<i>Pyrgus alveus</i>
<i>Coenonympha gardetta</i>	<i>Libythea celtis</i>	<i>Pyrgus armoricanus</i>
<i>Coenonympha pamphilus</i>	<i>Limenitis camilla</i>	<i>Pyrgus malvae</i>
<i>Coenonympha pamphilus ssp. lyllus</i>	<i>Limenitis reducta</i>	<i>Pyrgus malvoides</i>
<i>Colias alfacariensis</i>	<i>Lycaena alciphron</i>	<i>Pyrgus onopordi</i>
<i>Colias crocea</i>	<i>Lycaena dispar</i>	<i>Pyrgus serratulae</i>
<i>Colias hyale</i>	<i>Lycaena hippothoe</i>	<i>Pyrgus sidae</i>
<i>Colias palaeno</i>	<i>Lycaena phlaeas</i>	<i>Pyronia cecilia</i>

<i>Colias phicomone</i>	<i>Lycaena thersamon</i>	<i>Pyronia tithonus</i>
<i>Cupido alcetas</i>	<i>Lycaena tityrus</i>	<i>Satyrium acacia</i>
<i>Cupido argiades</i>	<i>Lycaena virgaureae</i>	<i>Satyrium ilicis</i>
<i>Cupido minimus</i>	<i>Lysandra bellargus</i>	<i>Satyrium spini</i>
<i>Cyaniris semiargus</i>	<i>Lysandra coridon</i>	<i>Satyrium w-album</i>
<i>Erebia aethiopellus</i>	<i>Lysandra hispana</i>	<i>Satyrus ferula</i>
<i>Erebia aethiops</i>	<i>Macroglossum stellatarum</i>	<i>Scolitantides orion</i>
<i>Erebia albergana</i>	<i>Maniola jurtina</i>	<i>Speyeria aglaja</i>
<i>Erebia arvernensis</i>	<i>Melanargia arge</i>	<i>Spialia sertorius</i>
<i>Erebia epiphron</i>	<i>Melanargia galathea</i>	<i>Thecla betulae</i>
<i>Erebia euryale</i>	<i>Melanargia russiae</i>	<i>Thymelicus acteon</i>
<i>Erebia ligea</i>	<i>Melitaea athalia</i>	<i>Thymelicus lineola</i>
<i>Erebia medusa</i>	<i>Melitaea celadussa</i>	<i>Thymelicus sylvestris</i>
<i>Erebia melampus</i>	<i>Melitaea cinxia</i>	<i>Timandra comae/griseata</i>
<i>Erebia mnestra</i>	<i>Melitaea deione</i>	<i>Vanessa atalanta</i>
<i>Erebia montana</i>	<i>Melitaea diamina</i>	<i>Vanessa cardui</i>
<i>Erebia pharte</i>	<i>Melitaea didyma</i>	<i>Zerynthia cassandra</i>
<i>Erebia pronoe</i>	<i>Melitaea phoebe</i>	

Table 2: Species detected in 2023

## 7. Annex II: Recorders list of 2023

Transects	Volunteers
Acque Dolci	Lorenza Borsarelli
Allacciante di sinistra	Leonardo Favilli
Annicco Cremona	Marco Ghisolfi
Area Naturale Protetta della Selva di Meana	Massimo Luciani
Attiggio Cesi	Tania Pecci
Battaglietta	Grazia Militello, Laetitia Bourget
Belagaio_Marsiliana5	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Bernate Ticino MI - IOLAS 02	Associazione Iolas
Bianello	Lorenzo Meglioli
Bolzano Eurac Research	Eurac Research (Institute for Alpine Environment)
Borgata Piane	Roberto GALATI
Bosco Campagnazza	Vanni Polo
Bosco di Agognate	E.G.A.P. Ticino e Lago Maggiore, Marco Ricci, Cecilio Uglietti
Bosco Fontana I	Sönke Hardersen
BOSCO GRANDE DI PAVIA	Valentina Giordano
Bosco Vedro	E.G.A.P. Ticino e Lago Maggiore, Antonio Gennaro, Paola Trovò, Marco Ricci, Karen Contu, Cecilio Uglietti, Simone Trabattoni, Alessandra Serini, Giancarlo Zaccala
Brughiera Briantea	Dario Donzelli
Canale Acque Alte	Fausto Leandri
Canale del Granduca	Leonardo Favilli



Canapre	Cristiana Cerrato, Roberto Bolzanello
CantonTea1	Simone Bocca
Capo Rama	Laura Genco, Grazia Militello
Cascata	Chiara Furlan
Cascina Lai	Associazione Natura Cascina Bellezza
Castelleone	Marco Ghisolfi
Celarda 1	Marialuisa Dal Cortivo
Celarda 2	Marialuisa Dal Cortivo
Cirimilla	Giacomo Gola, Mara Calvini, Daniela Roveda
Cittadella	Paola Pilotto
Coldemies	Chiara Furlan
Colla di Ortovero (monte Chiesa)	Matteo Serafini
Colle di Val d'Elsa	Elena Dionori
Cornalin	Cecilia Noce
Costa del Vento, Montalto Pavese PV - IOLAS 01	Associazione Iolas
Costaz 1	Gianna Bosio, Giada Cignetti, Alessandro Durando
Cupolone	Alessandro Salemi, Grazia Militello
Curino, ex miniera a cielo aperto	Lucio Bordignon
Da Santa Giustina a Santa Croce	Associazione Comitato Mura di Padova
Davoli	Margherita Lombardo
Elba 1	Zen Lab
Fianco funicolare Piazza Mondovì	Bruno Regis
Fogliano LIFE_ESC360	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Fossa della Garofala	Sara Chiarello, Grazia Militello
Fraina	RCB Catanzaro
Galeone 3	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Galeone LIFE_ESC360	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Galeone LIFE_ESC360 T2	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Gaudella	Michele Presacane
Giardino Botanico Alpi Orientali	Marialuisa Dal Cortivo
GOLENA BASTIONI BUOVO E CORNARO	Associazione Comitato Mura di Padova
Gorgofreddo 1	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Grotta Sant'Antonio	Maria Giovanna Casanova
Grotticelle	Raffaella FANELLI
Grotticelle 1	Raffaella FANELLI
I Galli	Simona Zaghi
Infusino Taverna	Marco Infusino
Isola clodia	Pamela Rustici
Isola di Sant' Erasmo	Carlo Marinello
IT5190008 Lago di Montepulciano	Leonardo Favilli
JRC Ispra	Maria Luisa Paracchini
La Cassinazza 1	Roberto Garavaglia
La Rosa	Leonardo Favilli
Lama lunga	Gianluca Stasolla
L'Ape Regina Monte Rufeno	RN Monte Rufeno MDF RN Monte Rufeno MDF

Località Anzan Vervò	Elisa Zadra
Maleda - Forborida	Luca Pedrotti
Mars1	lifeESC_Marsiliana
Marsiliana_ESC360	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Marsilianaesc360_2	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Marsilianaesc360_3	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Meisutera	Elio Giuliano
Monte Iabbro	Pamela Rustici
Monte Mao	Marco Bonifacino
Montemanna	Laetitia Bourget, Grazia Militello
Montioni_pievaccia_LifeEsc360	LIFE ESC360 Progetto LIFE17 ESC/IT/001
Oasi Lipu Bosco Negri PV - IOLAS 03	Associazione Iolas
Oasi WWF Stagni di Casale	Giacomo Gasparini
Orto Botanico Università della Calabria	Antonio Mazzei
Parco Collodi - Transetto 1	Clarissa Puccioni
Parco Nazionale Val Grande	Ente Parco Nazionale Val Grande, Andrea Mosini
Parcomurgia	Vito Santarcangelo
Pejo paese	Luca Pedrotti
Percorso Domagnano	Luca Maccapani
Pertusella/Cesate	Dario Donzelli
Pian del Re, RF2	Marco Rastelli
Pian Fiorenza, RF1	Marco Rastelli
Pian Grande delle Tampe, RV1	Marco Rastelli
Pian Grande delle Tampe, RV2	Marco Rastelli
Pian Inseta	Gianna Bosio
Pian Sengio	Gran Paradiso, Silvia Ghidotti, Emanuel Rocchia, Ylenia Sartorello, Cristiana Cerrato
Pod.Serra	Giuseppe Molinari
Pravedela	Luca Pedrotti
Premeno	Andrea Mosini
PSK 1	RCB ISERNIA
Radicchia	Fulvia Benetello
Riserva di Decima Malafede 1	Arianna Giannini, Giulia Bacco
Riserva naturale Bessa	E.G.A.P. Ticino e Lago Maggiore
Riserva naturale Bosco Casale	Carlo Meo
Riserva Naturale Murge Orientali sezione Galeone	Reparto Biodiversita' Martina Franca
Riserva Naturale Orientata Monticchie	Lorenzo Mazzocchi, Giulia Mazzocchi, Angelo Dadda, Simone Majocchi, Silvia Ghidotti, Tiziana Impollonia, Linda Mazzoleni, Matteo Grechi, Marco Piacentini, Alice Locatelli, Laura Codeca', Marco Polonioli
Riserva Naturale Statale di Montecellesi, progetto APINCITTA'	Leonardo Favilli
Riserva Naturale Valle Dell'aniene	Alperen Yayla
Risorgive del Vinchiaruzzo	Niccolò Fagotto
Rocca Bianca, Ab1	Marco Rastelli

RN Crava Morozzo – Foresteria dell’Oasi	Mario Dalmasso, Beatrice Gammino, Laura Martinelli, Alma Cozzolino
RN Crava Morozzo - Nuovi Stagni	Mario Dalmasso, Beatrice Gammino, Laura Martinelli, Alma Cozzolino
Rocca Bianca, Ab2	Marco Rastelli
Rocca Bianca, Af1	Marco Rastelli
Rocca de Baldi_Campo Alessandro Gioda	Comizio Agrario di Mondovì
Rocca delle Caminate	Silvia Versari
Roccelletta	Giuseppe Rijllo
Roncino	RCB Catanzaro
Saffignano	Alessandro Pastori
San Donà di Piave (Grassaga)	Raffaella Marcon
Santa Lucia Portoferraio	Giulio Colombo
Santa Teresina Via Grassaga	Raffaella Marcon
Selva del Lamone - Cavicchione	Selva Lamone
Sentiero delle Lavandaie	Filippo Bargelli
Sentiero Natura Del Fiore Monte Rufeno	Antonella Lisi
SIC Fontana del Guercio	PARCO GROANE
SIC Pineta di Cesate	PARCO GROANE
Stablet - TN	Luca Pedrotti
Sticciano Scalo	Pamela Rustici
Stradasorgenti_Colognole	Alessandro Cini
Tontola01	Giuseppe Molinari
Tor Paterno	Marica Furini
Torbiere Nord Est	Gabriele La Grasta
Torbiere Nord Ovest	Gabriele La Grasta
Torbiere Sud	Gabriele La Grasta
Transetto Ef - Valli Mirandolesi	Elia van Tongeren
Traversata Muggesana	Simone Ghassempour
Turin - Parco Piemonte	Gianluca Chieppa
Turin - Parco Piemonte	Marta Depetris, Lorenzo Bianco, Federica Paradiso, Francesca Martelli, Nicolò Chiappetta, Simona Alberti, Elisa Plazio
Turin Mirafiori	Marta Depetris, Lorenzo Bianco, Simona Alberti, Elisa Plazio
Una Garlanda	Una Garlanda
Vaie	Valentina Bollo
Val di Viso	Lucrezia Lorenzetti, Luca Pedrotti
Valle della Nava	Laura Farina
Valle Morosina - Ghebo Storto	Luca Sattin
Vallere	Simona Zaghi
Vallone dell'alpetto, AF2	Marco Rastelli
Via Juglaris	Exodomus
Vivaio a Cirimido	Dario Donzelli
Vivere Il Po A Casale Monferrato - Oltreverde	Maria Teresa Bergoglio, Roberta Bruschini, Beatrice Allera, Valentina Pallanza, Alessandra Martino, Paola Pilotto
Zoom Torino	Yari Roggia

Zoom Torino Parco	Yari Roggia
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*Table 3: List of recorders with the relative site name for 2023*