

Schmetterlings-Monitoring Österreich



© S. Gallup, Getty Image
Carterocephalus palaemon

Johannes Rüdiss

Friederike Barkmann, Peter Huemer et al.

 Bundesministerium
Klimaschutz, Umwelt,
Energie, Mobilität,
Innovation und Technologie

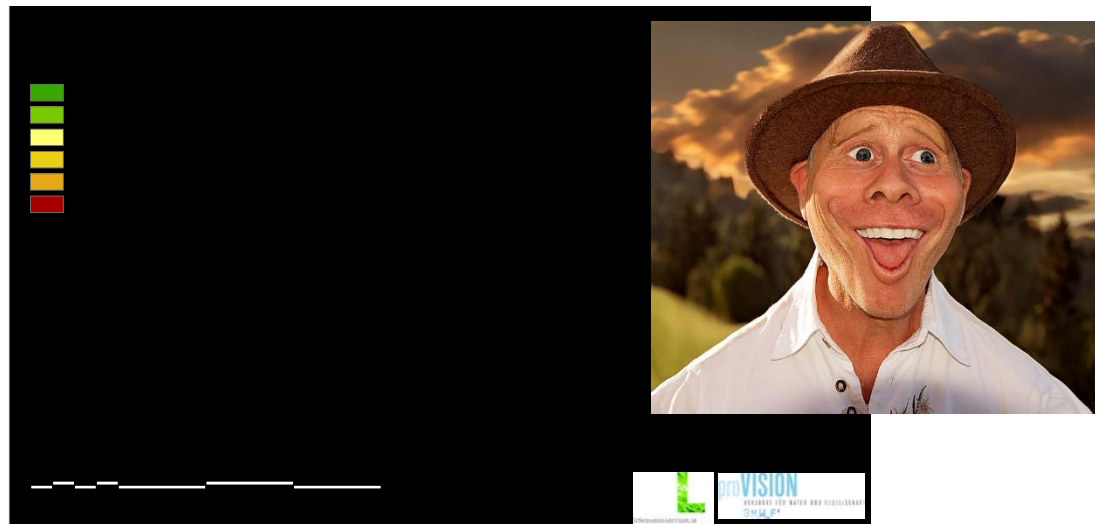


Alles gute zum 20. Geburtstag!



Es war einmal ...

2009 – 2011: Werkzeuge für Modelle einer nachhaltigen Wirtschaft

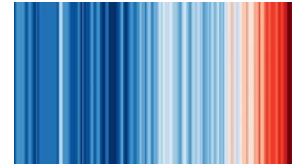
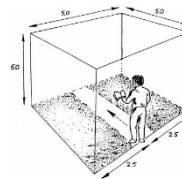
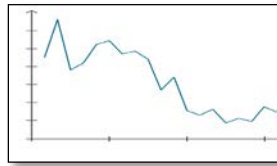
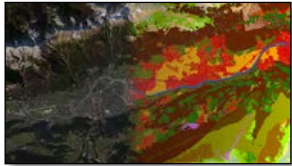


Biodiversitäts-Monitoring Schweiz



Qualitätskriterien Biodiversitäts-Monitoring

- repräsentativ (für gesamte Fläche)
- kontinuierlich
- reproduzierbar (einheitliche quantitative Methodik)
- sensitiv (für Veränderung)
- kommunizierbar
- finanzier- und realisierbar



Vision

Ein von Wissenschaft und Schulen getragenes Tagfalter-Monitoring

- Beitrag zu einem dauerhaften Biodiversitäts-Monitoring
- Bewusstseinsbildung für die Bedeutung biologischer Vielfalt

2013 - 2016



bmwfw



bmwfw

Finalist Citizens (2017) 21-077-088
DOI: 10.1007/s10641-017-0663-3

ORIGINAL PAPER

Simplified and still meaningful: assessing butterfly habitat quality in grasslands with data collected by pupils

Johannes Ruedisser¹ · Erich Tasser² · Janette Wabke³ · Peter Hummer⁴ · Kurt Lechner⁵ · Alois Ortner⁶ · Ulrike Tappeiner^{1,2}

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Abstract Public participation in scientific research, now commonly referred to as citizen science, is increasingly promoted as a possibility to overcome the large-scale data limitations related to biodiversity and conservation research. Furthermore, public data-collection projects can stimulate public engagement and provide transformative learning situations. However, biodiversity monitoring depends on sound data collection and warranted data quality. Therefore, we investigated if and how trained and supervised pupils are able to systematically collect data about the occurrence of diurnal butterflies, and how this data could contribute to a permanent butterfly monitoring system. We developed a specific assessment scheme suitable for teachers and applied it at 10 sampling sites in Tyrol, Austria. Data quality and its explanatory power to predict butterfly habitat quality was investigated comparing data collected by pupils with independent assessments of professional butterfly experts. Despite substantial identification uncertainties for some species or species groups, the data collected by pupils was successfully used to predict the general habitat quality for butterflies using a linear regression model ($r^2=0.73$, $p<0.000$). Applying the proposed

method in a citizen science context with typepeople could support both the long-term monitoring of butterfly habitat quality, as well as the efficient selection of sites for professional in-depth assessments.

Keywords Lepidoptera · Citizen science · Monitoring · Indicator · Data quality · Volunteer

Introduction

Biodiversity assessments and continuous monitoring schemes are important and generally recognized prerequisites to efficiently address the ongoing biodiversity crises (Schneider et al. 2013). Nevertheless, resources for collecting data on biodiversity are—and will always be—limited (Braz et al. 2013; Roldán 2015). Public participation seems to be an interesting option to support the collection and processing of biodiversity data (Dickerson and Johnson 2017; Attanasio et al. 2016), and, at the same time, to generate authentic opportunities for environmental education (Chen and Cowie 2017). Such projects can lead to public engagement and can have transformative learning potential (Rota et al. 2016; Dickinson et al. 2012; Hobbs and White 2012; Lewandowski and Oberbauer 2017). The involvement and contribution of volunteers to academic research by collecting and submitting observation data has a long tradition in ecology and especially ornithology. For decades—the long-running bird counting project in the US has collected data for over 110 years so far—thousands of amateur and professional ornithologists worldwide have been contributing to an otherwise inaccessible database (Fitch et al. 2013). Public participation in scientific research, now often called citizen science (CS) (e.g. Irwin 1995), was for many years rarely reported in scientific publications. However,

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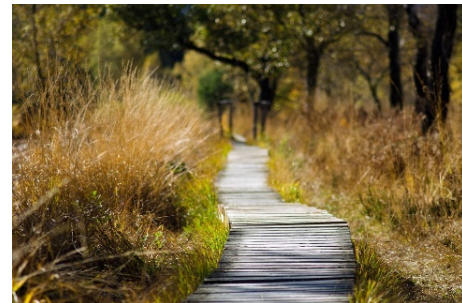
⁴ Tiroler Landesmuseum Naturkunde, o.B.G.,
Naturwissenschaftliches Zentrum, Finkbeinle 11a,
6020 Innsbruck, Austria



Schmetterlings-Monitoring Österreich

480 Standorte (+ 340 in Südtirol)

→ Tirol	100 (ab 2018)
→ Vorarlberg	100 (ab 2020)
→ Österreich	200 (ab 2023)
→ Salzburg	80 (ab 2025)

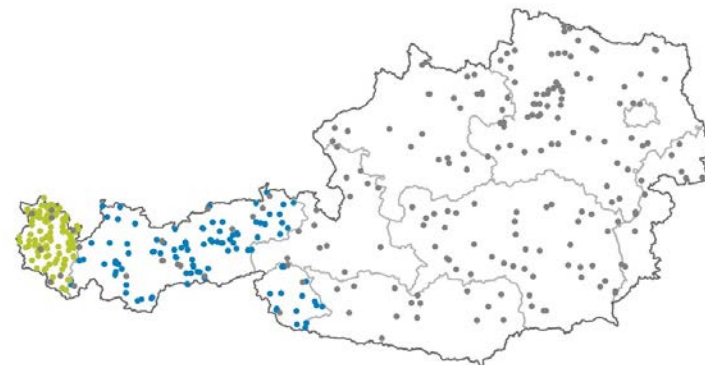


Nachtfalter

→ 80 Standorte

Lebensraum

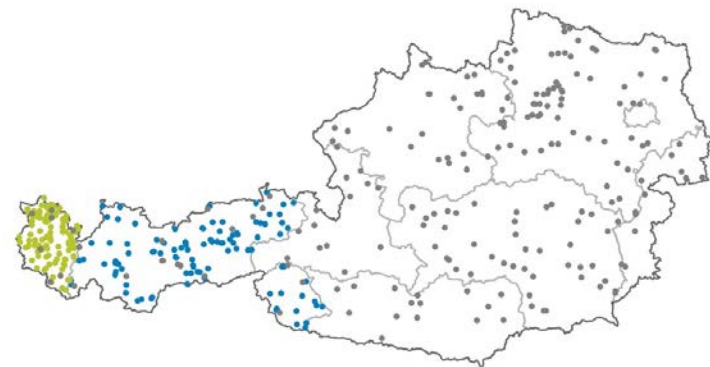
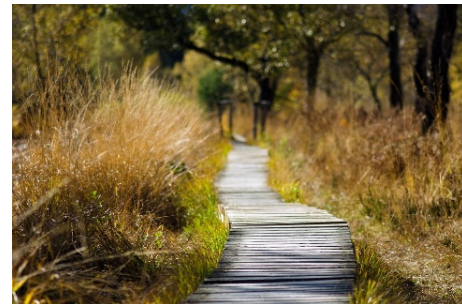
→ Landschaft + Vegetation



Schmetterlings-Monitoring Österreich

Viel-Falter Projekte

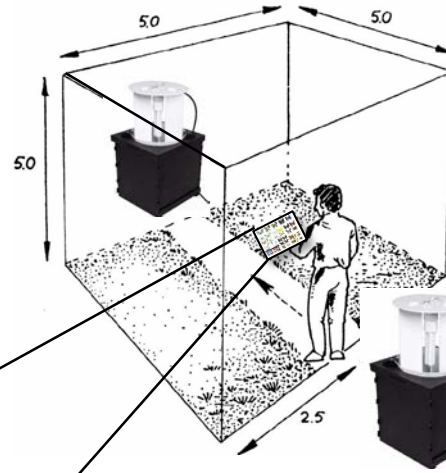
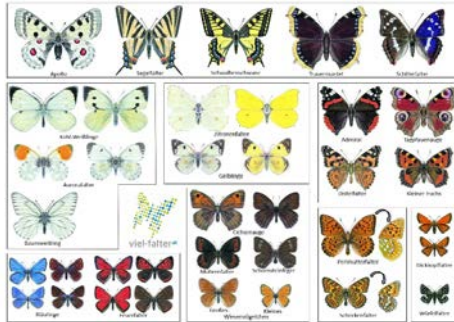
- Insekten Monitoring Österreich: Schmetterlinge (2023-2026)
- Tagfalter Monitoring Tirol (2018-2027)
- Tagfalter Monitoring Vorarlberg (2020-2029)
- Tagfalter Monitoring Salzburg (2025-2027)



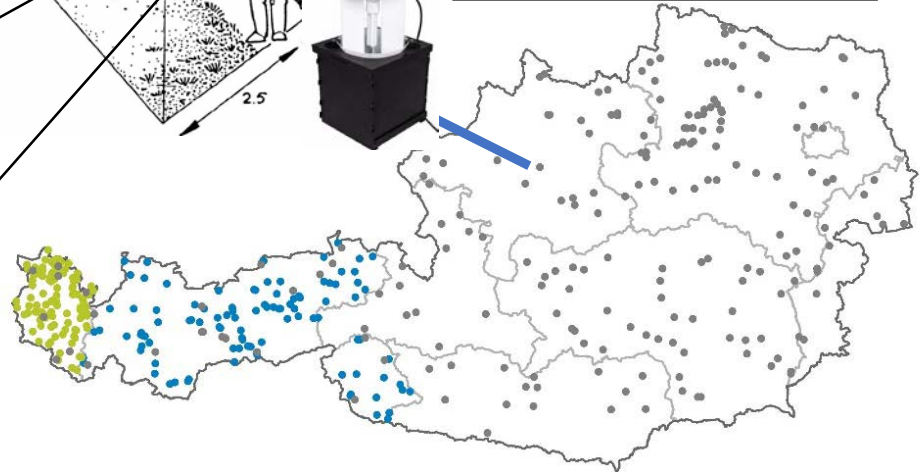
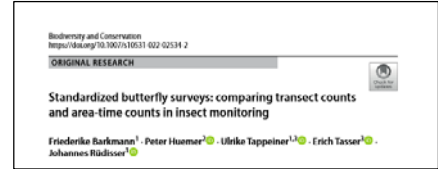
Dauerhafte repräsentative Tagfalterbeobachtung

Schmetterlings-Monitoring Österreich

- 4 Erhebungen pro Standort (je 30 min)
- Jährlich 25 % der Standorte
- Wiederholung ab dem 5. Jahr
- Nachtfalter mittels Lichtfallen
- Ergänzung durch Citizen Science:



Flächen-Zeit Erfassung



Schmetterlings-Monitoring Österreich

Schmetterlingserhebungen mit Lichtfallen



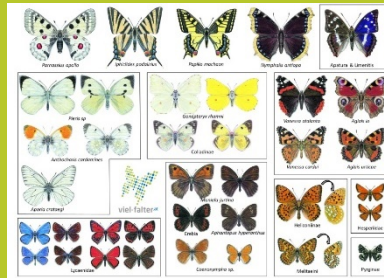
Viel-Falter Monitoring

Experten

[illegible]

Referenzdaten aller Tagfalter

Freiwillige



Daten zu Abundanz und Biodiversität

Öffentlichkeit



Berichte und Medienarbeit

Herausforderungen

- Relativ starre Methodik
- Vorausgewählte Beobachtungsstandorte
- Hohe Fluktuation bei Teilnehmer*innen
 - 500 Erstkontakte
 - 250 geschult und aktiv
 - 50 pro Jahr



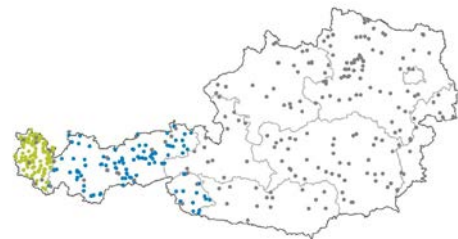
Stärken

- **Niedrige Hürden** um Citizen Scientists einzubinden
- Effiziente und effektive **Umweltbildung**
- Beteiligung fördert Selbstwirksamkeit (**Empowerment**)
- PR-Aktivitäten stärken **Umweltbewusstsein**



Schmetterlings-Monitoring Österreich (2018 – 2024)

- **1979 Erhebungen** (20 Expert*innen)
→ 35.973 Individuen
- **2167 Erhebungen** (308 Freiwillige)
→ 14.019 Individuen



GroÙes Ochsenauge



Hauhechelbläuling



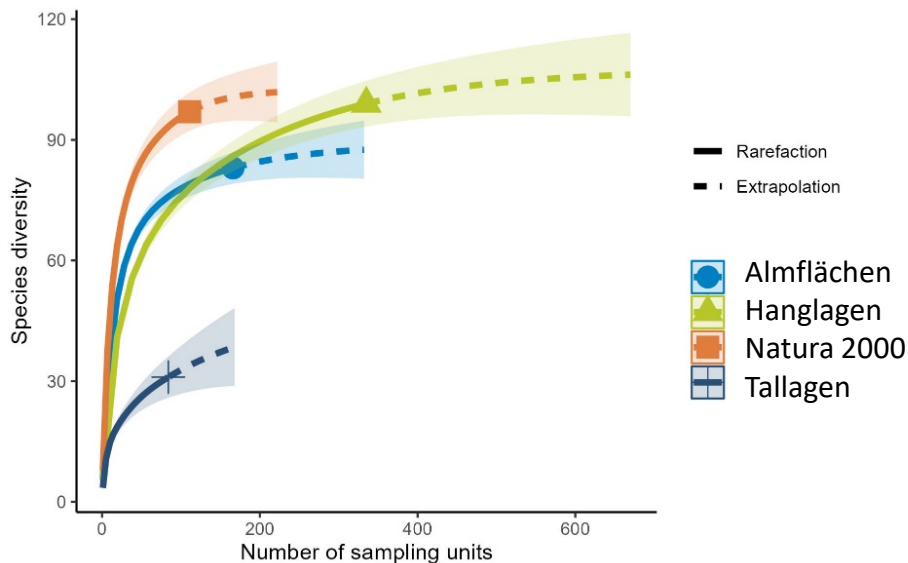
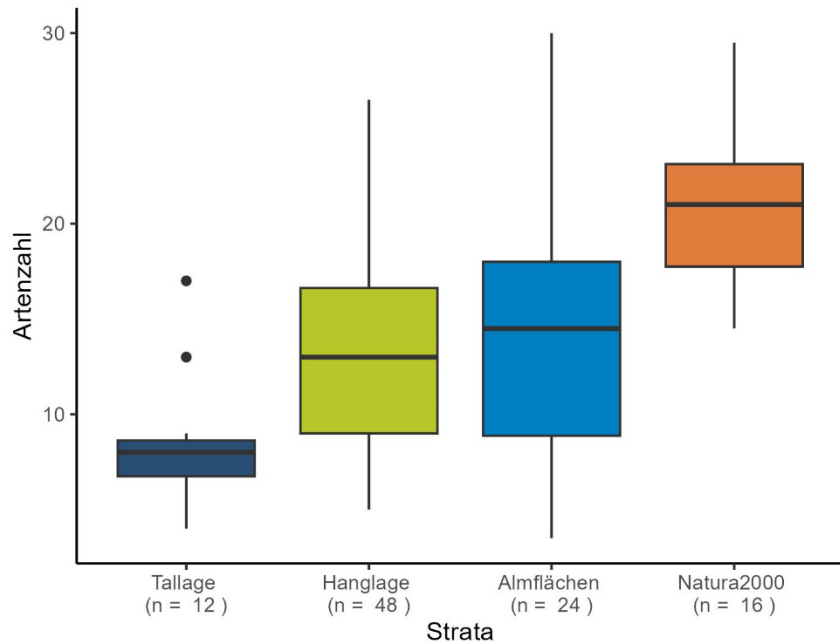
Kleiner Fuchs



Kleiner Kohlweißling

Kleines Wiesenvögelchen

Charakterisierung von Wiesentypen (Bsp. Tirol)



Bestandsentwicklung Einzelarten

Kleiner Kohlweißling *Pieris rapae*

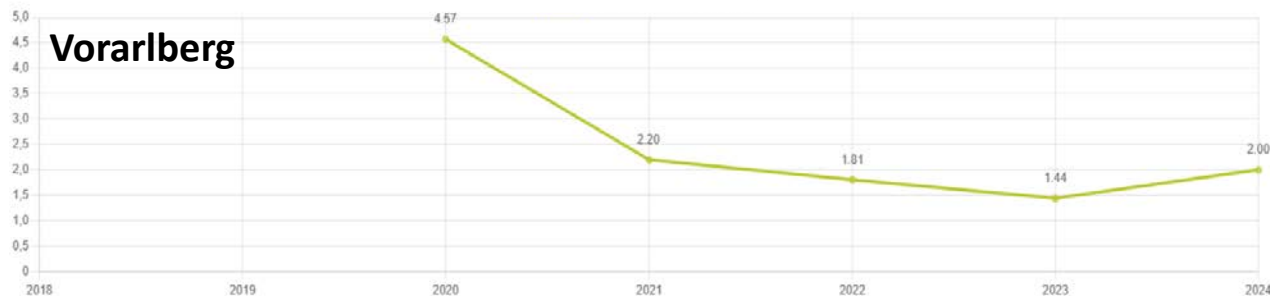
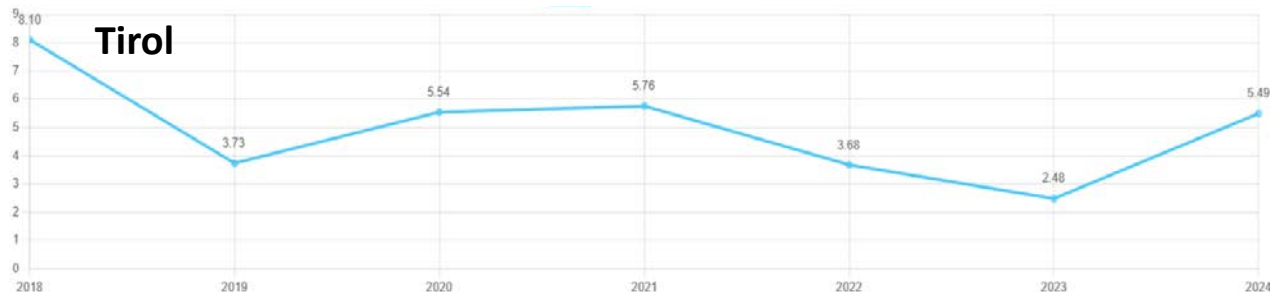
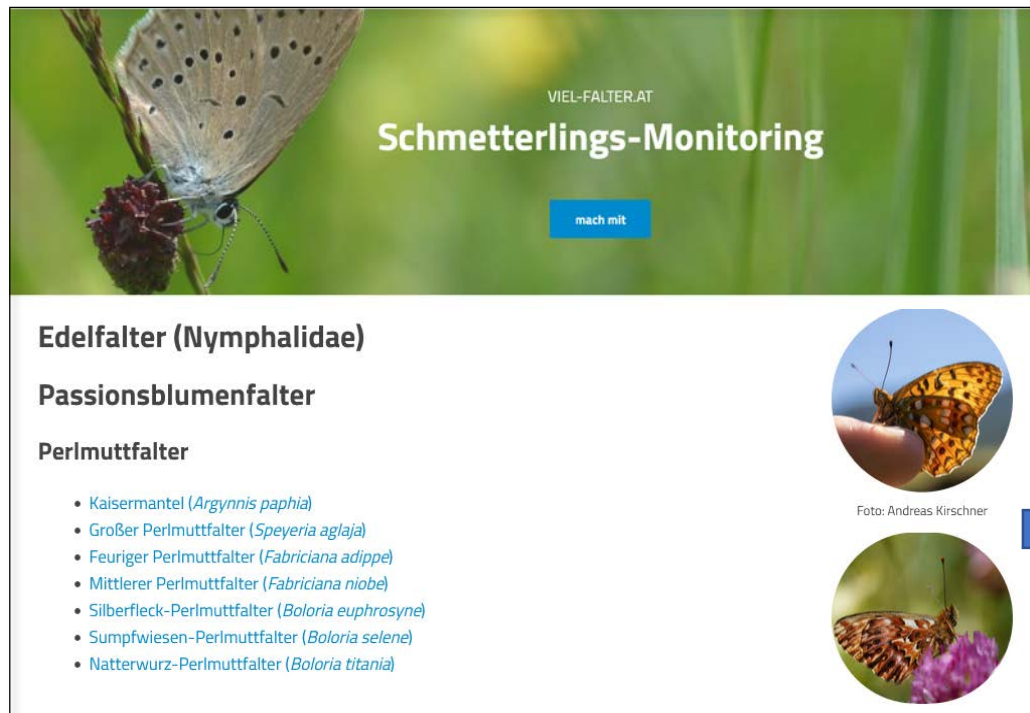


Foto: Petra Schattaneck

Bestandsentwicklung Einzelarten

→ Homepage



VIEL-FALTER.AT

Schmetterlings-Monitoring

[mach mit](#)

Edelfalter (Nymphalidae)

Passionsblumenfalter

Perlmutterfalter

- Kaisermantel (*Argynnis paphia*)
- Großer Perlmutterfalter (*Speyeria aglaja*)
- Feuriger Perlmutterfalter (*Fabriciana adippe*)
- Mittlerer Perlmutterfalter (*Fabriciana niobe*)
- Silberfleck-Perlmutterfalter (*Boloria euphrosyne*)
- Sumpfwiesen-Perlmutterfalter (*Boloria selene*)
- Natterwurz-Perlmutterfalter (*Boloria titania*)

Foto: Andreas Kirschner

Kleiner Kohlweißling (*Pieris rapae*)

Merkmale

Die Art hat eine Flügelspannweite von 40 bis 50 mm. Auf der Oberseite sind die Flügel des Kleinen Kohlweißlings weiß. Nur die Spitzen der Vorderflügel sind schwarz gefärbt. Zudem haben die Männchen nur einen schwarzen Fleck am Vorderflügel. Bei den Weibchen befinden sich zwei Flecken am Vorderflügel. Die Hinterflügelunterseite ist gelblich, mit feiner schwarzer Beschuppung.

[Weitere Details und Fotos beim Lepiforum.](#)



Verwechslungsmöglichkeit

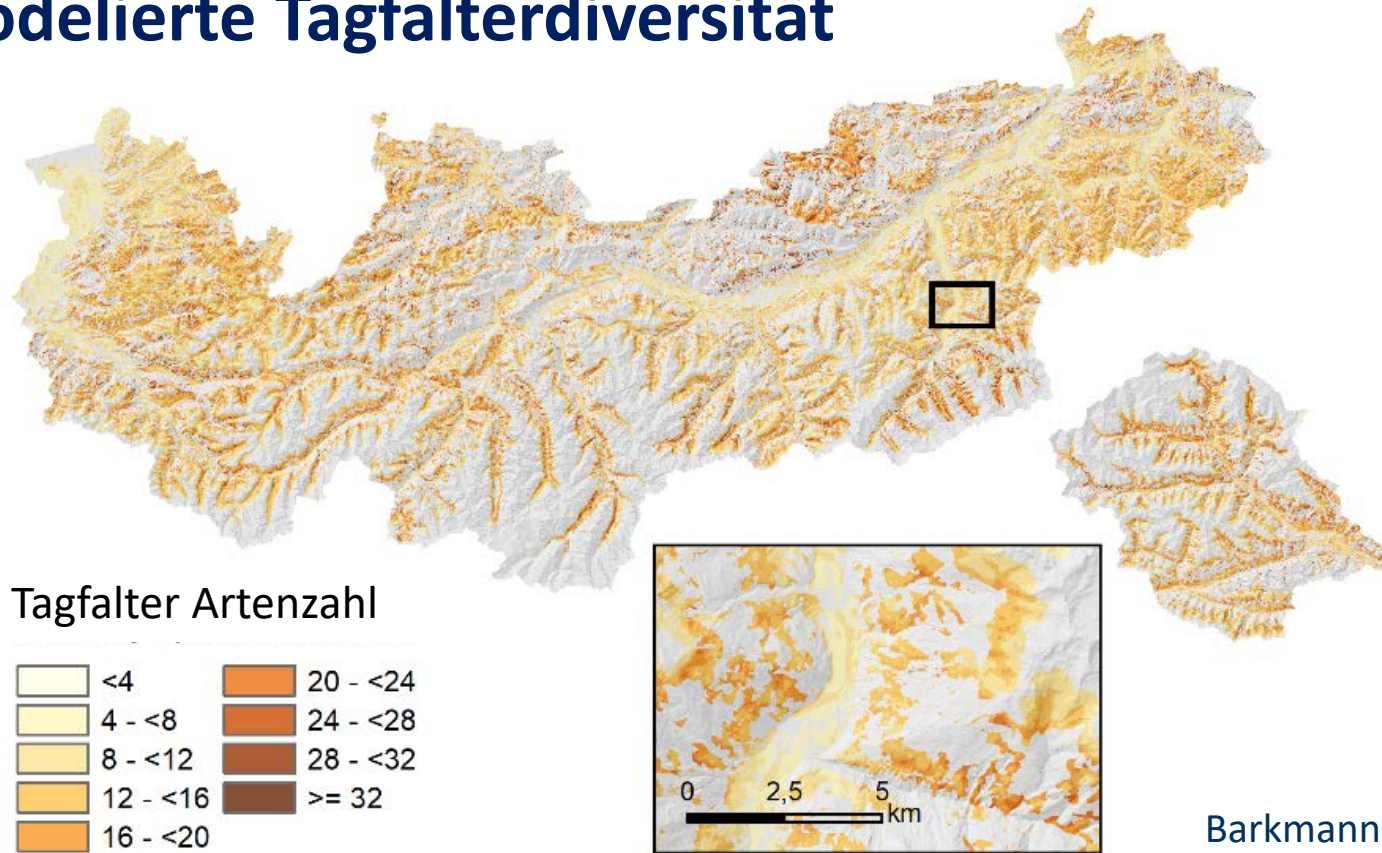
Der Kleine Kohlweißling kann mit dem Großen Kohlweißling (*Pieris brassicae*) verwechselt werden. Dieser ist allerdings größer und zeigt einen breiten, schwarzen Spitzenfleck auf der Vorderflügeloberseite, der bei Männchen und Weibchen bis zur 5. Ader reicht. Der Kleine Kohlweißling könnte auch mit dem Karstweißling (*Pieris manii*) verwechselt werden.

Pieris rapae (Kleiner Kohlweißling)



Nahrung der Raupe

Modelierte Tagfalterdiversität



Barkmann et al. (2025)

Publikationen



viel-falter.at

MASTER'S THESIS

„Optimization of butterfly surveys in the context of long-term monitoring“



Masterarbeit

zur Erlangung des akademischen Grades

Master of Science (M.Sc.)



Vorkommen und Phänologie der Tagfalter (Papilionoidea) im Höhenverlauf eines Lawenstrichs im Karwendel bei Innsbruck

– Masterarbeit –

Fabian Kerschbör

Zur Erlangung des akademischen Grades Master of Science an der Leopold-Franzens-Universität Innsbruck

Herabzug

Dr. Johannes Ruedisser, Universität Innsbruck, Institut für Ökologie

Beitrag: Wissenschaft – Trichter: Landwirtschaft, Sammlung und Forschungsmethoden

Innsbruck, den 18.05.2023

Simplified and still meaningful: assessing butterfly habitat quality in grasslands with data collected by pupils

Johannes Ruedisser¹, Erich Tasser², Janine Walke³, Peter Huemer⁴, Kurt Lechner⁵, Alois Otter⁶, Ulrike Tappeiner^{1,7}

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© The Author(s) 2023. This article is an open access publication

Abstract Public participation in scientific research, now commonly referred to as citizen science, is increasingly presented as a possibility to overcome the large-scale data limitations related to biodiversity and conservation research. Furthermore, public data collection projects can stimulate public engagement and provide transformative learning situations. However, biodiversity monitoring depends on sound data collection and statistical data quality. Therefore, we investigated if and how trained and supervised pupils are able to systematically collect data about the occurrence of diurnal butterflies, and how this data could contribute to a permanent butterfly monitoring system. We developed a specific assessment scheme suitable for laypeople and applied it at 35 sampling sites in Tyrol, Austria. Data quality and its explanatory power to predict butterfly habitat quality was investigated comparing data collected by pupils with independent assessments of professional butterfly experts. Despite substantial identification uncertainties for some species or species groups, the data collected by pupils was successfully used to predict the general habitat quality for butterflies using a linear regression model ($p < 0.001$, $p < 0.001$). Applying the proposed

Diversity and Distributions

Mapping Butterfly Species Richness and Abundance in Mountain Grasslands—Spatial Application of a Biodiversity Indicator

Friederike Barkmann¹, Erich Tasser², Ulrike Tappeiner^{1,3}, Peter Huemer⁴, Benjamin Schattauer/Weninger⁵, Kurt Lechner⁶, Alois Otter⁷, Johannes Ruedisser¹

Abstract The integration of high-quality field data with high-resolution remote sensing data can give detailed insights into the spatial distribution of biodiversity and provide valuable information for biodiversity conservation at a scale relevant for management action. We developed a framework based on remote sensing data and field surveys for modelling species richness and abundance of butterflies at high spatial resolution to infer about the spatial distribution of butterfly species richness and abundance and analyse their drivers and the scale of effect of landscape factors.

Recognizing failures in citizen science projects: Lessons learned

Biodiversity and Conservation (2023) 32:987–1004
https://doi.org/10.1007/s10531-022-02534-2

Standardized butterfly surveys: comparing transect counts and area-time counts in insect monitoring

Friederike Barkmann¹, Peter Huemer², Ulrike Tappeiner^{1,3}, Erich Tasser⁴, Johannes Ruedisser⁵

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The EU Butterfly Indicator for Grassland species: 1990–2017
Technical report

Butterfly CONSERVATION EUROPE

Öffentlichkeit

Berichte



Öffentlichkeit

Interaktive-Medien

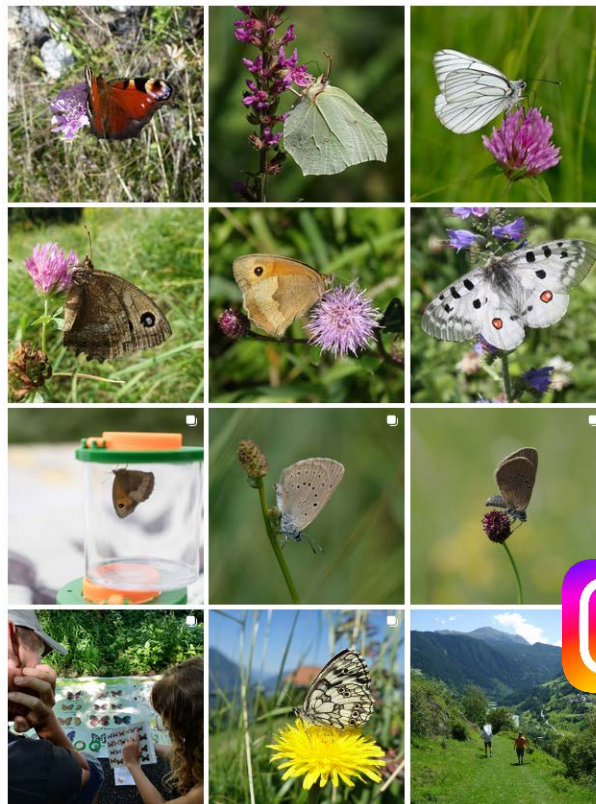


Viel-Falter

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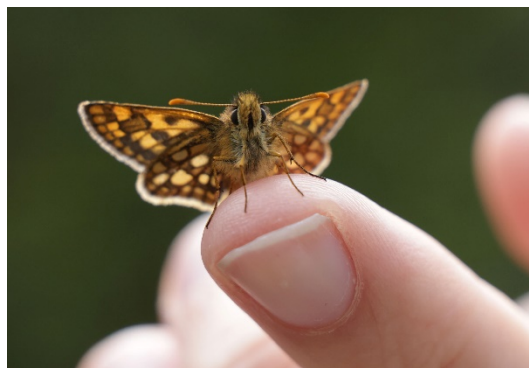


Contact Us Liked Message



Möglichkeiten

- Schulung von **Multiplikatoren**
- **Austausch** von Fehlern, Daten, Ressourcen, Materialien, Ideen, Freiwilligen, ...
- **Standardisierung** von Methoden
- Steigerung des Bewusstseins für (professionelle) **Wissenschaft**



Fragen?



z.B.: Artikel 11: Wiederherstellung landwirtschaftlicher Ökosysteme

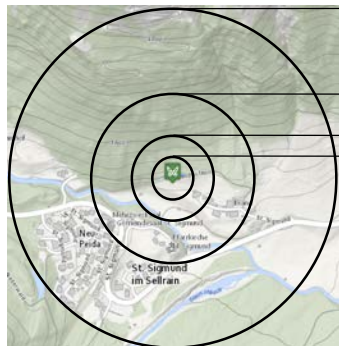
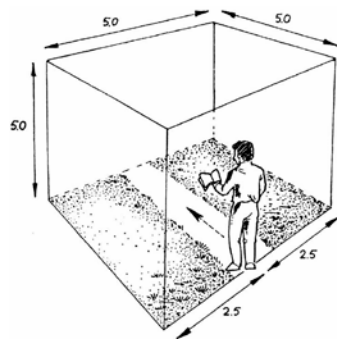
(2) Die Mitgliedstaaten ergreifen Maßnahmen, die darauf abzielen, dass auf **nationaler Ebene ein Aufwärtstrend** bei mindestens zwei der folgenden drei Indikatoren ... **erreicht ist**:

- a) **Index der Grünlandschmetterlinge (→ Tagfalter!)**
- b) Vorrat an organischem Kohlenstoff in mineralischen Ackerböden
- c) Anteil landwirtschaftlicher Flächen mit Landschaftselementen mit großer Vielfalt

Modelierte Tagfalterdiversität

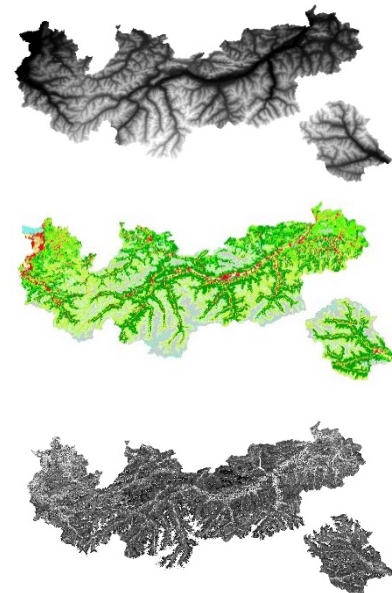
Fernerkundungsdaten

- Topographie
- Klima
- Landbedeckung
 - Anteil Landnutzung
 - Komposition
 - Ökotope, ...
- Vegetations-Indikatoren
 - NDVI, NDMI, Produktivität, ...

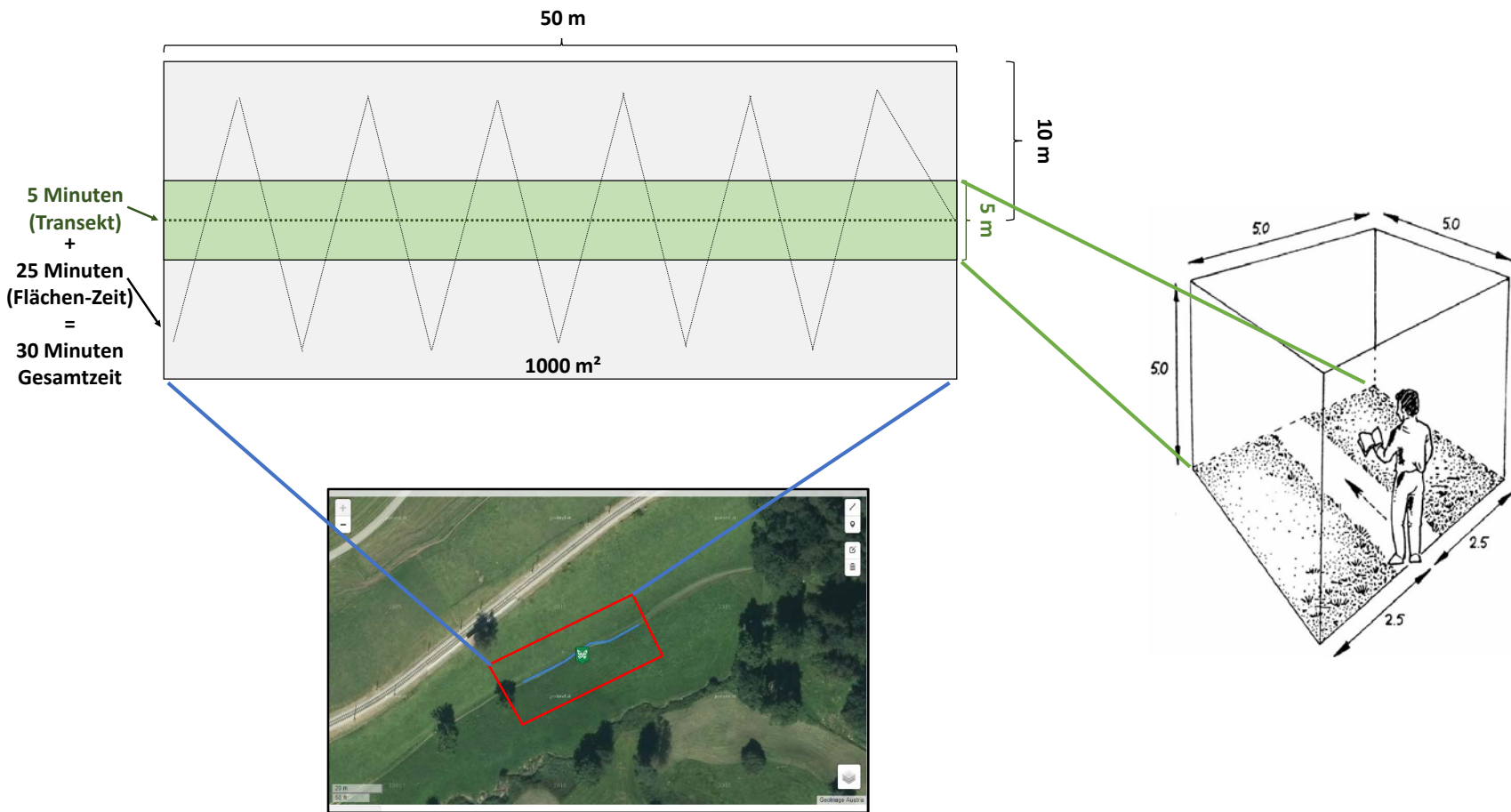


1000 m

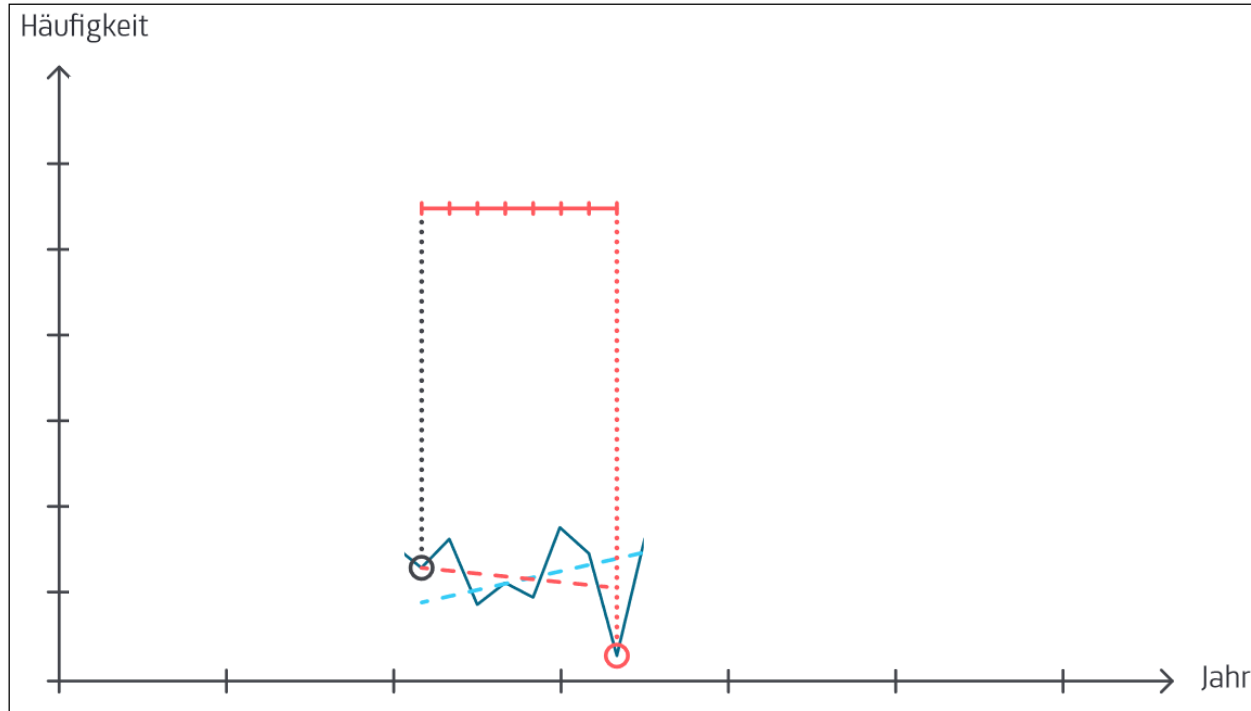
500 m
250 m
125 m



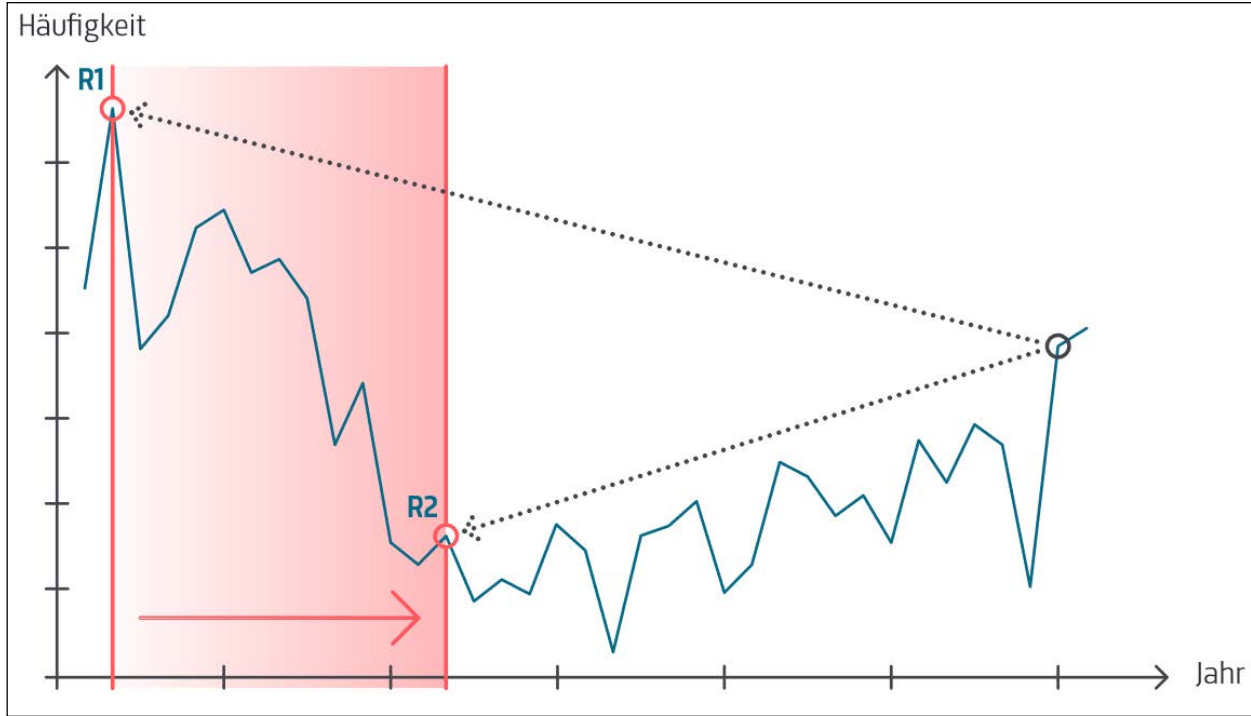
Barkmann et al. (2025)



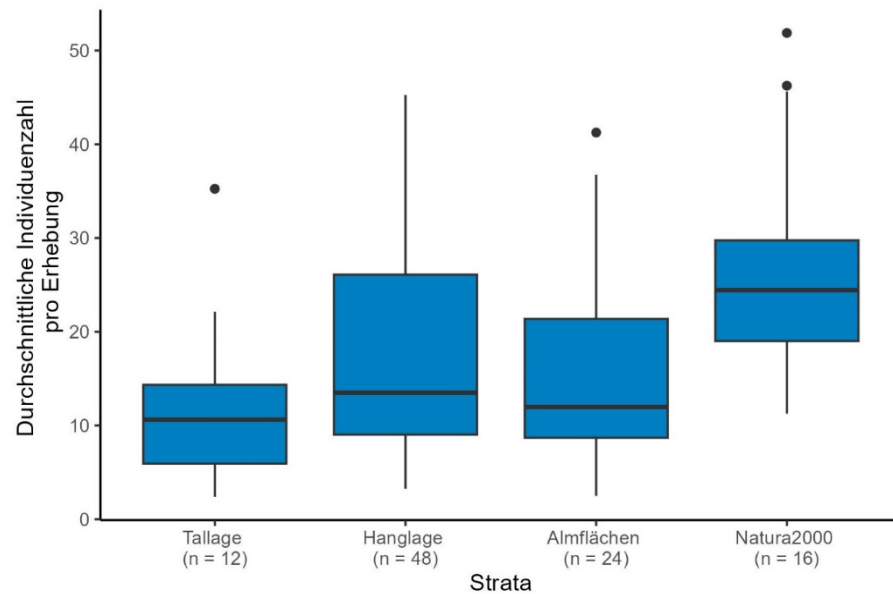
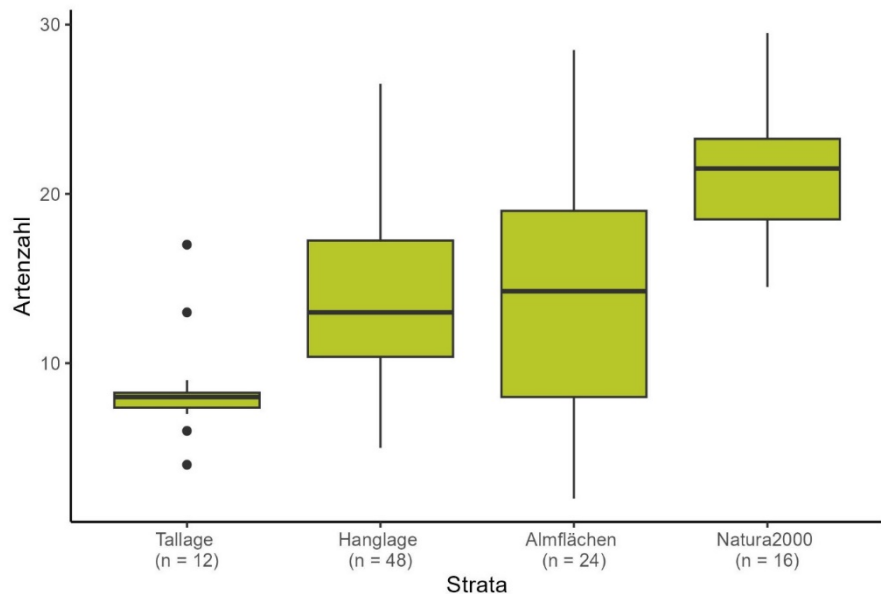
Population development



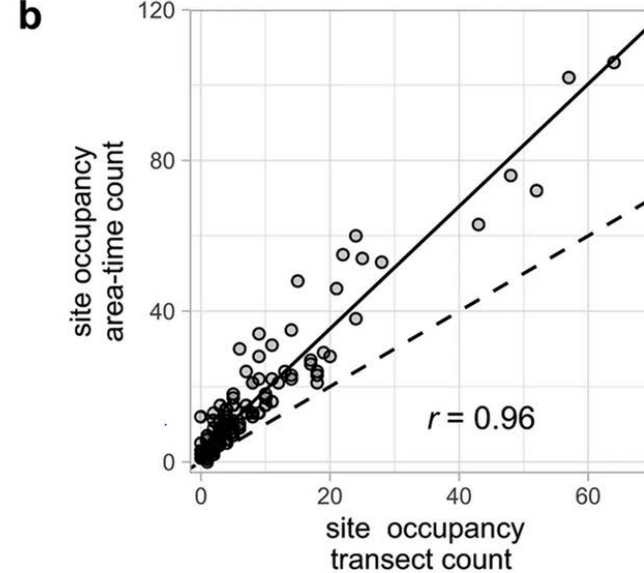
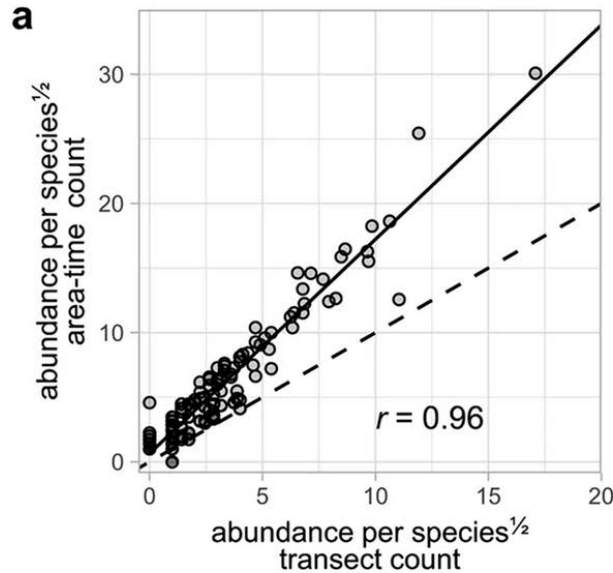
Population development



Ergebnisse nach Lebensraumtypen (Tirol)



Methodenvergleich



Barkmann et al. (2023)