

**42° Congresso  
della Società Italiana  
di Biogeografia**

***La Biodiversità in Italia  
al check-up***

Trieste, 22-25 giugno 2022



*Il convegno è stato organizzato con il contributo del Comune di Trieste e del Dipartimento di Scienze della Vita dell'Università degli Studi di Trieste.*



**comune di trieste**



DIPARTIMENTO DI  
SCIENZE DELLA VITA



**UNIVERSITÀ  
DEGLI STUDI  
DI TRIESTE**

**42° Congresso della Società Italiana di Biogeografia**  
*La biodiversità in Italia al check-up*

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**Comitato Scientifico**

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Marina Cobolli  
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## **Presentazione**

*Il tema di questo Congresso della Società Italiana di Biogeografia, 'La biodiversità in Italia al check-up', fa riferimento ad un termine comunemente utilizzato in ambito medico-sanitario. In medicina preventiva, un check-up consiste in una serie di accertamenti diagnostici rivolti a puntualizzare lo stato generale di salute di un paziente. Un esito positivo di un check-up si esplicita nel riconoscere uno stato invariato rispetto ad una condizione di salute pregressa, una condizione che è essenziale conoscere.*

*Nel corso di oltre un sessantennio di attività scientifica i soci della SIB, botanici, zoologi, ecologi, hanno raccolto, elaborato e discusso una ingente quantità di dati sulla biodiversità italiana, delimitata in comparti geografici o ambientali omogenei. Molto di quello che oggi si conosce in forma organizzata sulla fauna, flora e vegetazione delle Alpi, di tutto l'Appennino, delle grandi e piccole isole mediterranee, delle acque interne, delle grotte, delle aree costiere e anche in mare scaturisce da ricerche promosse dalla SIB e pubblicate nelle varie raccolte tematiche oggi disponibili anche online nella rivista Biogeographia.*

*Alla luce dei grandi cambiamenti ambientali e climatici occorsi negli ultimi decenni e del crescente interesse pubblico e istituzionale sul tema della biodiversità, entrata quest'anno a far parte della Costituzione Italiana, era maturata l'occasione di determinare, localizzare geograficamente e valutare l'entità e il livello di rischio dei cambiamenti. Tutti gli indicatori alle varie scale della biodiversità: geni, popolazioni, taxa, comunità vegetali e animali, laddove disponibili per confronti diacronici, possono far parte del toolkit del biogeografo per produrre un check-up dello stato della flora e fauna a scala locale, regionale o nazionale.*

*Questo era ed è l'obiettivo auspicato di questo convegno: si basava sulla premessa che gli stessi ricercatori e naturalisti di allora, o i loro eredi culturali, avessero a disposizione almeno una stagione da dedicare alle ricerche e monitoraggi sul campo. Purtroppo la pandemia COVID ha in parte vanificato queste aspettative e soltanto una quota limitata degli interventi presentati al congresso risultano in linea con le attese. In qualche caso i monitoraggi di flora e fauna sono stati affiancati o sostituiti da dati prodotti da siti di Citizen Science, una realtà sempre più importante che si allinea con la ricerca di base nella produzione di dati sulla biodiversità.*

*Ma l'emergenza COVID non ha intaccato il profilo del congresso, che mantiene alta tutta la sua autorevolezza con la presenza dei principali stakeholders, da ricercatori dell'ISPRA e del Network Nazionale della Biodiversità, ai delegati del Comitato Scientifico per la Fauna d'Italia, al nascente gruppo di riferimento per le banche dati botaniche, ai responsabili dei Musei di Storia Naturale che continuano a rappresentare il capitale delle conoscenze pregresse sulla biodiversità fino ad autorevoli rappresentanti di organizzazioni e forum di Citizen Science.*

*Questa è la comunità della Società Italiana di Biogeografia, un gruppo solidale e coeso di ricercatori che da decenni interpreta il senso della conoscenza della natura che ci circonda e che tutti riconosciamo come biodiversità.*

*Sono davvero grato a Stefano Martellos per aver ospitato, con il supporto del Comune e dell'Università di Trieste, questo convegno interpretandone nell'organizzazione lo spirito leggero e solidale dei congressi SIB. Mi auguro che questo possa rappresentare l'inizio di una nuova feconda stagione di studi e ricerche sulla biodiversità in Italia.*

*Benvenuti a Trieste e buon congresso a tutti i partecipanti!*

Valerio Sbordoni

*Presidente della Società Italiana di Biogeografia*

## Programma del Convegno

<b>Giovedì 23 Giugno</b>		
09:00-09:30	<b>Registrazione dei partecipanti</b>	
09:30-10:00	<b>Saluti e apertura del Convegno</b>	
10:00-11:00	<b>Sessione 1</b>	
	Vincenzo Vomero	Biodiversity. Prospecting the role of nature museums in the Italian recovery plan.
	Leonardo Latella, Sebastiano Andreatta, Stefano Mazzotti, Vincenzo Vomero	Museums repositories of biodiversity
	Francesco Roma-Marzio, Giovanni Astuti, David Dolci, Simonetta Maccioni Lorenzo Peruzzi	Updating floristic knowledge through herbarium digitization: the Herbarium Guadagno and the checklist of the Italian vascular flora
	Camilla Wellstein, Elisabeth Kindermann, Gianmaria Bonari, Norbert Hölzel	Long-term change of inner-alpine dry grassland species composition differs between protected and non-protected sites
11:00-11:30	<b>Coffee break</b>	
11:30-13:00	<b>Sessione 2</b>	
	Pietro Brandmayr & Giorgio Colombetta	Carabid communities and landscape at the eastern border of Italy, a database for biodiversity and changes
	Patrizia Gavagnin, Marco Masseti	Un porta verso l'occidente Mediterraneo: la biodiversità della Alpi Lguri, un'esigenza di conservazione
	Vera D'Urso, Salvatore Brunetti, Antonino Puglisi, Salvatore Bella, Thomas Cassar, Arthur Lamoliere, David Mifsud, Giorgio Sabella	The 'FAST' Project as a common action of information, knowledge and contrast to invasive alien species present in Malta and Sicily
	Marco D'Antraccoli, Fabrizio Bartolucci, Gabriele Galasso, Fabio Conti, Lorenzo Peruzzi	Floristic richness and composition among regions of the Italian vascular flora
	Marco A. Bologna, Lucio Bonato, Fabio Cianferoni, Alessandro Minelli, Marco Oliverio, Fabio Stoch, Marzio Zapparoli	The new Checklist of the Italian Fauna
13:00-14:30	<b>Pausa pranzo</b>	
14:30-16:00	Tavola Rotonda sul tema: Database sulla Biodiversità in Italia (completezza, uso e prospettive). Intervengono: Fabio Attorre, Alessandro Chiarucci, Pier Luigi Nimis, Andrea Sforzi, Valerio Sbordoni, Vincenzo Vomero, Modera Stefano Martellos.	
16:00-16:30	<b>Coffee break</b>	
16:30-18:30	<b>Assemblea dei Soci</b>	
20:00	<b>Cena Sociale</b>	

## Venerdì 24 Giugno

09:30-11:00	<b>Sessione 3</b>	
	Stefano De Felici, Donatella Cesaroni, Marco Lucarelli, Valerio Sbordoni	Long and short term changes in abundance and distribution of butterflies: hints from the Lazio database
	Pietro Brandmayr, Bruno Massa, Antonio Mazzei, Salvatore Surdo	Centosessantasette anni di reperti di Saga pedo in Italia diacronicamente rivisitati
	Roberto Catania, Vittorio Nobile, Salvatore Bella	The bees (Hymenoptera, Apoidea) of Egadi Islands, new records and the first checklist for the Archipelago (Sicily, Italy)
	Pietro Gardini, Stefano Taiti	Faunistics and biogeography of terrestrial isopods (Crustacea, Oniscidea) from Liguria, north-western Italy.
	Bruno Massa, Marcello Romano	Risultati di un sondaggio sul declino degli insetti in Italia
11:00-11:30	<b>Coffee break</b>	
11:30-13:00	<b>Sessione 4</b>	
	Vincenzo Vomero, Stefano Martellos	From CollMap to CollMap 2.0 - Management and follow up of the Italian project.
	Andrea Sforzi, Cristian Di Stefano	Biogeografia partecipata: il progetto gatto selvatico Italia
	Marco Masseti	Verifica sullo stato attuale dei vertebrati terrestri nelle isole italiane, alla luce delle più recenti azioni intraprese per la loro conservazione
	Nicola Baccetti, Alvise Luchetta, Luca Melega, Marco Zenatello	Dalla 'conta delle papere' all'IWC: lo svernamento degli uccelli acquatici in Italia al check-up 2020
	Alessandra Riccieri, Marco A. Bologna, Riccardo Poloni	Different biogeographic histories in the Mediterranean-Macaronesian genus <i>Stenostoma</i> (Coleoptera, Oedemeridae)
13:00-14:30	<b>Pausa pranzo</b>	
14:30-16:00	<b>Sessione 5</b>	
	Michele Adorni, Alessandro Alessandrini, Sebastiano Andreatta, Nicola Maria Giuseppe Ardenghi, Carlo Argenti, Alessio Bertolli, Enzo Bona, Maurizio Bovio, Gabriele Casazza, Davide Dagnino, Roberto Dellavedova, Francesco Festi, Filiberto Fiandri, Bruno Gallino, Luigi Ghillani, Andrea Mainetti, Fabrizio Martini, Rizzieri Masin, Sergio Montanari, William Morelli, Simonetta Peccenini, Mauro Pellizzari, Filippo Prosser, Enrico Romani, Silvio Scortegagna, Alberto Selvaggi, Giulia Tomasi, Thomas Wilhalm	Cartografia floristica in nord Italia: valutazione del livello di esplorazione per quadrante
	Leonardo Latella, Sebastiano Andreatta	Three centuries of biodiversity in the city of Verona
	Francesco Spada, Bartolomeo Schirone	Which biodiversity for the Italian forests?
	Annalisa Falace, Stanislao Bevilacqua, Giuseppina Alongi	Species loss and long-term decline in taxonomic diversity of macroalgae in the northern Adriatic Sea over the last six decades
	Maria Guerrina, Spyros Theodoridis, Luigi Minuto, Elena Conti, Gabriele Casazza	Recent range contraction in <i>Berardia subacaulis</i> , an endemic species of the Southwestern European Alps.
16:00-16:30	<b>Coffee break</b>	
16:30-17:50	<b>Sessione 6</b>	
	Fernando Lucchese	La flora vascolare del Lazio: aggiornamenti e considerazioni biogeografiche
	Antonio Giacò, Paola De Giorgi, Giovanni Astuti, Lucia Varaldo, Luigi Minuto, Lorenzo Peruzzi	Taxonomy and distribution of <i>Santolina</i> L. (Asteraceae) in Italy: an overview from the early Italian floras to present

	Nicolás Velasco	Potential spread of invasives Fabaceae (subfamily: Mimosoideae) in Italy predicted from stand vs regeneration species distribution models.
	Michele Lussu, Piero Zannini, Riccardo Testolin, David Dolci, Matteo Conti, Stefano Martellos, Alessandro Chiarucci	Island species–area relationship (ISAR) of Orchids in Central West Mediterranean Basin.
17:50	<b>Chiusura del Convegno</b>	

<b>Sabato 25 Giugno</b>		
<b>09:30-13:00</b>	<b>Escursione in Val Rosandra</b>	<p>La zona dell'escursione sarà raggiunta con mezzi pubblici (autobus numero 40, con partenza da Piazza della Libertà, ore 9:30; arrivo a Bagnoli della Rosandra ore 10:10. Costo del biglietto Euro 2,00).</p> <p>Si raccomanda l'uso di berretti e creme solari, visto il forte irraggiamento del periodo. Si raccomanda inoltre ogni partecipante di munirsi di almeno un litro d'acqua.</p> <p>Il ritorno avverrà anch'esso tramite mezzi pubblici, con partenza del bus numero 40 alle ore 12:55 o 13:25.</p>



# **Abstract**

(organizzati in ordine alfabetico secondo il cognome del primo autore)

## **Cartografia floristica in nord Italia: valutazione del livello di esplorazione per quadrante**

Michele Adomi, Alessandro Alessandrini, Sebastiano Andreatta (1), Nicola Maria Giuseppe Ardenghi (2), Carlo Argenti, Alessio Bertolli (3), Enzo Bona, Maurizio Bovio (4), Gabriele Casazza (5), Davide Dagnino (5), Roberto Dellavedova, Francesco Festi (3), Filiberto Fiandri (6), Bruno Gallino (7), Luigi Ghillani, Andrea Mainetti (4), Fabrizio Martini, Rizzieri Masin, Sergio Montanari (8), William Morelli, Simonetta Peccenini (5), Mauro Pellizzari (9), Filippo Prosser (3), Enrico Romani (10), Silvio Scortegagna, Alberto Selvaggi (11), Giulia Tomasi (3), Thomas Wilhalm (12)

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Despite a significant delay compared to other European countries, Italy is also beginning to have considerable databases on higher plants. From a recent summary of our work concerning floristic cartography projects in northern Italy ([https://www.fondazionemcr.it/UploadDocs/22824\\_Art\\_02\\_AAVV\\_min.pdf](https://www.fondazionemcr.it/UploadDocs/22824_Art_02_AAVV_min.pdf)) it appears that this territory has 1,639,401 data grouped by quadrant. Here we present a summary data processing aimed at highlighting the major exploratory gaps.

**Keyword:** Cartografia floristica, Nord Italia, Quadro d'unione per quadranti, Lacune esplorative

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## **Dalla 'conta delle papere' all'IWC: lo svernamento degli uccelli acquatici in Italia al check-up 2020**

Nicola Baccetti (1), Alvise Luchetta (1), Luca Melega (1), Marco Zenatello (1)

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*From the 'duck counts' to IWC: wintering waterbirds in Italy at the 2020 check-up.*

This form of animal monitoring, which has allowed the use of some of the main criteria for the Ramsar Convention site qualification, was born in the UK in early post-war years. We briefly describe its development in time, till drawing the present state of the art in Italy, as the national report 2010-2020 is currently in advanced production. Abundance, distribution and trends of species are discussed, as well as different forms of use of the database and a number of operative details (methods, formation and recruitment, funding). This is probably the most continuous and longest-running monitoring scheme of the Italian natural resources. Largely based on citizen science, whose pros and cons pose peculiar conditions in the relations with institutional and scientific bodies, the system has proven to be capable of showing a remarkable resilience across all possible changes in bureaucracy, institutional assets and managers.

**Keyword:** waterbirds, wetlands, bird census, Italy

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## The new Checklist of the Italian Fauna

Marco A. Bologna (1), Lucio Bonato (2), Fabio Cianferoni (3, 4), Alessandro Minelli (2), Marco Oliverio (5), Fabio Stoch (6), Marzio Zapparoli (7)

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The Scientific Committee for the Italian Fauna is managing the new Checklist of the animal species of Italy. The previous Checklist was published in 1993-1995 and included both protozoans and Metazoa (more than 57,000 species); the new project, which includes only Metazoa, started in 2020 and is aimed at updating the former checklist (with more than 60,000 expected species) by on-line datasets and data papers. The new Checklist includes marine species, recorded for nine areas, and terrestrial species recorded for the administrative regions and/or four macro-regions. Over 180 Italian and foreign taxonomists have so far participated to the new project, providing datasets for taxa at different hierarchical level. The list is intended to be a fundamental tool not only for the faunistic knowledge of Italy, but also for biodiversity conservation strategies in Italy and UE. The New Checklist of the Italian fauna is freely available from the platform LifeWatch, and it will be progressively updated. Furthermore, data papers for taxa at different hierarchical level will be published with continuity on the journal *Biogeographia*. We summarize here the information collected so far for some groups for which datapapers have been published (marine Mollusca and Ascidiacea, Rotifera and Hexapoda Mecoptera) and we give some comparative remarks with the previous Checklist, 27 years after its publication. For marine Mollusca the total 1777 species recorded represent a 17% increase, while the 138 species of Ascidiacea include a 7% increase. One single additional species has been recorded for Mecoptera (increase 10%) with a total of 11 species. For Rotifera, the currently accepted Italian taxa (483) have nearly doubled those previously known (97% increase). Furthermore, data for other groups recently added to the Checklist are discussed.

**Keyword:** Checklists, animal diversity, chronoecology, datapapers

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## **Carabid communities and landscape at the eastern border of Italy, a database for biodiversity and changes.**

Pietro Brandmayr (1), Giorgio Colombetta (2)

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A proposal for a simplified database structure is presented for the carabid communities of the Friuli-Venezia Giulia region of Italy. Our experience of 40 years sampling in vegetationally characterized stands demonstrates that the best solution for a reliable landscape structure is to subdivide a complex landscape in more units identified by a geomorphological/bioclimate criterion, corresponding more or less to the "ecotopes" of landscape ecologists. In this region following units were recognized: A - alpine biome; B - boreal biome; D1 - temperate mixed deciduous forest (Abies and Fagus); D2 - temperate deciduous oak belt; M - mediterranean sclerohphylls; Gap - Natural grasslands of the upper plain; Lap - subsoil water conditioned forest of the lower plain; RE -lotic waters, rivers; LE - lentic waters, lakes, ponds; PB - peat bogs; DU -coastal dunes; SM - salt marshes. Inside each landscape unit a complex of dynamic relationships is thriven by the ecological successions and spontaneous colonization from more permanent habitats to more unstable and disturbed ones and vice versa. In other words, each unit guests not only a vegetation complex but also a complex of animal communities, some of which represent the "endpoint" of a natural sere or ecosystem evolution, but at the same time a mosaic of communities reflecting anthropogenic disturbance levels. The database allows also an evaluation of population density changes occurred in the last 40 years, especially in forest and open land habitats of the Triestine Karst but also of mountain and alpine communities upward shift. It gives also a realistic picture of the climate/geomorphology conditioned boundary between dinaric or southeastern European endemites and the fauna of the alpine- and Po plain biogeographic district. There are signals of a progressive shift towards a more Mediterranean structure of the carabid communities that show a lower species diversity of forestlands. Species composition and traits are strongly changing at the lowland/mountain boundary.

**Keyword:** Landscape ecology, landscape system, species diversity, climate change, population decline

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## **Centosessantasette anni di reperti di *Saga pedo* in Italia diacronicamente rivisitati**

Pietro Brandmayr (1), Bruno Massa (2), Antonio Mazzei (3), Salvatore Surdo (2)

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La *Saga pedo* è un ortottero Tettigoniidae specializzato nella predazione di altri insetti, in particolare ortotteri. Avendo una posizione apicale nella rete trofica, è per sua natura raro e al tempo stesso rappresenta un ottimo indicatore della qualità ambientale. Per tale motivo si trova elencato nell'Allegato IV della Direttiva Habitat e ne viene richiesto il monitoraggio periodico. I presenti autori hanno messo insieme 170 segnalazioni di questo insetto avvenute tra il 1855 e il 2020 in numerose regioni d'Italia, suddividendole in tre periodi: 1) ante 1970; 2) 1970-2000; 3) 2001-2020; quindi presentano e discutono la distribuzione diacronica di questo insetto in Italia. Le segnalazioni sono state tratte da pubblicazioni e più recentemente da siti e forum entomologici. Questo ha consentito un notevole aggiornamento della distribuzione, tutte le regioni italiane sono risultate abitate dall'ortottero. Gli autori aggiornano la carta delle località italiane in cui è stata osservata *Saga pedo*, le quote massime raggiunte dalla specie e forniscono qualche dato utile per il futuro monitoraggio sulla sua fenologia e l'ecologia.

**Keyword:** Distribuzione diacronica, Status, Trend, Citizen Science

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## The bees (Hymenoptera, Apoidea) of Egadi Islands, new records and the first checklist for the Archipelago (Sicily, Italy)

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The Egadi Archipelago, located in front of the Trapani and Marsala coast, in western Sicily, consisting of three main islands, Favignana, Levanzo and Marettimo, and several islets and stacks. These islands show an interesting botanical heritage that reaches its greatest richness on the island of Marettimo, with about 500 infra-generic taxa (including species, subspecies, and varieties), and different endemic taxa (Francini and Messeri 1956; Gianguzzi et al. 2006; Scuderi 2008). Egadi islands have a significant number of endemics also among animal species, but to date, the apidological fauna of these islands has never been specifically treated, and only few records are reported in Nobile (1990, 1991), Smit (2018), and Comba (2019). Surveys were conducted in Favignana and Marettimo, during the end of April and the beginning of May 2021, to improve the knowledge about bee-fauna of Egadi's Archipelago. A total of 40 species belonging to five families (Colletidae: 3 spp.; Andrenidae: 9 spp.; Halictidae: 4 spp.; Megachilidae: 15 spp.; Apidae 9 spp.) are reported for these islands, in particular: Favignana 35 spp., Levanzo 2 spp., Marettimo 9 spp. Among them 27 species are new record for this Archipelago, 9 species are not known for Italian peninsula, and 12 taxa are Mediterranean endemic. The presence of *Hylaeus (Prosopis) duckei* (Alfken, 1904) (Colletidae), and *Osmia (Helicosmia) alfkenii* Ducke, 1899 (Megachilidae) is reported for the first time for Sicily. Furthermore, *Panurgus siculus* Morawitz, 1871 (Andrenidae) and *Lasioglossum parvulum* (Schenck, 1853) (Halictidae) are reported for the first time as host species of *Nomada sicula* Schwarz, 1974, increasing the knowledge on the bio-ecology of this endemic cleptoparasitic bee. Comparing the number of reported species with the other Sicilian archipelagos, the Egadi Archipelago shows the least number of bee species, probably related to the lower number of studies conducted in these islands. We believe that further investigations are required to increase the knowledge of the Egadi's bee fauna.

**Keyword:** wild bees, biodiversity conservation, Mediterranean pollinators, Egadi, Italy

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## Floristic richness and composition among regions of the Italian vascular flora

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Floristic inventories play a relevant role in taxonomic, biogeographic and conservation studies. We explored floristic richness and composition at administrative regional level, based on the data available from the checklists of native and alien Italian vascular floras. Concerning richness, we used a Species Area Relationship (SAR) approach focusing on 4 species groups: native flora, alien flora, Italian endemics, and regional endemics. Based on SAR regression (log-transformed Arrhenius power function) residuals, we obtained the actual floristic richness of each region. To compare regional floristic compositions, we used the turnover component of beta diversity. The SAR explained variance is 20% (native), 60% (alien), 28% (Italian endemics), and 40% (regional endemics). Concerning regional endemics, 11 regions show more species than expected. Alien categories show different relationships with area: explained variance for casual, naturalized and invasive is 40%, 60%, and 25%, respectively. Floristic richnesses of native and alien flora are positively correlated ( $r = 0.7$ ). Native richness shows a decreasing trend along a N-S gradient, whereas an increasing trend from E to W and from N to S is highlighted for Italian endemics. Pairwise comparison of floristic composition among regional floras highlights that Sardegna, Sicilia, Trentino-Alto Adige, Valle d'Aosta and Friuli Venezia Giulia host the most different floras with respect to other regions, while the flora of Umbria shows the lowest turnover. Diachronic analyses were conducted comparing floristic richnesses among regional data available in 1994, 2005 and 2022, respectively. The SAR's regression parameter  $z$  (which expresses how fast species richness increases as the area enlarges) increases in time. Regions tends to maintain similar diachronic richness patterns, but in some cases values show a decreasing trend along time, like Basilicata, Molise, Umbria, and Sicily.

**Keyword:** beta diversity, floras, Species Area Relationship, species richness, Italy

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## **Long and short term changes in abundance and distribution of butterflies: hints from the Lazio database**

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The DB on the occurrence data of the butterflies (Papilionoidea) of Lazio, at 14th February 2022 consisted of 36244 records including 154 species distributed throughout a total of 6719 sites. The data set included geo-referenced and chrono-referenced data collected from the literature, specialist-validated occurrences from websites (Forum Natura Mediterraneo, iNaturalist, Ornitho), as well as an important amount of original observations included in the database of the Lazio Biodiversity Observatory. All observations were used to create distribution maps. In order to evaluate any change in observations over time for the various species, all records were divided into three different periods: before 1980 (4425 records), 1980-2000 (6498 records) and post 2000 (25321 records). A finer subdivision was then examined within the post-2000 period: 2001-2007 (11888 records), 2008-2014 (4977 records), 2014-2021 (8456 records). Further analyses were carried out to highlight differences in the distribution of species as a function of altitude and / or changes in land use that have occurred in the last decades. The results show that qualitatively the species present in the region before 1980 are all still present today, however the abundance of related observations in several cases has changed considerably. Observations of an important portion of the species have significantly decreased in recent years. This trend is observed in the majority of mountain species and various habitat-specialist butterflies regardless of altitude. In some other species, often the most common or habitat-generalist butterflies, an increase was observed. The causes of these trends can be identified in the human land use and climate change, without excluding, however, the differences in data recording over time that could favor the most common species.

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## **The 'FAST' Project as a common action of information, knowledge and contrast to invasive alien species present in Malta and Sicily**

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The Mediterranean Basin is one of the areas of the planet with the most intense international transit of goods and people and this rapid and often uncontrollable development affects natural ecosystems with a loss of local biodiversity. In this context, the accidental introduction of alien animal and plant species is one of the most worrying phenomena, with negative effects on the quality of natural environments, on the survival of some species at risk, and also on human behaviour and the management of urban areas. The "FAST" Project (Fight Alien Species Transborder) Interreg Italia-Malta 2014-2020, aims to safeguard the biodiversity of Sicily and Malta located in the centre of the Mediterranean, focusing on the problem of biological animal and plant invasions. The main activity was the creation of a database of alien, terrestrial and freshwater animal species, with particular attention to invasive ones. For each species recorded, the pathways, the diffusion and the degree of invasiveness in the two archipelagos were recorded. The elaboration of the database, in addition to the unpublished personal data, required the consultation of the main international databases (e.g. DAISIE, ISSG, CABI, GRIIS, GBIF) and national (e.g. checklist of the Italian fauna, species invasive.it), and publications concerning single taxa or groups of taxa. Several problems arose above all in the preliminary work that led to the creation of the lists of non-native invertebrates, due to the considerable number of taxa to be considered, the discrepancy of the sources consulted, taxonomic confusions, and gaps in ecological and ethological knowledge on some species. In this regard, it was also necessary to resort to the contribution of experts in various zoological fields. For the species introduced before 1500 and naturalized, the term parautoctonous was used. Over 900 alien and cryptogenic species have so far been identified in the two archipelagos.

**Keyword:** FAST Project, invasive alien species, Malta, Sicily

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## **Species loss and long-term decline in taxonomic diversity of macroalgae in the northern Adriatic Sea over the last six decades**

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The northern Adriatic Sea is a shallow, semi-enclosed basin characterised by oceanographic features that differ significantly from the rest of the Mediterranean Sea. Studies over the last decades show that the composition of algal vegetation has changed significantly due to land reclamation, tourism, habitat loss, pollution and climatic changes that directly or indirectly affect benthic algal communities. The most obvious change is a remarkable loss of the formerly predominant furoid brown algae, whose distribution and abundance throughout the basin has declined over the last 50-60 years. *Fucus virsoides*, the only endemic Mediterranean *Fucus* species, has suffered the most dramatic decline and is now restricted to a few sites in the Venice Lagoon, the Gulf of Trieste and northern Croatia. The species of *Cystoseira* s.l., once widespread on the rocky coasts of the region, currently occur only in reduced populations or in patches confined to a few protected and undisturbed sites. These communities have been replaced by perennial turf-like mats of Gelidiaceae and *Symphycladiella/Xiphosiphonia*, which are well adapted to environmental disturbance and thrive in stressful habitats characterised by sediment resuspension and deposition. The predominance of taxa with high tolerance or ephemeral species (Rhodophyta, especially Ceramiales and Corallinales; Ectocarpales among the Ochrophyta; Cladophorales and Ulvales among the Chlorophyta) at some sites is mainly due to lower light penetration, high sedimentation rates and pressure from herbivores, as reported in other areas of the Mediterranean.

**Keyword:** macroalgae, biodiversity, Northern Adriatic Sea

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## **Faunistics and biogeography of terrestrial isopods (Crustacea, Oniscidea) from Liguria, north-western Italy.**

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The aim of this contribution is to illustrate the current state of knowledge of the Ligurian oniscidean fauna. Information from literature data and from material collected and examined in recent years are compared. Prior the start of our research in 2017, the total number of species recorded for Liguria was 73, belonging to 29 genera and 12 families. Most of these species were described or reported in a rather large number of papers on this topic published in the first half of the 20th century. From the '60s onwards, however, studies concerning terrestrial isopods from this region have considerably decreased, despite the large amount of undetermined material collected over the years and deposited in the scientific collections of several museums. The examination of both preserved and newly collected material has raised the number of species to 103, belonging to 38 genera and 17 families. Among these, it is worth to point out the presence of six species new to science, currently under description. Considering the limited territorial extension of Liguria (5,418 km<sup>2</sup>), 103 is a rather conspicuous number of species. For comparison, 78 species are recorded for Corsica (8,680 km<sup>2</sup>), 94 for Sardinia and surrounding islands (24,100 km<sup>2</sup>), 103 for Sicily and surrounding islands, including the Maltese Archipelago (26,148 km<sup>2</sup>), and 131 for Tuscany (22,943 km<sup>2</sup>). Moreover, as some areas or environments of the region have not been adequately investigated yet, such a sum is likely to increase. Such species richness, noticeable not only in terrestrial isopods, is probably due to the great environmental variability, the geographic position, and the geological context of Liguria, which is known to represent a significant biogeographic crossroad.

**Keyword:** Oniscidean fauna, Italy, Liguria, biogeography, new records, new species.

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## **Una porta verso l'occidente Mediterraneo: la biodiversità delle Alpi Liguri, un'esigenza di conservazione**

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Le Alpi Liguri rappresentano l'estrema propaggine meridionale delle Alpi Occidentali al confine tra l'Italia e la Francia. Il quadro floristico e vegetazionale è stato ampiamente descritto in numerosi lavori che hanno consentito di individuare l'areale delle Alpi Liguri come uno dei dieci hot-spots di biodiversità vegetale del bacino del Mediterraneo (Médail & Quézel, 1999), il quadro faunistico appare altrettanto rilevante. La posizione geografica, la struttura geologica dei substrati e le caratteristiche climatiche dei versanti hanno influenzato anche la distribuzione della fauna, particolarmente gli Invertebrati a motivo della limitata vagilità, per cui il contingente delle specie endemiche è molto ricco e particolare. Altri fenomeni sono l'esistenza di gradienti distributivi, di sovrapposizione di areali tra specie sorelle – fattore che condiziona l'esistenza di ibridi – la convivenza di specie mediterranee e specie alpine, la risalita in quota di specie mediterranee. Tra i Vertebrati convivono specie di erpetofauna tipiche del Mediterraneo occidentale, tra queste la lucertola ocellata (*Timon lepidus*), una specie bandiera degli ecosistemi mediterranei occidentali ed altre a distribuzione alpina ed eurosiberica che trovano nelle Alpi Liguri il limite meridionale dell'areale, altre hanno una distribuzione disgiunta o. Ulteriore fattore di interesse è rappresentato dalla presenza storica della fauna di maggiore mole. Nel secolo XIX nelle Alpi meridionali, in quelle Liguri e nel Nizzardo, era descritto un certo isolamento che ha consentito la sopravvivenza di specie più a lungo che in altri punti dell'arco alpino, esempi sono esemplari conservati al Museo Giacomo Doria di Genova, memoria riguarda anche le specie necrofaghe. Tra i Mammiferi particolare interesse biogeografico attiene il Gatto selvatico europeo *Felis s. silvestris* dal momento che le montagne meridionali costituiscono la parte centrale dell'areale distributivo occidentale del carnivoro (Ragni, 1993). Mantenere il patrimonio di biodiversità delle componenti faunistiche, e floristiche, di questa parte delle Alpi pone rilevanti problemi di conservazione e la necessità di impostare strategie dal momento che non tutte le specie godono di uno status di tutela adeguato e la Direttiva HABITAT non è sempre uno strumento sufficiente.

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## **Taxonomy and distribution of *Santolina* L. (Asteraceae) in Italy: an overview from the early Italian floras to present**

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*Santolina* L. (Anthemideae) is a genus composed of 26 species of aromatic dwarf shrubs endemic to the western portion of the Mediterranean Basin. Since the 1800s until the second half of the last century, drastically differing taxonomic treatments were proposed for the Italian populations. For instance, in 1853 Bertoloni reported just three taxa, whereas in 1927 Fiori reported six. A peculiar case is given by Guinea, who proposed six taxa for the Italian territory in 1970, and just three in 1976. The incongruences among the taxonomic treatments can be due to the low number of diagnostic morphological characters, and the misinterpretation of *S. chamaecyparissus* L. *sensu stricto*, a widely cultivated pentaploid species that is naturalized in ephemeral spots throughout the peninsula. Indeed, several occurrences of *Santolina* in continental Italy were later attributed to naturalized populations of this latter species. A long lasting taxonomic stability was reached in the second half of the last century, thanks to the qualitative morphological and karyomorphological studies by Marchi and Arrigoni. This latter author reported six native species for Italy in 1982: four of them are endemic to the peninsula and occur in relatively restricted areas, while two of them occur in Sardinia. Currently, a quantitative integrated taxonomic approach is ongoing to elucidate the relationships among the species of the whole *S. chamaecyparissus* complex, including all the Italian taxa. According to new systematic knowledge, *Santolina insularis* (Gennari ex Fiori) Arrigoni (putatively endemic to Sardinia) has to be considered as a heterotypic synonym of *Santolina corsica* Jord. & Fourr., a Sardinian-Corsican endemic polyploid. Conversely, morphometric, phylogenomic, and comparative niche preliminary analyses suggest that the four peninsular Italian endemics are good species. Accordingly, five native species occur in Italy, and *S. chamaecyparissus* and *S. virens* Mill. also can be found as aliens.

**Keyword:** Mediterranean Basin, endemism, systematics, Anthemideae, biogeography

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## **Recent range contraction in *Berardia subacaulis*, an endemic species of the Southwestern European Alps.**

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Late Quaternary glaciations left an enduring imprint on the distribution of species and their genetic structure. Up today, in the European Alps, two patterns have been detected: the post-glacial expansion and the long-term stability (mainly by altitudinal shift), while an expansion during glaciation, followed by a population contraction after glaciation has never been detected. We used species distribution models to estimate the paleodistribution of *Berardia subacaulis* Vill. (Asteraceae) throughout the last 28 Ky and generated genome-wide sequences to estimate current patterns of spatial structure of genetic diversity. Integrating the results of the two independent approaches, we tested five demographic models under an Approximate Bayesian Computation framework. The species has weak genetic differentiation among populations, with two main genetic groups. Species distribution models showed a reduction in potentially suitable areas for *B. subacaulis* during the post-glacial warming and demographic models identified a recent split (2.46 Kya) between the two groups. We provide empirical evidence of post-glacial demographic contraction for an endemic plant in the Alps during the Late Quaternary. The pattern observed might be due to several factors. First, the Southwestern Alps (SW Alps), where the species grows, were characterized by greater availability of ice-free terrain during the last glacial maximum because of the Mediterranean Sea mitigation that maintained temperatures some degrees higher than in the rest of the Alps. Second, the SW Alps were characterized by relatively high precipitation, which, combined with the ice-free areas, might have allowed the species to persist or even expand in most climatically suitable areas at high altitudes during the last glacial maximum. Future research in areas where the ice cover was less extensive will contribute to a more complete understanding of the role of climatic changes in shaping the highly endemic biota of the Alps.

**Keyword:** Paleo-endemic plant species, genotyping by sequencing, past climate change, post-glacial contraction, species distribution models, Global warming, Approximate Bayesian Computation

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## **Three centuries of biodiversity in the city of Verona**

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The first monitoring of flora and fauna in the city of Verona dates back to the 19th century. Many of the specimens sampled at that time are still present in the collections of the Natural History Museum and can therefore be used for taxonomic updates and statistical analyses. A recent survey of the flora and studies on specific animal taxa make it possible to estimate the current biodiversity and compare it with data collected in the past. Special emphasis was given to the number and spatio-temporal distribution of alien species in the urban area and to the presence of species included in protection lists. Data analysis revealed the presence of some biodiversity hotspots within the studied area. These include the Adige River banks, the city walls and the ramparts, which also act as important ecological corridors that, crossing the city, interconnect the surrounding natural areas.

**Keyword:** Flora, Fauna, alien species, urban biodiversity, ecological corridors, Veneto, Italy

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## **Museums repositories of biodiversity**

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Field research, the implementation and preservation of collections, and the dissemination of data for research use are the core of the 'mission' of natural history museums. The majority of actions aimed to the knowledge of biodiversity in Italy have made use of the data stored in museum collections. Some examples of historical and current collections that have contributed, and can still contribute, to the knowledge of the biological diversity of our territory are presented. These represent useful case studies to identify the usefulness of naturalistic collections in monitoring biodiversity, its evolution over time and the dynamics that have determined it.

**Keyword:** Natural History Museums, collections, data mining

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## **The vascular flora of Latium: updates and biogeographic remarks**

Fernando Lucchese

The conservation of animal and plant species is an urgent issue; therefore, a constant effort is needed to update and complete biodiversity data at all levels of management (community, national, regional and local). The vascular flora of Lazio includes a total of 3.380 taxa, which are divided into 2.873 native taxa and 507 alien taxa. The native flora of Lazio includes 2.730 species, 821 genera and 130 families, while the alien flora consist of 489 species, 316 genera and 99 families. The areas in which a high number of native taxa is observed fall both in the inner mountainous areas (eg M. della Laga, M. della Duchessa, Terminillo, M. Simbruini, etc.), and in the coastal areas (eg. Castelporziano, Circeo, Prom. rio di Gaeta) or closer to the coast (such as the urban area of Rome or M. Aurunci). The areas which show a smaller number of native taxa are placed, on the other hand, in zones with a prevalent agricultural vocation such as eg. the Pianura Pontina, the Alta Tuscia Laziale and some hilly areas of the Sacco Valley. The areas with the highest biodiversity are also those that host a flora of greater biogeographical value. Overall, 186 endemic taxa and 44 subendemic taxa are found in Lazio region. Populations of native taxa that are located at the southern limit of their range along the Tyrrhenian side of the Italian peninsula are 290, while those occupying the northern limit of their peninsula range on the Tyrrhenian side are 169. Observing the distribution maps of the native vascular flora of Lazio, it is possible to recognize some recurring patterns in which taxa with similar ecological and biogeographical features are present. The most frequent regional chorotypes are that of mountain and / or high mountain species (666 taxa) and that of littoral species (178 taxa).

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## **Island species–area relationship (ISAR) of Orchids in Central West Mediterranean Basin.**

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Considered as one of ecology's few laws, the island species–area relationship (ISAR) is widely used to explain patterns of biodiversity distribution. Orchidaceae count more than 28.0000 species worldwide and the adaptation to specific pollinators is the main driver of their diversity. Here, based on presence-absence matrix, we investigate the insular biogeography of orchids across the Central West Mediterranean Basin, globally recognised as a biodiversity hotspot. Indeed, despite the relevance of orchids in the European flora and the several studies conducted on their pollination syndroms, very few investigations are focused on their geographic distribution in the Mediterranean Basin. Our final list comprises 135 islands and 140 orchid species. We intend to investigate the ISAR in the Central West Mediterranean Basin, if islands with volcanic origin show lower species richness than expected by ISAR for those with a continental origin and the small island effect and its eventual relationship with pollination strategy. In order to propose scientific-based conservation programs to preserve these unique life-forms, further studies are required to complete the knowledge of the orchid diversity in this hotspot of biodiversity.

**Keyword:** island species–area relationship (ISAR), island biogeography, Mediterranean region, phytogeography, Orchidaceae, presence-absence matrix

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## **Risultati di un sondaggio sul declino degli insetti in Italia**

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Gli autori hanno lanciato un sondaggio proponendo una serie di domande agli entomologi italiani per conoscere la loro opinione sullo stato di salute delle popolazioni di insetti in Italia. Il sondaggio è stato diramato attraverso la piattaforma 'entomologiitaliani.it', la Società Entomologica Italiana e l'Accademia Nazionale Italiana di Entomologia. Al sondaggio hanno partecipato parecchie decine di entomologi che hanno dato interessanti risposte, le quali confermano in Italia quanto sembra ormai accertato in buona parte d'Europa e anche in altri Paesi: le popolazioni di insetti sono andate diminuendo nel corso degli ultimi vent'anni. Le cause possono essere molteplici, ma ancora è molto difficile comprendere cosa c'è a monte di questo declino. Gli autori riportano la statistica dei risultati del sondaggio e si intrattengono su quelle che sono ritenute le principali cause di quello che da più parti è definito 'insect apocalypse'

**Keyword:** Sondaggio, Declino insetti, Cause

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## **Verifica sullo stato attuale dei vertebrati terrestri nelle isole italiane, alla luce delle più recenti azioni intraprese per la loro conservazione**

Marco Masseti

International Union for the Conservation of Nature (IUCN) e Società Italiana per la Storia della Fauna "Giuseppe Altobello"

Per la loro stessa definizione, le isole rappresentano ecosistemi molto particolari, spesso caratterizzati da elementi biologici esclusivi raggruppati in biocenosi molto vulnerabili a qualsiasi interferenza esterna. Nel corso dell'Olocene, le isole italiane hanno subito variazioni faunistiche prevalentemente imputabili all'azione antropica. L'attuale situazione dei locali vertebrati terrestri è in molti casi piuttosto critica non solo per gli effetti prodotti nel corso delle epoche storiche ma anche per la discutibile gestione che ne stanno facendo alcune delle organizzazioni che dovrebbero essere invece preposte alla loro protezione e conservazione.

*By their very definition, islands represent very particular ecosystems, often characterised by exclusive biological elements grouped in biocenoses that are very vulnerable to any external interference. During the Holocene period, the Italian islands have undergone faunal variations mainly due to anthropic action. The current situation of the local terrestrial vertebrates is in many cases rather critical, not only because of the effects produced in the course of the historical periods, but also because of the questionable management that some of the organisations that should be in charge of their protection and conservation are doing.*

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## **Different biogeographic histories in the Mediterranean-Macaronesian genus *Stenostoma* (Coleoptera, Oedemeridae)**

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The complex geological history of the Mediterranean basin reflects in the intriguing patterns of distribution of the species that inhabits it. The false blister beetle tribe Stenostomatini, including only the genus *Stenostoma*, has mainly a circum-Mediterranean distribution: three species show a relic range on both volcanic (Pantelleria: *S. cossyrense*; and Madeira: *S. lowei*) and continental (Sicily, Malta and Gozo: *S. melitense*) Mediterranean-Macaronesian islands, while *S. rostratum* is widely distributed along the Mediterranean-Atlantic coasts. Here, the four species of the genus *Stenostoma* are analysed morphologically and molecularly to understand their phylogenetic relationships and to try to delineate the possible biogeographic scenario leading to such distribution. Molecular analyses (nucDNA and mtDNA) revealed some discrepancies with morphological observations and evidenced a complex evolutionary and biogeographic history of the genus. In particular, the speciation of *S. cossyrense* seems the consequence of a very recent dispersal and founder effect that produced a great morphological differentiation from the other species, which, however, is not reflected in molecular results. The observed distribution of the genus *Stenostoma* might be interpreted as an origin by dispersal episodes for *S. lowei* and *S. cossyrense*, and vicariance events for *S. melitense*. The specialised dispersal strategy of *S. rostratum* (by eggs and larvae developing inside beached wood carried by the sea) evolved only in this stenoeocious dune species and likely allowed such a wide distribution along the Mediterranean and Atlantic coasts. Despite its wide range, no geographic structure was found by the genetic analysis of a few specimens of *S. rostratum* from different localities, but this preliminary result needs more thorough and dedicated study. Molecular clock analyses and biogeographic reconstruction with a parametric approach are ongoing to shed light on the fascinating distribution of the tribe Stenostomatini.

**Keyword:** Molecular Phylogeny, Biogeography, Stenostomatini

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## Updating floristic knowledge through herbarium digitization: the Herbarium Guadagno and the checklist of the Italian vascular flora

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Herbarium specimens document spatial and temporal patterns of plant diversity, representing an invaluable source of data for a wide range of research, from taxonomy and systematics to biogeography and ecology. In recent years many efforts have been made to digitize herbarium collections and make them available to the scientific community. The digitization process – i.e. the capture and organization of images and metadata from herbarium labels – is a crucial first step in transforming this amount of data into accessible and usable information. In this framework, since 2017 the Herbarium of the University of Pisa started a process of digitization, particularly focused on the Herbarium of Michele Guadagno (1878–1930), an amateur botanist active between 1890 and 1926. A unique ID was assigned, and a high-resolution image was acquired for all specimens. At the end of this process, it was possible to establish that the Herbarium Guadagno consists of 44,350 specimens, many of which collected from central and southern Italian peninsula. At April 29th, 2022, 28,260 out of 44,350 specimens were also completely digitized concerning metadata. Accordingly, we have been able to detect potential floristic novelties for the Italian vascular flora. After a preliminary taxonomical and distributional check of the completely digitized specimens, about 5% of 16,200 specimens collected in Italy were labelled as taxa not reported for one or more Italian regions. About 15% of these putative novelties were revised by default based on geographical distribution (e.g. northern specimens attributed to *Crocus neapolitanus* (Ker Gawl.) Loisel. revised as *C. neglectus* Peruzzi & Carta), whereas the remaining 85% need an accurate check of their identity. Of these specimens, preliminary data suggest that 15% are potential novelties at national level whereas, at regional scale, 30% concern from Campania, followed by Abruzzo (15%), Calabria (10%), and other regions (30%).

**Keyword:** Herbarium digitization, floristic novelties, Italian vascular flora

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## **Biogeografia partecipata: il progetto gatto selvatico Italia**

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Most Felids are known to be elusive species, whose detectability in the field is often limited by several factors (e.g. mainly crepuscular or nocturnal activity, low population densities, preference for dense cover). Gathering reliable data on their presence and distribution can hence be a demanding activity, hard to be carried out at a wide scale and in the long term. The European wildcat provides a leading example in this respect. Historical national maps of the species suffered from paucity of data and were produced as a compendium of several information of different nature, unevenly distributed in time and space. Over the past decades, biodiversity data gathering solutions inspired by citizen science principles have been successfully applied to several species, whose monitoring greatly benefitted from a network of potential observers. The Italian Wildcat Project ([www.gattoselvatico.it](http://www.gattoselvatico.it)) is among the first experiences in Italy of a country-wide survey that combine institutional wildlife monitoring and citizen science data collection, aiming at taking the most from the combination of both data sources. The project builds upon the facilities provided by the NNB: "National Biodiversity Network" promoted by the Ministry of Ecological Transition and managed by the National Institution for the Protection of Environment (ISPRA). An example to be possibly extended to other species of conservation concern.

**Keyword:** European wildcat, citizen science, national biodiversity network, national survey

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## Which Biodiversity for the Italian Forests ?

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The ongoing process of spontaneous regrowth of forests throughout Italy, due to the abandonment of larger areas of former arable land and pastures, triggered a debate on a predicted global loss of biodiversity. Voices are raised on the need to prevent this, since forests are assumed to host a lower degree of floral and faunal species richness in comparison to open habitats. On the same line of thinking, artificial openings in forests which gradually achieved close canopies due to decrease in the frequency of coppicing during the last decennia are required by conservationists in order to improve site biodiversity. This "natural" rewilding, this outstanding forest recolonization and recover, supposed to induce negative impacts on the global biodiversity in the involved territories, is a quite bizarre paradox which deserves "botanical" attention.

Here, we revisit some aspects of forest succession emphasizing the unquestionable fact that nearly all forests belonging to the natural assessment of the zonal forest communities in the country, do have an extremely low amount of associates among vascular plants in the understorey, when reaching late successional stages. This is particularly true for the broadleaved evergreen Mediterranean forests at low altitudes, as well as for the temperate deciduous nearly monophytic *Fagus* forest and for the coniferous forest of *Picea* at higher altitudes. A rich understorey usually is the result of previous impacts due to ancient forest grazing, shifting cultivation, forest fires or subrecent coppicing. Most of the present day forest flora of nearly all forest stands in the country is therefore represented by ingressive species from historical anthropogenic openings, since the onset of the agrarian colonization.

This type of species richness is hardly accounting for a desirable and degree of forest biodiversity and most misleading as goal for nature conservation, since it basically focuses on degraded aggregations from the point of view of forest succession. Considering the huge impact of these issues on future forest management, especially in protected areas, we argue against a scientific opinion which acritically sees with biological concern the new spread of forests into formerly cultivated spaces or pastureland and against a forest management aiming to keep stands at a steady state of coenological degradation in the name of biodiversity. Considering the extremely low amount of old-growth forests in the country, we support the need of preserving larger areas of incipient late successional forests with a poor stock of associates among vascular plants in the understorey, as only and most representative stands for their corresponding natural biomes.

**Keyword:** Biogeography, Succession, Phytodiversity, Old-growth Forests, Open Habitats, Conservation strategies, Cultural Indicators, Ecosystem restoration, Plant species richness, Protected areas,

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## **Potential spread of invasives Fabaceae (subfamily: Mimosoideae) in Italy predicted from stand vs regeneration species distribution models.**

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The Mediterranean Basin have many invasive plant species, for which the use of species distribution models (SDMs) is a standard tool to assess their potential spread. SDMs are usually created with WorldClim bioclimatic variables, yet, temperatures available on the database correspond to air conditions above 2 meters of the ground. Interestingly, species occurrences also relate to previous conditions used in the early and smaller stages of development, so if species grow in open conditions, one assumption is that environmental layers could also predict their potential regeneration distribution. Here, I compared the "stand" (WorldClim) vs the "regeneration" SDMs, using twelve invasive Mimosoideae species in the Mediterranean Basin, and then I assessed its potential spread in Italy. Occurrences were gathered from iNaturalist and GBIF, while "regeneration" models were created with bioclimatic variables between 0-20 cms of the ground, from the Global Maps of Soil Temperature. Per each of the 24 models, 510 candidate hyperparametrized models were evaluated with the SDMtune R package and selected by reducing the AUC difference between training and validation sets. Final SDMs were projected with MaxEnt, using 50 replicates. *Albizia julibrissin* and *Acacia dealbata* had higher suitability predicted by an overlap of both models, while *Acacia melanoxylon* and *A. longifolia* failed to be predicted in Italy, although they had already been naturalized in other areas of the Mediterranean Basin. Only *Vachellia karroo* had higher suitability predicted by the "stand" model. On the opposite, *Acacia mearnsii*, *A. pycnantha*, *A. retinodes*, *A. saligna*, *Leucaena leucocephala* and *Paraserianthes lophantha*, have an area predicted by the "regeneration" model higher than the stand model, with higher suitability in Sardinia and Sicily. This suggests that early development conditions for these species could be more favourable than expected, and species may have a higher potential spread if kept unattended.

**Keyword:** Fabaceae, Introduced, Prediction, Soil Temperatures, Acacia

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## **Biodiversity. Prospecting the role of nature museums in the Italian recovery plan.**

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The study of biodiversity, from alpha-taxonomy to population dynamics and metagenomics, is a prerequisite to all forms of long-term development and sustainability and should be considered ahead of any planning in economics. Our society's culture is flawed if it does not include knowledge of how life evolved, how ecosystems originated, and how these function. It is therefore difficult to understand how humans have become the new selective force on Earth, characterizing with their actions a new geological era, the so-called "Anthropocene". Knowledge of biodiversity and its protection has become central to EU policies. The Italian Recovery Plan will finance what should be the primary focus of any investment on our future: nature, biodiversity, and our natural heritage. The Italian Government has clearly shown a strong commitment to the whole issue of biodiversity by paying attention and financing a new National Centre for Biodiversity. Italy does not have a central institution dedicated to biodiversity research, has never encouraged the training of new generations of taxonomists and, owing to a peculiar geopolitical history, is one of the few European countries without a national natural history museum. However, in Italy there are hundreds of science and nature museums whose institutional mission is to collect and preserve natural history specimens, perform biodiversity research, and engage people with science. This talk aims to stimulate a debate on the manifold old and new roles of natural history museums in relation to the new NCB. Main points are as follows. Exploration of biodiversity in space and time ensuring conservation of all collections. Increase centers of expertise on the taxonomy of organisms. Enhance effective digitisation of the heritage of natural history museums scattered over the country. Participate in international networks (CETAF), and digitisation initiatives (DiSSCo and GBIF). Activate communication, outreach and education programs. Involve citizenship in activities in the field. Build and implement large "showcases" of nature and biodiversity both at local and national levels for raising awareness on biodiversity issues and build up cultural capacity in science.

**Keyword:** Natural History Museums, National Center of Biodiversity, Collections, Taxonomy, Communication

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## **From CollMap to CollMap 2.0 - Management and follow up of the Italian project.**

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CollMap (mapping the natural history collections of the Italian scientific museums) is a national project managed by ANMS (National Association of Scientific Museums). Co-financed by MIUR (Ministero dell'Istruzione, Università e Ricerca), leads a screening of more than 600 national museums and research institutions quantifying their numerical consistency, taxonomic and biogeographical value, laying the foundations for their complete digitization. (<http://www.anms.it/collmap/> 5). CollMap started as a first step to activate the creation of a diffuse Italian museum system, a national hub to ensure the optimization of the management of national collections. This provides support and coordination of taxonomic research for the study and management of biodiversity, thus eliminating the chronic taxonomic impediment. CollMap has provided data on a large percentage of the public heritage of collections that science museums make available to the Nation. This facilitates the major digitization process started this year, 2022, by the National Centre for Biodiversity (CNB), financed by the funds of the PNRR. The remarkable Italian political decision serves to optimize work on our natural history collections and current taxonomic skills, providing rational modalities, professional support and infrastructure and hopefully, career paths for young scientists. Thanks to the collaboration with the LifeWatch-ITA infrastructure, CollMap has undergone a revision of the original contents, to ensure a professional structure of data management, aimed at a complete integration with the metadata database, already operational on the ANMS website. CollMap 2.0 is now a new database with revised, controlled, implemented data relating to registry of institutions, unique identifiers of institutions and/or collections (idGrBio and HI), categories and themes of the collections, accreditation and contacts, ready to be properly used by the new CNB.

**Keyword:** CollMap, Metadata, Natural history collections

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## **Long-term change of inner-alpine dry grassland species composition differs between protected and non-protected sites**

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The Val Venosta in South Tyrol (IT) is one of the few remaining inner-alpine valleys in Central Europe that today still features highly diverse and ecologically valuable semi-natural dry grassland habitats. Long-term changes in the composition of these grasslands have rarely been assessed due to data scarcity. This might, however, allow conclusions on ecological effectiveness of conservation measures like habitat protection. Our primary strategy is based on the reassessment of historical sampling sites documented by Josias Braun-Blanquet. For localization of the historic sites, we filtered all historically available terrain information with a digital elevation model and confirmed the potential sites by in-situ inspection. We re-identified 51 dry grassland sites and excluded 27 sites due to successional processes to forest or non-traceable historic site descriptions. We extended classical pairwise ordination methods by novel model-based approaches to assess species-level contribution to compositional differences on protected vs. non-protected sites over time based on species frequencies. Our analysis shows two main tendencies: Today's protected dry grassland sites that still feature a managed grazing system, maintained a more closely related species composition to the historical dry grassland habitat with a high frequency of typical character species. Non-protected sites are characterized by successional processes mostly due to changes in land use. This does not necessarily lead to poorer species diversity but allows different species to assemble within the sites deriving from neighboring habitats. The results emphasize that protection measures are an important tool to maintain dry grassland habitats.

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