



The role of citizen science in monitoring and characterizing the habitat of the annex II-IV target species *Himantoglossum adriaticum* H. Baumann

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Himantoglossum adriaticum H. Baumann

It is a terrestrial orchid, listed in the Annexes II-IV (Dir. 92/43/EEC) of Habitat Directive 92/43/CEE .

Unmistakable morphology

- Flowers with a flashy, trilobate labellum; the central lobe is greatly elongated and wavy/spiral-shaped, unmistakable even to the inexperienced observer!

Ecology

- It occurs in **secondary and transitional habitats** up to **1600 m a.s.l.**, including **Calcareous dry grasslands and open woodlands**, and woodland edges.

Code	Kingdom	Family	Annex HD	EU Red List IUCN (*)	IT Red List IUCN (*)
4104	Plantae	Orchidaceae	II-IV	LC	LC

MS/EU28	Region	Curr. CS trend	Curr. CS
EU28	ALP	↓	U1
EU28	CON	→	U1
EU28	MED	→	FV
EU28	PAN	→	U1
IT	ALP	↓	U1
IT	CON	→	FV
IT	MED	→	FV

Conservation status of *Himantoglossum adriaticum* in the different biogeographic regions of Europe and Italy (ex. art. 17 Habitat Directive (92/43/EEC))



Aim of the study

1. Demonstrate the potential role of citizen science in monitoring easy-recognizable species
2. Characterize the species' ecological preferences and habitat to provide useful knowledge for targeted monitoring and conservation strategy in central Italy. Improve knowledge on the distribution of *H. adriaticum* in Umbria.



1. Citizen science

Study area

The study took place in Umbria, central Italy.



Materials and methods:

Citizen Involvement in Monitoring *H. adriaticum*



- An informational flyer with pictures and reporting instructions was created to engage citizens in monitoring *H. adriaticum*.
- Citizens were asked to take photos of the plant and report the precise spatial coordinates and population size using their smartphones.
- The flyer was spread in social media, fairs, and LIFE IMAGINE website

1. Citizen science

Data sources

- Records from citizens
- Online databases (e.g., iNaturalist;)
- Social media (Facebook), facebook group “spontaneous orchids in Umbria”
- Records collected by the G.I.R.O.S – Italian group of research about Orchids
- "Carabinieri Biodiversity Department of Assisi“
- Records collected from our research group
- Bibliographic data



Materials and methods

Validation:

- photographic documentation from citizens was analyzed for record verification.
- Also, many stations reported by citizens have been checked on field and monitored by our research group

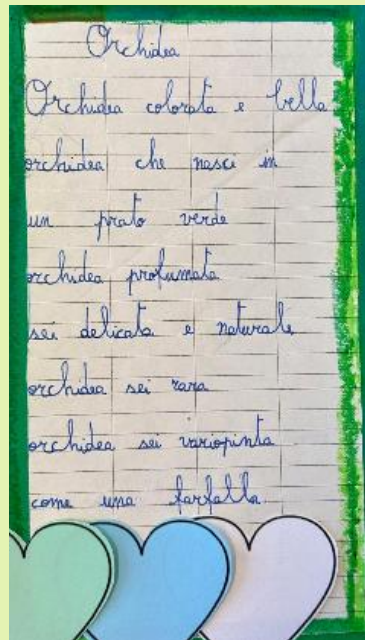
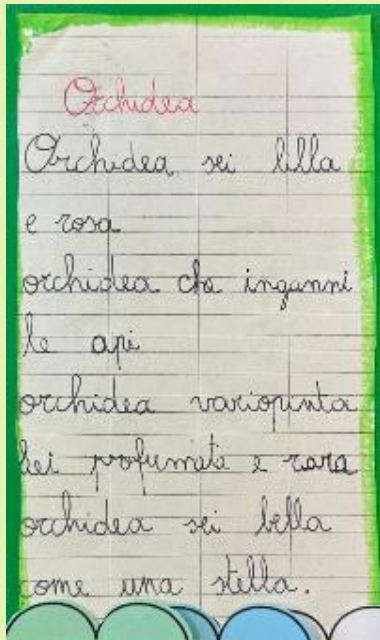


1. Citizen science

Educational Activity with children

A population of the orchid found in a primary school was used by the teacher to realize environmental education activities, with the collaboration of our research group, focused in different labs:

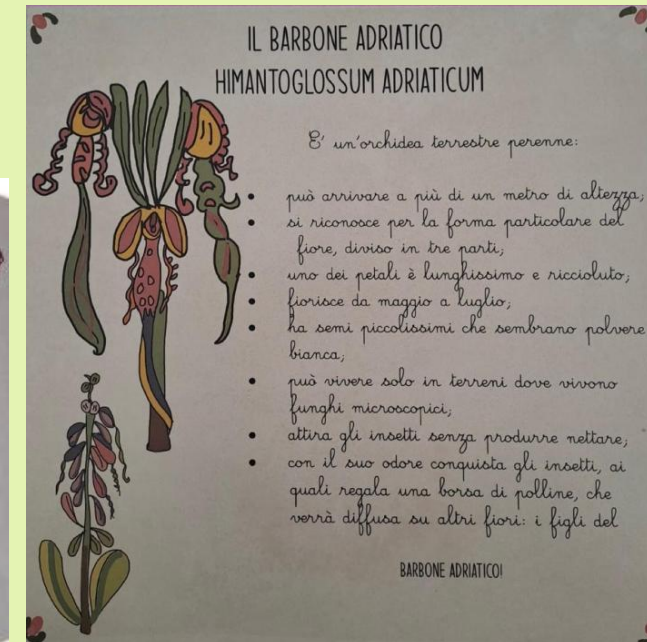
Poetry



Art



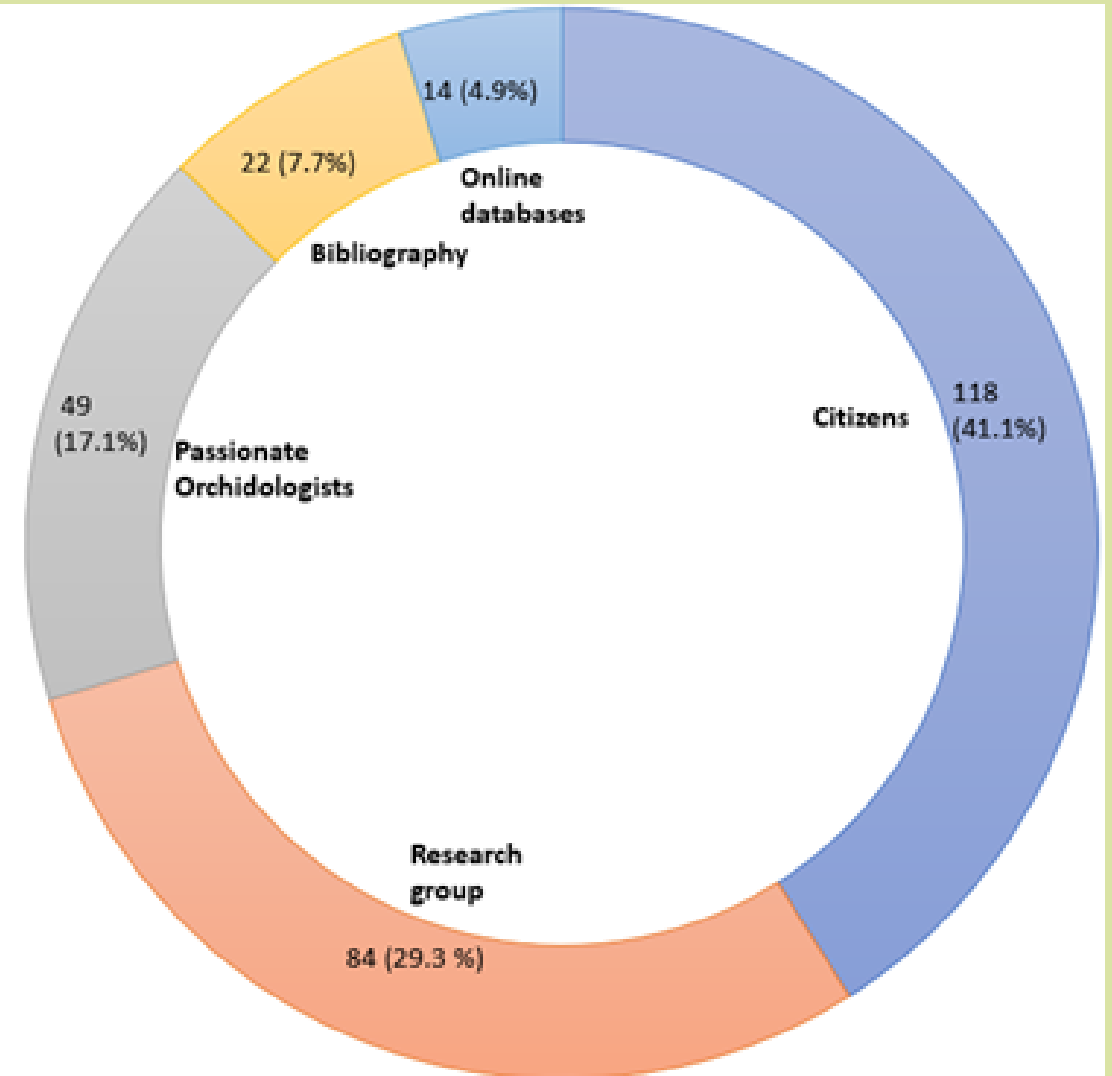
Science



1. Citizen science

Results: reports contribution

- We collected 300 new records of *Himantoglossum adriaticum*, the majority of which have been reported by Citizens (41.1%), followed by Research group (29.3%) and Passionate Orchidologist (17.1%)
- Citizen have played a fundamental role during the participative monitoring process!

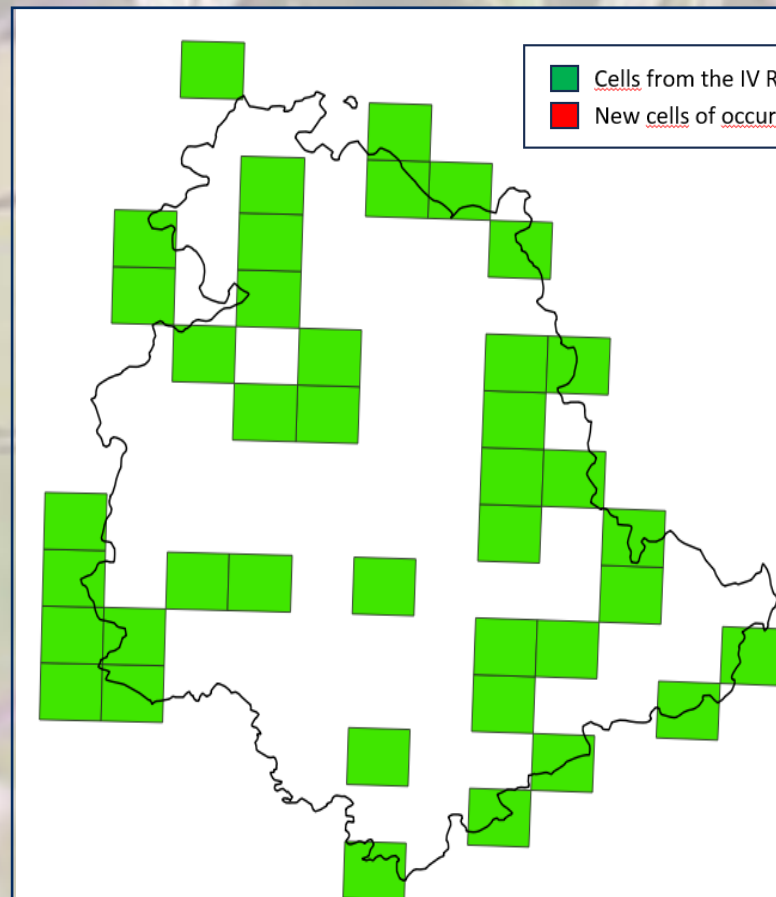


Results: Contribution to V REPORT ex art. 17 of Habitat Directive

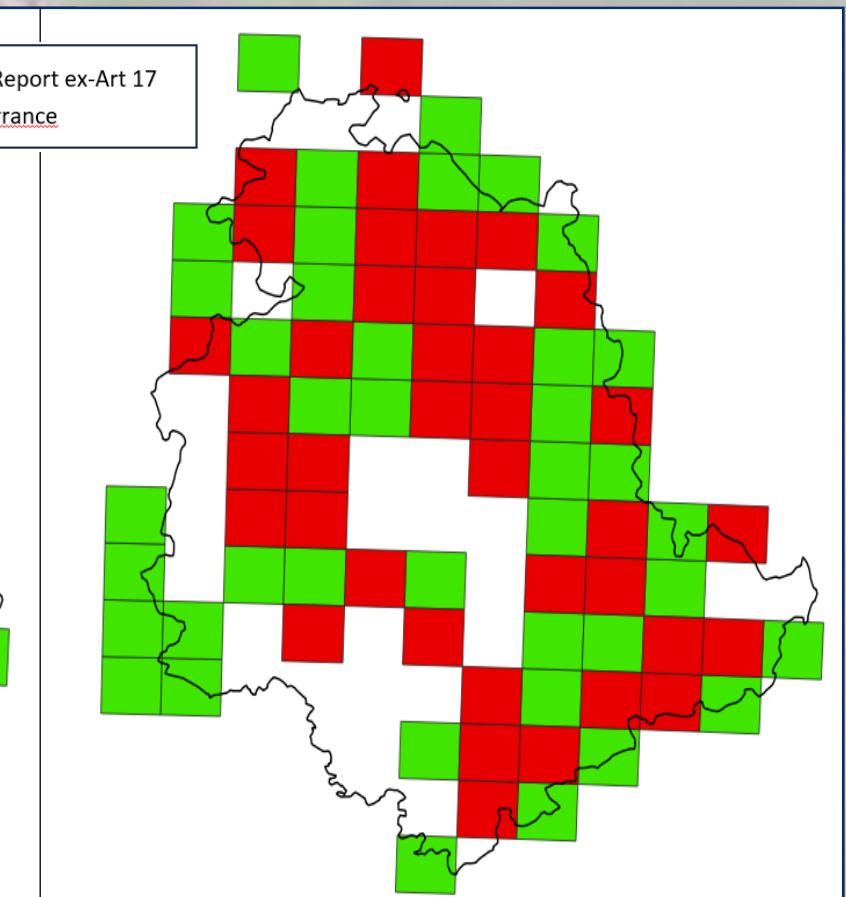
Lambert Grid (10km x 10km) Updates:

- Newly Added Cells: 38
- Previously Confirmed Cells: 24
- **Contribution to Report ex art.17:** Presence cells have more than doubled thanks to the participatory monitoring process!

BEFORE Participatory monitoring....



AFTER Participatory monitoring!



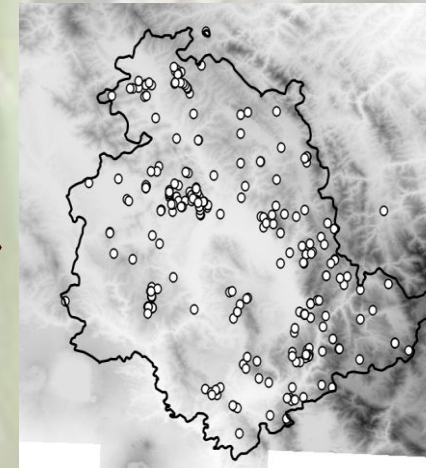
2. Ecological and Geomorphological characterization

Materials and methods

The following datasets were used

- ▶ INGV DEM (Digital Elevation Model) to analyze the distribution of species across different geomorphological parameters.
- ▶ Corine Land Cover (100 m resolution ~ 1:100.000)
- ▶ Carta della Natura (1:50.000)
- ▶ ESA World Cover classification (10 m resolution ~ 1:10.000)

Distance analysis was conducted in QGIS to : measure how far each record is from the borders of its ESA World cover category of occurrence.



Results have been thus represented in Histograms and violin-boxplot graphs, to gain an immediate representation of species distribution across different land cover and geomorphological categories.

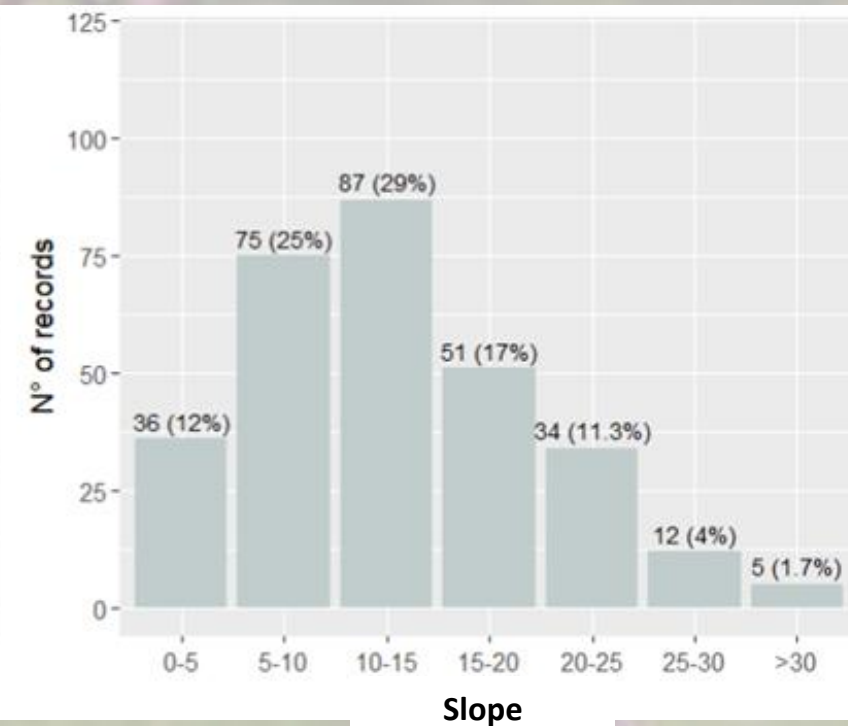
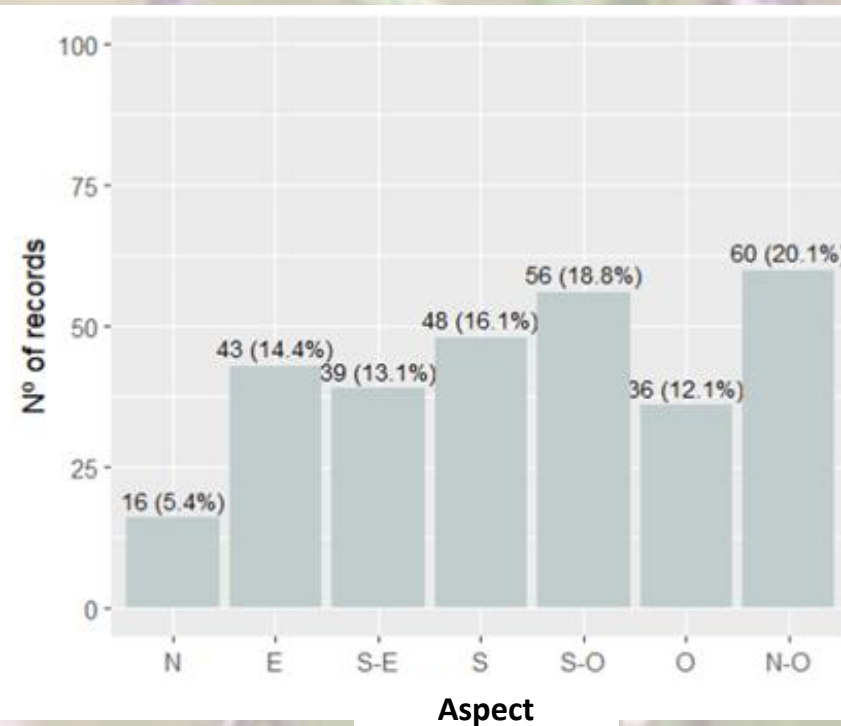
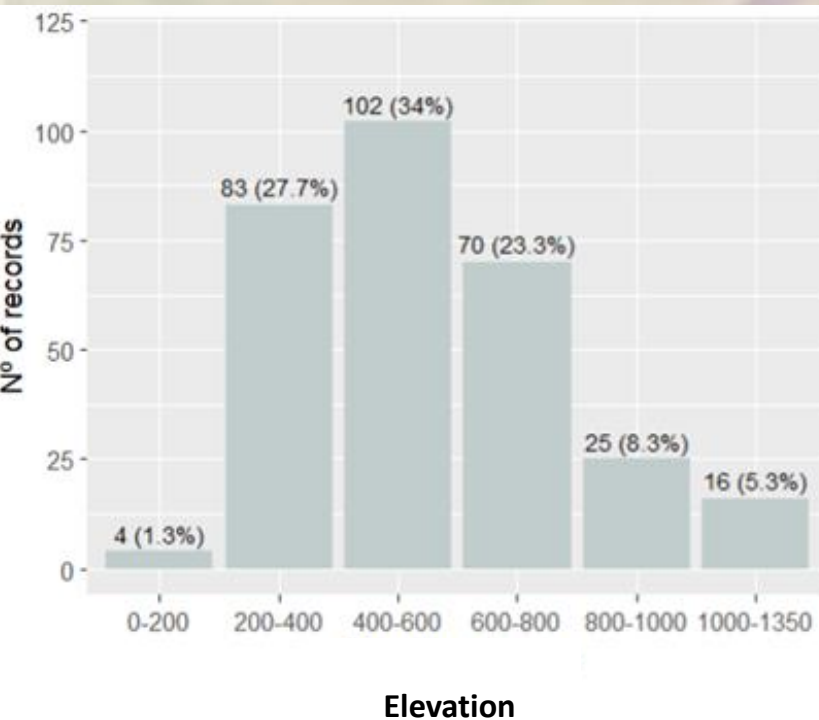
2. Geomorphological characterization

Results

Elevation Preference: Preference for medium elevations (400-600 m a.s.l.), with a gradual decrease at higher altitudes.

Aspect Preference: Predominantly southwest and south-facing locations, suggesting a preference for sunnier exposures.

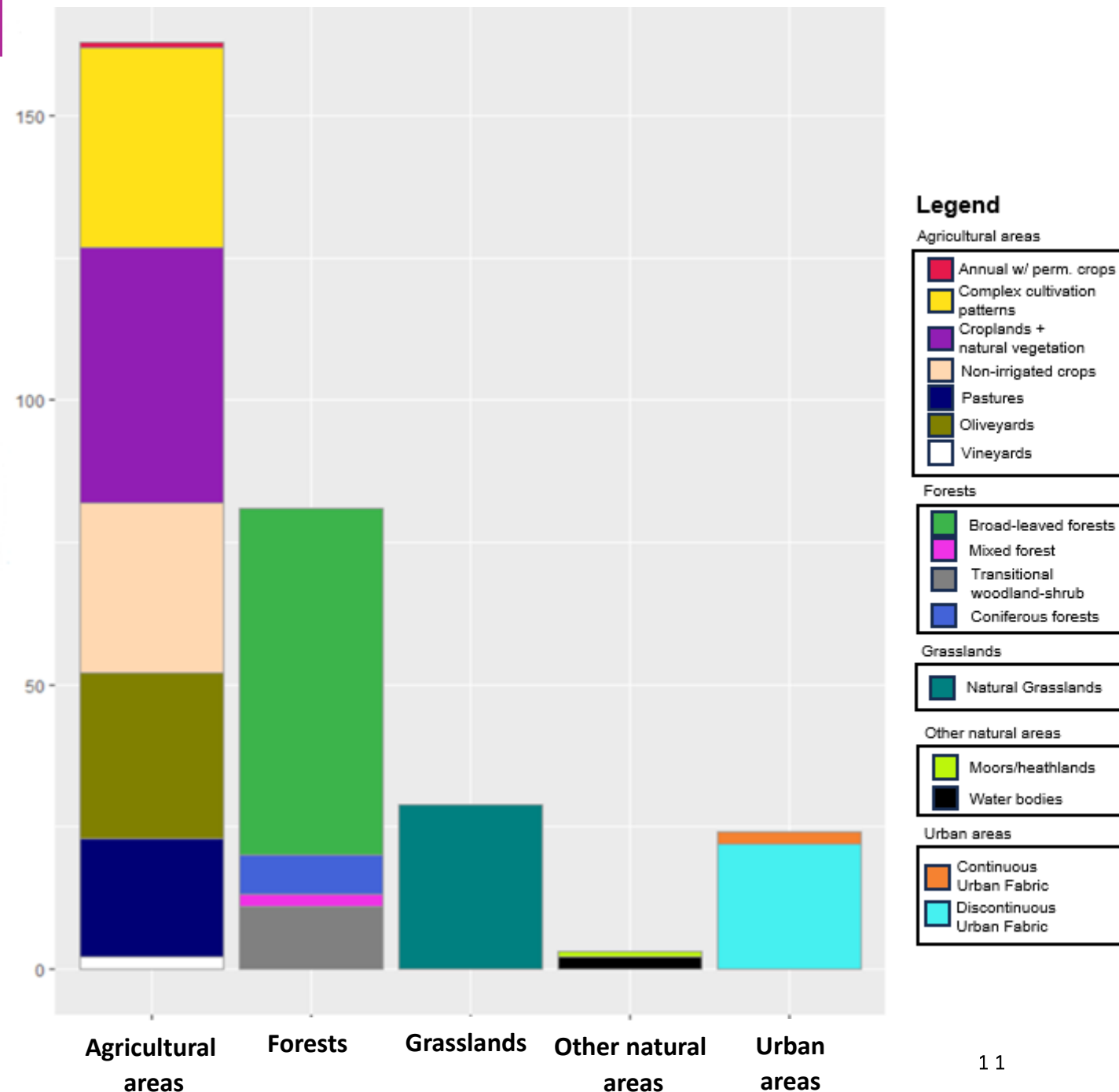
Slope Preference: Favorable to moderate slopes (10-15°), with lower representation in steeper terrain



2. Ecological characterization

Results: Corine land Cover

- **Importance of complex agricultural ecosystems**, offering the simil-ecotonal condition appreciated by the orchid (54%)
- **Broad-leaved forests** is the most represented subcategory (20,3%)
- **Natural grasslands** (9,7%) and **urban areas** (8.0%) are also well-represented

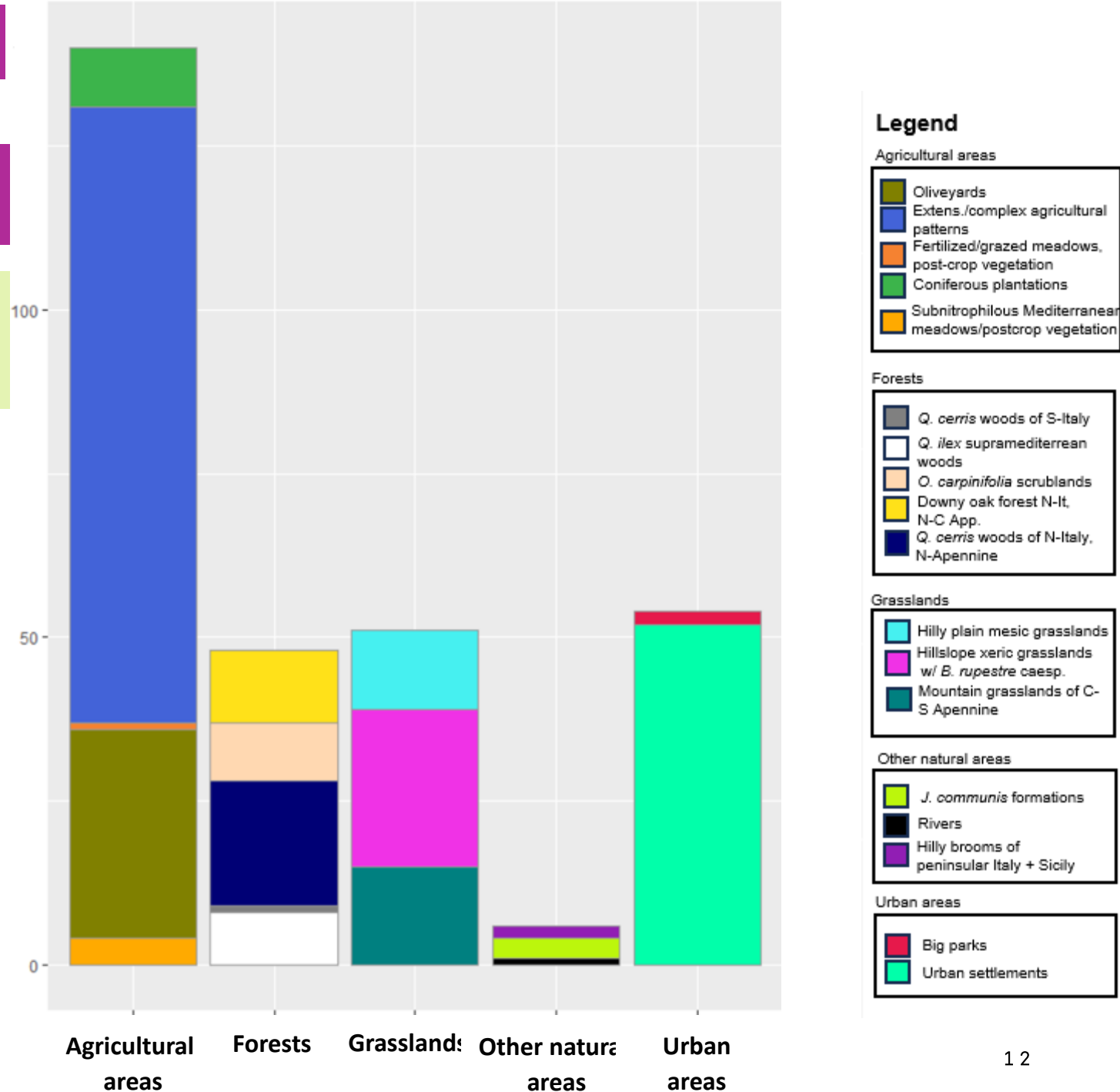


2. Ecological characterization

Results: “Carta della Natura”

Results obtained by Corine land cover analysis are confirmed!

- **Importance of agricultural areas is affirmed:** Relevant are Extensive/complex agricultural patterns (29%), and Oliveyards (17%)
- **Grasslands** (combined total: 21.3%), representing several types of Annex I Habitats are here the 2nd most represented category!
- **Urban settlements** (19%) are well-represented together with **Forests** (16,13%)



2. Ecological characterization

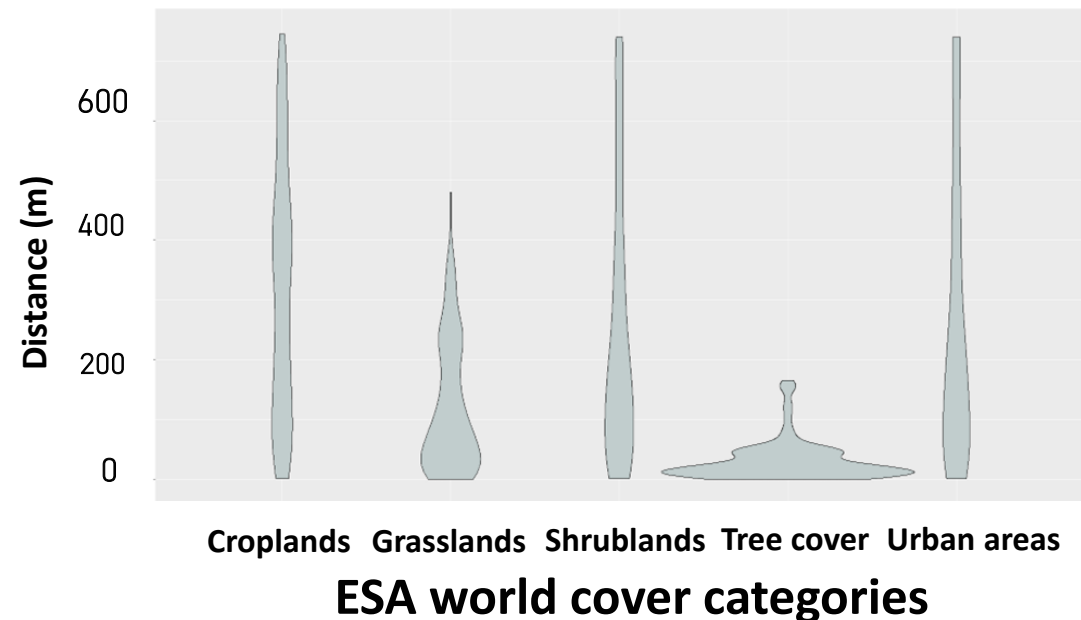
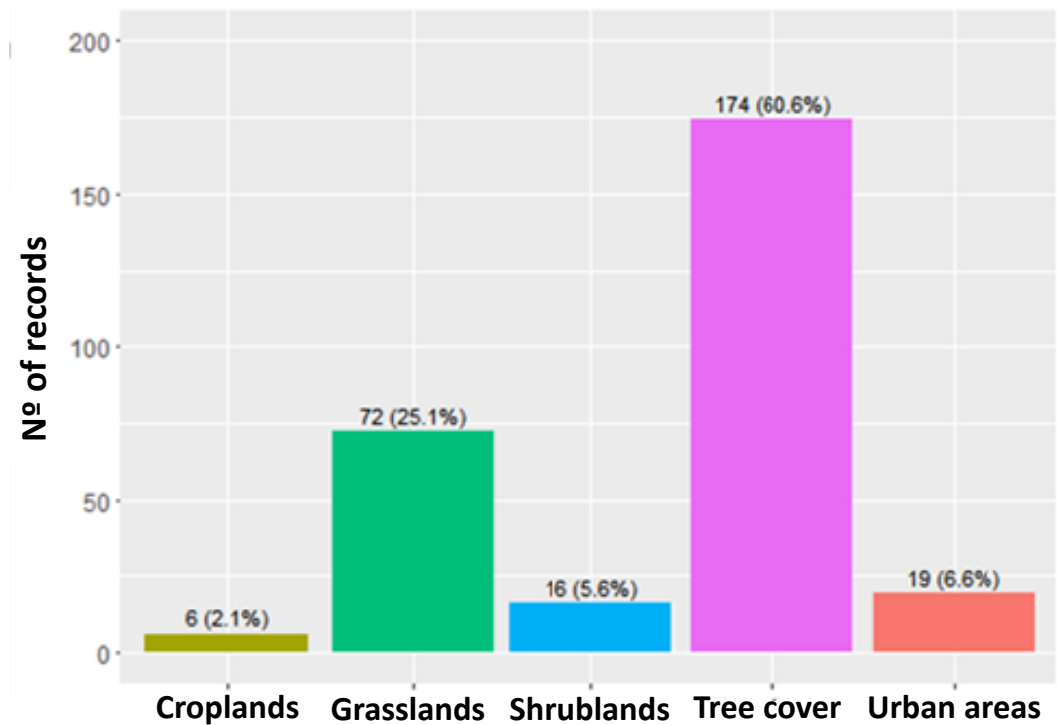
Results: ESA World Cover

Most common subcategories: Tree cover (60,3%), followed by Grassland (25.1%),

The category «Tree cover» includes forests, sparse trees as well as plantations

Analysis of Distances from the border of the occurrence category

The ESA WorldCover categories with the highest number of records located near their borders are 'Tree cover' and 'Grasslands'. This provides further evidence of the species' characteristic preference for edge, ecotonal habitats, both natural and artificial.



Citizen Science as a Valuable Tool for species monitoring

- The participation of non-expert citizens significantly expanded knowledge on *H. adriaticum* distribution in Umbria.
- Citizen Science proved to be an effective method for mapping this orchid due to its easily recognizable features.
- The collected data are supporting the **V Species Report (2018-2024)** ex Art.17 of the Habitats Directive.

Ecological and Geomorphological characterization of *Himantoglossum adriaticum*

- This study provides **new insights into the geomorphological and ecological characteristics** of *H. adriaticum* habitats in Umbria.
- These findings can serve as a **starting point for more targeted monitoring and conservation strategies** in Central Italy.

Conservation Priorities and Management Strategies

- **Preventing grassland abandonment** is crucial for preserving *H. adriaticum* populations.
- Proper **management of transitional areas (ecotones)** in both human-influenced habitats (e.g., roadsides, agricultural areas, olive groves, vineyards) and encroaching grasslands can benefit conservation efforts.
- Encouraging **collaboration with landowners** through agreements and incentives can promote habitat-friendly practices.
- **Citizen involvement** remains key to long-term conservation, reinforcing the role of participatory science.

Thanks for the attention!

