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Keynote Speakers



Integrating ecogeography and pollination in the study of flower evolution

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Interactions with animal pollinators are commonly touted as the most important drivers of flower evolution, with shifts among functional pollinator groups spurring flower diversification. However, plant-pollinator interactions happen embedded in complex biotic (e.g., other plant species) and abiotic (e.g., climatic) ecological contexts, and those are rarely integrated in the study of flower evolution. In my keynote, I will explore where, when and how shifts from bee to vertebrate and generalist pollination occur, using the tropical plant family Melastomataceae as a model. After identifying mountains as major ecogeographic gradients triggering pollinator shifts through reductions in the effectiveness of ancestral pollinators, I will then focus on cases of mountain colonization without pollinator shifts. Specifically, I will discuss the adaptive value of stamen traits in bee-buzz-pollinated flowers and how modifications to stamen architecture and structure may contribute to floral diversification within the same functional pollinator group.



From release to resistance: biotic interactions in plant invasions

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Plant invasions are a major driver of global change, contributing to biodiversity loss, ecosystem transformation, and homogenization of the global flora. Invasions continue to increase, with more than 16,000 established alien plant species documented worldwide and 1,615 neophytes recorded in Austria. Many hypotheses have been proposed to explain why some alien plants become invasive, with mixed evidence. Biotic interactions often play a central role, as illustrated by the enemy release hypothesis, which proposes that alien plants may benefit from leaving natural enemies behind. Once established, invasive alien plants can affect native species and communities by reducing plant growth, reproduction, abundance, diversity, and fitness. At the same time, resident communities may provide biotic resistance and reduce invasion success through competition, herbivory, pathogen attack, soil microbial feedback and the tendency of diverse communities to resist invasion. Recent research has shown that biotic interactions in plant invasions are dynamic and context-dependent: they range from negative to positive, involve direct and indirect effects, occur aboveground and belowground and are increasingly modified by global change. These interactions may further change with residence time, as both invaders and resident species may respond ecologically and evolutionarily. Invaders may rapidly adapt to novel environments, acquire new mutualists or accumulate enemies, while native species and communities may also adapt, potentially increasing biotic resistance over time. In my presentation, I synthesize current knowledge on how biotic interactions can release plant invaders from biotic constraints or strengthen resistance against them in an era of rapid global change.



Building and applying tools for high-throughput phylogenetics across the plant tree of life

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The origin and diversification of major plant groups is a fundamental question in evolutionary biology. While the scaling-up of phylogenetics to phylogenomics promised improved resolution for challenging groups, it instead led to a need to re-think how to assess clade support. Phenomena such as incomplete lineage sorting (ILS) and hybridisation can both lead to varying levels of conflict between the evolutionary history of any one gene and the "true" history of speciation, or gene tree - species tree conflict. Recent evidence has demonstrated that the tempo and pattern of diversification across the plant tree of life is heterogeneous, with some clades characterized by extremely rapid radiations and therefore high levels of gene tree – species tree conflict while other groups appear to exhibit a consistent signal of speciation across the genome. Target enrichment, and the establishment of standardized methods for data collection and analysis, have enabled the collection and analysis of "genome scale" data for increasingly diverse groups of organisms without the need for de novo generation of genomic resources. In many cases, these methods can shed light on processes that may have influenced the establishment of critical synapomorphies and led to rapid diversification, as well as allowing for an assessment of clade support that reflects biological processes such as ILS. This talk will examine how these data have shaped our understanding of phylogenetic relationships throughout green plants (Viridiplantae), from the relationships among major clades to the reconstruction of recent, rapid species radiations.

Umbel arrangement and development in Apiaceae: Typology vs. evo-devo plant morphology

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Inflorescence morphology is usually based on branching patterns. Evo-devo plant morphology, in contrast, understands plant forms as the outcome of morphogenetic processes starting from meristems with different developmental potentials. The talk illustrates the different views using the ‘umbel with umbellets’ (usually termed ‘umbel’) of the Apiaceae as an example. Both the umbel and the branched shoot system with umbels are traditionally interpreted as compound inflorescences or synflorescences. Developmental studies question this view. If umbels and umbel groups were inflorescences they should originate from a single inflorescence meristem. We tested this hypothesis in two *Ferula* species and *Orlaya grandiflora* and found three different patterns: a single inflorescence in *Ferula hezarlalehzarica*, several inflorescences in *F. aucheri* and solitary umbels arranged along a monopodial shoot system in *Orlaya grandiflora*. Even more surprising is the finding that the ‘umbel with umbellets’ does not develop like an inflorescence but like a floral unit (comparable to the capitulum in Asteraceae). It originates from a determinate, flower-like meristem which passes through repeated steps of fractionation until it is completely used up. The developmental approach clearly shows that branching patterns may be misleading if their meristematic origin is disregarded. The present study emphasizes the importance of different meristem identities and deeply changes our understanding of the evolution of reproductive structures in Apiaceae.



Talks



GRACE Resurvey of Central European Grassland Vegetation to study the Impacts of Country-Level Landscape Dynamics on Biodiversity

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Grasslands harbor high species diversity and are strongly influenced by local management and land-use histories. In countries of Central Europe, these ecosystems were severely impacted by different agricultural policies on both sides of the former Iron Curtain in the second half of the 20th century, reshaping grassland extent and habitat quality. These land-use changes turned border regions into a natural experiment for studying the impacts of landscape structure and management on grassland plant communities. Here, we provide 401 historical vegetation plots, each paired with its recent resurvey, along the border region between Austria, the Czech Republic and Slovakia. The dataset, collected as part of the GRACE project (GRAssland Communities Experiment), spans 95 years, with the first surveys conducted between 1930 and 2020 and resurveys conducted between 2024 and 2025. The resurvey design was structured to balance representation across both countries and to capture the macroclimatic gradient of the region. The resulting vegetation-plot dataset provides valuable insights into the development of initially similar grassland communities impacted by divergent country-level landscape dynamics in Central Europe since the mid-20th century.



Interactive effects of microplastics and arbuscular mycorrhizal fungi on grassland communities

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Terrestrial microplastic pollution is receiving increasing public and scientific attention. While diverse microplastic effects on individual plants' physiology, morphology, and productivity are known, how such effects transmit to the community level remains poorly understood. However, as grassland plant communities are central agents for ecosystem functioning and ecosystem services, assessing how microplastics may interfere with such functions is indispensable. To reduce this gap, we tested how six types of artificial particles and their interactions with arbuscular mycorrhizal fungi (AMF) affect the productivity and composition of plant communities representing dry and mesic grasslands over 17 months. Effects were strongest in the mesic, less diverse community type. Without artificial particles, community biomass was higher with AMF but lower without AMF, while AMF did not affect community biomass if artificial particles were present. Compared with glass, microplastics increased diversity with AMF but decreased it without AMF. Importantly, most effects depended on AMF inoculation and material type and concentration, revealing no universal pattern of microplastic pollution on grassland communities. Full publication can be found at: <https://doi.org/10.1002/ppp3.70229>



Rapid Change and Thermophilization of Summit Plant Communities in the Central Eastern Alps (Italy)

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Alpine vegetation is highly sensitive to global warming because these ecosystems are shaped by low temperatures. Upward migration of thermophilic species increases species richness at high elevations but may threaten cryophilic specialists. We assessed temporal changes in species richness, species turnover, and the main drivers of vegetation change across four summits ranging from 2180 to 3287 m a.s.l. in the Texel Group, South Tyrol (Italy), with a particular focus on potential tipping points in the nival belt. Vegetation and soil temperature data collected over 21 years (2003–2024) were analysed to evaluate changes in species richness, composition, ecological indicator values, and elevational distribution patterns. Species richness increased overall by 13%, accompanied by thermophilization on all summits except the subnival summit, where richness remained stable. A significant decline occurred only on the southern slope of the lowest summit. During the last seven years, species richness on the highest summit increased by 75%, coinciding with a longer growing season and higher mean soil temperatures. Our findings show that the nival belt, previously characterized by stable species numbers, is now undergoing rapid vegetation change and provide the first evidence of thermophilization in the nival belt of the Central Alps. These changes may reflect the crossing of a mean growing-season soil temperature threshold of 4.9 °C, associated with closed grasslands. While cooler northern aspects may serve as short-term microrefugia, the long-term persistence of cryophilic specialists will depend on the balance between colonization, facilitation, extinction, and the availability of suitable refuges under continued climate warming.



**Climate, geography, and landscape connectivity shape the
phylogeography of Persian oak (*Quercus brantii*) across the Zagros
Mountains**

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The Zagros Mountains comprise one of the largest forest ecosystems in Southwest Asia, where Persian oak (*Quercus brantii*) forms the ecological backbone of the landscape. Despite its ecological and socioeconomic importance, the evolutionary processes underlying the genetic structure of this keystone species and its response to past and future climate change remain poorly understood. Here, we integrated genome-wide single nucleotide polymorphism (SNP) data generated by genotyping-by-sequencing (GBS) with phylogenetic analyses, population genomics, and ecological niche modeling (ENM) to reconstruct the evolutionary history and assess the climatic vulnerability of *Q. brantii* across its distribution in the Zagros Mountains. Genome-wide analyses revealed two major genetic groups distributed along a northwest–southeast gradient, with a continuous admixture zone in the central Zagros. Population differentiation was primarily explained by isolation by distance, while environmental gradients further contributed to the observed spatial genetic structure. Ecological niche models identified precipitation seasonality as the strongest predictor of habitat suitability and suggested climate-driven redistribution toward cooler, higher-elevation habitats in the near future. However, projections under high-emission scenarios indicated a substantial contraction of suitable habitat by the end of the twenty-first century, particularly in the southern Zagros. Our findings demonstrate that the interaction of geography, climate, and landscape connectivity has shaped the contemporary phylogeography of Persian oak while highlighting the increasing vulnerability of Zagros forests to climate change. These results provide a genomic framework for conserving genetic diversity and guiding adaptive management of one of the Middle East's most important forest ecosystems.



***Typha minima* Liccana – ein Erfolgsmodell der Wiederansiedlung einer Wildflussart?**

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Der Zwerg-Rohrkolben (*Typha minima*) ist eine Charakterart der montanen Ausprägung des prioritären FFH-Lebensraumtyps „7240 Alpine Pionierformationen des *Caricion bicoloris-atrofuscae*“. Die gefährdete Art war entlang der Flüsse der Alpen historisch weiter verbreitet. Natürliche Rest-Vorkommen gab es an den drei Vorarlberger Flüssen Alpenrhein, Bregenzer und Dornbirner Ache sowie am Tiroler Lech. Im Zuge von zwei Life-Projekten wurden am Lech Artstützungsprojekte der Wildflussart durchgeführt. Ausgehend von dieser gestärkten Population am Tiroler Lech wurde im Botanischen Garten der Universität Innsbruck Pflanzenmaterial für mehrere Wiederansiedlungsprojekte am Tiroler Inn vorgezogen. Weiters wurde Samenmaterial der Lechtaler Zwerg-Rohrkolben-Population auch für Aufzuchtversuche der Art im Nationalpark Donauauen verwendet. Es wird die aktuelle Verbreitung der montanen Ausprägung des FFH-Lebensraumtyps „7240“ mit *Typha minima* vorgestellt (Vorarlberg, Tirol, Kärnten). Anhand verschiedener Wiederansiedlungsstandorte entlang des Tiroler Lech und Inn werden beispielhaft Anforderungen und Herausforderungen von Wiederansiedlungsprojekten einer Wildflussart diskutiert. Zentrale Elemente solcher Initiativen sind dabei Auswahl und Gewinnung von ausreichend Pflanzenmaterial, Standortauswahl der Ausbringung, Flusssdynamik und Größe von Flussrenaturierungen.



Der Echt-Speik (*Valeriana celtica* subsp. *norica*) als Herausforderung für Forschung und Naturschutz

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Der Östliche Echt-Speik (*Valeriana celtica* subsp. *norica* Vierh.) ist ein Endemit der Ostalpen. Das Baldriangewächs tritt in kalkarmen Rasen der subalpinen und alpinen Stufe auf. Sein Rhizom enthält ätherische Öle. Diese verleihen der Pflanze einen charakteristischen, als landschaftsprägend beschriebenen Geruch. Die Inhaltsstoffe begründeten verschiedene Nutzungen (rituell, medizinisch, kosmetisch), die bis in die Antike zurückreichten und große ökonomische Bedeutung erlangten. Speik wurde noch im 19. Jahrhundert in Tonnen gehandelt und in alle Welt verschifft. Trotz wiederholter Versuche lässt sich die Pflanze bis heute nicht kultivieren und trat gegenüber dem Medizinischen Baldrian (*Valeriana officinalis* L.) in den Hintergrund. Heute steht der Speik unter Naturschutz; im UNESCO Biosphärenpark Salzburger Lungau & Kärntner Nockberge dürfen unter strengen Auflagen 30 Kilogramm geerntet, „gespeikt“ werden. Der Echt-Speik war Gegenstand eines inter- und transdisziplinären Forschungsprojektes, das von der Österreichischen Akademie der Wissenschaften gefördert wurde. Dabei wurde die Nutzung der Pflanze historisch, aktuell und im Hinblick auf ihre zukünftigen Potenziale untersucht. Für eine zukünftige nachhaltige Nutzung im Biosphärenpark wurden fünf mögliche Szenarien erarbeitet. Aus der Auseinandersetzung mit dem Speik erwachsen gleichermaßen angewandte wie auch grundlegende Forschungsfragen, die zu einer weiteren und vertieften Auseinandersetzung mit dieser Art anregen sollen.

Auinger M., Jungmeier M., Klemun M., Pichler-Koban C., Strasser S. A.-M., 2026: Die nachhaltige Nutzung des Echten Speik (*Valeriana celtica* subsp. *norica*) im Biosphärenpark Nockberge: Vergangenheit, Gegenwart und Zukunft. Verlag der Österreichischen Akademie der Wissenschaften, Wien, ISBN 978-3-7001-5011-4.



Interpretation der FFH-Lebensraumtypen: eine unendliche Geschichte

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Die Fauna-Flora-Habitat-Richtlinie (kurz FFH-Richtlinie) ist ein zentrales Instrument des europäischen Naturschutzes. Die Mitgliedstaaten sind verpflichtet, die in Anhang I der Richtlinie aufgeführten Lebensräume regelmäßig zu kartieren und zu überwachen sowie deren guten Erhaltungszustand sicherzustellen. Allerdings sind einige Lebensraumtypen nicht klar definiert, und ihre Auslegung ist in den EU-Mitgliedstaaten uneinheitlich. Die Erstellung eines Bestimmungsschlüssels für die in Niederösterreich vorkommenden FFH-Lebensraumtypen (kurz LRT) bot die Gelegenheit, einige dieser Auslegungsprobleme erneut zu prüfen und neue Lösungsansätze vorzuschlagen. In diesem Vortrag sollen einige Beispiele diskutiert werden, die auch über die Grenzen Österreichs hinaus relevant sind: LRT 2340 (Pannonische Binnendünen), der bisher fälschlicherweise auf saure Sandrasen eingeengt war; LRT 3130 (Oligo- bis mesotrophe stehende Gewässer mit Vegetation der Littorelletea uniflorae und/oder der Isoeto-Nanojuncetea), der einen großen Teil der namensgebenden Klasse Isoeto-Nanojuncetea auszuschließen scheint, insbesondere jene entlang fließender Gewässer (die meisten dieser Bestände können jedoch einem anderen Lebensraumtyp zugeordnet werden); LRT 3150 (Natürliche eutrophe Seen mit einer Vegetation des Magnopotamions oder Hydrocharitions), der wohl mehr als nur die beiden namensgebenden Verbände umfasst; LRT 6430 (Feuchte Hochstaudenfluren der planaren und montanen bis alpinen Stufe), der besser einige der im Interpretationshandbuch erwähnten pflanzensoziologischen Einheiten ausschließt; und LRT 91M0 (Pannonisch-balkanische Zerreichen- und Traubeneichenwälder), der zwei Assoziationen umfasst, die in einigen Staaten anderen oder gar keinen Lebensraumtypen zugeordnet sind. Der in Erprobung befindliche Bestimmungsschlüssel wird kurz vorgestellt.



Zwergbinsenfluren in Ostösterreich: Flora, Vegetation und Naturschutz

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Zwergbinsenfluren sind kurzlebige Pflanzengesellschaften auf periodisch überschwemmten bzw. zeitweise trockenfallenden Standorten. Sie beherbergen eine Vielzahl an spezialisierten und gefährdeten Pflanzenarten. Typischerweise findet man Zwergbinsenfluren an den Ufern und Altarmen der großen Flüsse, in und an regelmäßig abgelassenen Fischteichen, in Ackersutten, nassen Fahrspuren und feuchten Viehweiden. Zwergbinsenfluren sind, zumindest teilweise, als Lebensraumtyp 3130 „Oligo- bis mesotrophe stehende Gewässer mit Vegetation der Littorelletea uniflorae und/oder der Isoeto-Nanojuncetea“ europarechtlich geschützt. Jedoch gibt es zur Verbreitung und Erhaltungszustands dieses Lebensraumtyps bisher noch keine Basisdatenerhebung. Daher wurde im vorliegenden Projekt im Jahr 2025 versucht, eine erste Grundlagenerhebung für den Lebensraum Zwergbinsenfluren in Ostösterreich nach einem einheitlichen Ansatz zu verwirklichen. Knapp 160 Gebiete und Flächen wurden aufgesucht und dabei konnten 90 aktuelle Vorkommen von Zwergbinsenfluren kartiert werden. Insgesamt 112 Pflanzenarten der obersten drei Gefährdungskategorien (CR, EN, VU) wurden dabei gefunden, darunter Arten wie *Elatine alsinastrum*, *Eleocharis carniolica* oder *Lindernia procumbens*. Aspekte zur zukünftigen Vorgangsweise für eine flächige Erfassung und zum Schutz dieser seltenen Lebensräume werden erörtert. Diese Studie wurde durch den Biodiversitätsfonds des Bundesministeriums für Land- und Forstwirtschaft, Klima- und Umweltschutz, Regionen und Wasserwirtschaft gefördert und finanziert.



Campingplätze als überraschender Lebensraum für heimische und eingeschleppte Pflanzen

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In den Jahren 2025 und 2026 wurden vom Vortragenden gezielt über fünfzig Campingplätze in den Bundesländern Oberösterreich, Salzburg, Kärnten und in Südbayern nach Pflanzen abgesucht. Es hat sich gezeigt, dass die Vegetation einerseits aus typischen Scherrasenarten, die zum Teil auch aus Begrünungsansaat stammen, besteht, andererseits aber aus nicht wenigen eingeschleppten Arten. Letztere wurden unabsichtlich durch Fahrzeuge, Touristen, Zelte, Matten usw. mitgenommen. Es gelangen dabei Nachweise einiger neuer Arten für die Bundesländer bzw. Österreich, darunter sogar Vorkommen in hoher Abundanz, bei denen man sogar eine Etablierung annehmen kann. Es haben sich hinsichtlich des Bewuchses zwar Unterschiede zwischen den einzelnen Campingplätzen gezeigt, aber eine Gruppe von Pflanzen zeigte sich auf fast allen diesen Plätzen. Von einigen ausgewählten Arten werden Fotos gezeigt. Außerdem wird ein Vergleich mit anderen Veröffentlichungen über ähnliche Untersuchungen vorgenommen und es werden die gefundenen Arten hinsichtlich ihrer bisher bekannten Verbreitung diskutiert. Außerdem wird auf die Bedingungen dieses speziellen Lebensraumes näher eingegangen. Da Camping weiterhin stark im Trend liegt, sind auch in Zukunft neue Einschleppungen zu erwarten. Dieser Vortrag soll zu weiteren Untersuchungen anregen und Tipps zum Suchen und Erkennen dieser Arten bieten.



Tipps zur feldbotanischen Ansprache heimischer *Hylotelephium*-Arten

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In Österreich kommen nach Fischer et al. 2008 natürlicherweise 3 Arten der Gattung *Hylotelephium* vor. Es handelt sich dabei um das österreichweit verbreitete *H. maximum*, das in der NW-Hälfte des Bundesgebiets vorkommende *H. telephium* sowie das auf den engeren NW beschränkte *H. jullianum*. Im NW Österreichs, insbesondere in OÖ, überschneiden sich die Areale dieser 3 Arten, wobei etwa im Mühlviertel und dem Alpenvorland *H. jullianum* die mit Abstand häufigste Sippe ist. Dabei wird die letztgenannte Sippe zwar bei Fischer et al. 2008 als nicht sicher für Österreich angegeben, im vorläufigen Verbreitungsatlas der Gefäßpflanzen Österreichs ist sie jedoch schon weithin kartiert. Trotzdem ist sie in Fachkreisen grob unzureichend bekannt und auch mit den in der österreichischen Bestimmungsliteratur angegebenen Merkmalskombinationen nicht sicher bestimmbar. Durch illustrierte morphologische und ökologische Gegenüberstellungen innerhalb der Gattung soll nun die Kenntnis betreffend diese Art verbessert und einem weiten Publikum präsentiert werden.



Hidden diversity of *Astragalus onobrychis*: two new species in the Alps and the Apennines

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Recent studies of widespread Eurasian steppe biota revealed genetic divergence between populations from extrazonal European steppes and their relatives in the zonal steppe belt. Different genetic lineages – partly corresponding to differences in ploidy – have previously been identified in *Astragalus onobrychis* L. (Fabaceae), but the sampling for morphometric analyses was insufficient for taxonomic conclusions. In my presentation, I will elucidate the evolutionary origin and morphological differentiation of Alpine and Apennine populations currently assigned to *A. onobrychis*. The study integrates analyses of restriction site-associated DNA sequencing, relative genome size estimation and multivariate morphometric analyses. Both genomic and morphological evidence support the recognition of two new species currently being described and whose diagnostic traits will be presented in the talk, i. e. “*Astragalus vallium-aridarum*”, endemic to the Alps, and “*Astragalus italicus*”, endemic to the southeastern Alps and the Northern and Central Apennines.

Polyploidy and hybridisation shaped the evolutionary history of *Luzula* sect. *Luzula* in the Eastern Alps

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Whole-genome duplication and hybridisation are major drivers of flowering plant diversification. In holocentric species, concerted chromosome fission (agmatoploidy) can further increase karyotypic diversity, and together, these processes often produce reticulate evolutionary histories that complicate phylogenetic inference and generate complex phenotypic variation. We investigated the evolution of *Luzula* sect. *Luzula* (Juncaceae), a holocentric lineage characterised by polyploidy, extensive karyotypic variation, and high morphological similarity among species. Using phylogenomics, population genomics, cytogenetics, morphometrics, and ecological analyses, we examined how whole-genome duplication, agmatoploidy, hybridisation, and ecological differentiation contributed to its diversification, focusing on the European Eastern Alps. Phylogenomic analyses identified *Luzula* sect. *Luzula* as one of the youngest lineages in the genus, originating in the mid-Pliocene and diversifying during the Pleistocene. High coancestry and blurred species boundaries suggest ongoing speciation, with some recently described taxa shown to be paraphyletic. Both agmatoploidy and polyploidy evolved repeatedly across independent lineages and genomic analyses revealed widespread hybridisation within and across ploidy levels. In several cases, hybridisation was accompanied by whole-genome duplication, producing multiple allopolyploid species. The partially agmatoploid species *Luzula alpina* emerged as a notable example of cross-ploidy hybridisation. Ecological niche analyses showed strong overlap among alpine species, consistent with their frequent co-occurrence. Overall, our study highlights the value of integrative approaches for resolving complex evolutionary histories and highlights *Luzula* sect. *Luzula* as an exciting system for studying the many mechanisms that shape plant diversity on earth.

Phylogenetic, ecological and morphological characterization of a new species of *Homogyne* (Asteraceae) from the Southeastern Limestone Alps (Italy)

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The genus *Homogyne* (Asteraceae) is endemic to the European mountains and comprises three distinct species. The most widespread species, *H. alpina*, is tetraploid and exhibits a broad ecological amplitude, ranging from open montane forests and subalpine dwarf shrub communities to alpine grasslands. However, recent studies have revealed the existence of a morphologically similar diploid entity occurring in open alpine grassland communities (*Caricion firmae*) at three different localities within the *Dolomiti Bellunesi* and *Prealpi Carniche* (Southeastern Limestone Alps, Italy). The present study aims to distinguish this new entity from *Homogyne alpina* in terms of genetics, cytology, ecology and morphology, and to disentangle phylogenetic relationships within the genus *Homogyne*. We hypothesize that the newly discovered species is the ancestor of tetraploid *Homogyne alpina*, which may have originated through autopolyploidization. During fieldwork, six additional diploid populations were discovered within the aforementioned area, suggesting a wider distribution than previously known. For each population, a total of five vegetation relevés were recorded for five selected individuals. Silica gel-dried leaf material as well as herbarium vouchers from at least five individuals per population were collected for further analyses, including RADSeq and flow cytometry. The identical methodology was applied to eleven populations of *Homogyne alpina* within the same area. Preliminary results of our morphological studies exhibit a significant size-dependent differentiation, with the diploid taxon being smaller in both vegetative and reproductive parts. Genetic and ecological analyses are still ongoing and are expected to lead to the description of the diploid taxon as a new species.



Uncovering clonal genetic structures in steppe plants in the Pannonian region of eastern Austria

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Our project, funded by the Austrian Biodiversity Fund, investigated intraspecific genetic diversity of steppe plants in Austria based on 3RAD sequencing. We analyzed steppe plants from dry valleys of the Alps as well as from the Pannonian region of eastern Austria. Of the 13 taxa (single species and species groups) studied in total, four species are capable of vegetative reproduction (e.g. by rhizomes or root tubers) and could therefore potentially show clonal growth within the genetic data generated. Our results demonstrate varying proportions of clonality detected in our SNP data of *Artemisia pancicii*, *Carex supina*, *Iris humilis* subsp. *arenaria*, and *Phlomoides tuberosa*. It became obvious that sampling of clones could not be completely avoided mainly due to two facts: i) within very small ('individual-poor') populations our standardized sampling scheme of collecting 10 representative (distributed over the whole population area), independent (> 2 m apart) individuals was sometimes simply not achievable (*Carex supina*, *Iris humilis* subsp. *arenaria*) and/or ii) species with strong clonal structure showed large and probably old clonal structuring in combination with obviously reduced sexual reproduction (*Artemisia pancicii*, *Phlomoides tuberosa*). In view of these findings and given the dramatic declines in populations of these species across the Pannonian region of eastern Austria, greater efforts are needed to preserve them for the future. Our identification of different clones can therefore help effective nature conservation measures *in-situ* as well as *ex-situ*.



Divergent *Droseras*
Trap leaf specialization and intraspecific variation in the round-leaved
sundew *Drosera rotundifolia*

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Drosera rotundifolia is a widespread carnivorous plant with adhesive traps featuring three types of stalked glands: central, peripheral, and fast-moving snap tentacles. Despite its reputed morphological uniformity, we observed substantial variation in tentacle composition across populations. We investigated 22 populations in Austria, Germany, and the Czech Republic, documenting environmental parameters (altitude, geology, bog type, water chemistry, climate) and plant traits including rosette size, leaf position, tentacle counts, and prey capture. Snap tentacle percentages varied strongly between habitats ($p < 0.001$), ranging from 0% - 18%, and increased significantly with geographic distance (Spearman's $\rho = 33.2\%$). Principle component analyses revealed that tentacle composition varies orthogonally to overall plant size and vitality. Mixed-effect models demonstrated that snap tentacle abundance is primarily predicted by leaf position: prostrate basal leaves carried significantly more snap tentacles (9.0 ± 5.1) than erect leaves (3.1 ± 5.0). Snap tentacles were more common over Molasse and Moraine bedrock and less common in mixed and transition bogs. Basal leaves, rich in snap tentacles, were associated with poorer prey capture, and possibly specialized for crawling prey, whereas erect leaves appear optimized for flying insects. This leaf dimorphism mirrors functional differentiation known from *Nepenthes* pitchers and is in line with the absence of snap tentacles in cooccurring *D. intermedia* and *D. anglica*, which possess only erect leaves. Our findings reveal previously overlooked trap specialization within *D. rotundifolia*, driven by phenotypic plasticity, microhabitat conditions, and geographic structure. This intraspecific variation highlights how carnivorous plants fine-tune trapping strategies to heterogeneous environments.



From ancient genome duplication to Cenozoic migration: phylogenomics and biogeography of Rosaceae subtribe Malinae

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The Rosaceae tribe Maleae includes economically and ecologically important fruit, ornamental, and forest tree species. Its species-rich subtribe Malinae represents a striking example of evolutionary radiation, yet the relationships among its major lineages and the historical processes underlying its diversity have remained difficult to resolve. We generated the most complete phylogenomic dataset for Maleae to date, using Hyb-Seq data from 184 predominantly diploid accessions representing 159 species and all currently recognized genera. Nuclear and plastid phylogenies were reconstructed with explicit treatment of paralogy, and were integrated with divergence-time estimation, biogeographic modelling, diversification-rate analyses, tests of gene-tree discordance, and analyses of differential gene-copy retention. Our results support an Early Eocene origin of Maleae and Malinae, approximately 56 and 50 million years ago, respectively, with the Madrean Region reconstructed as an important ancestral area. The backbone of Malinae remained unresolved despite extensive nuclear data, indicating that its early diversification involved hard polytomies and an anomaly zone. Gene-tree discordance was explained mainly by gene-tree estimation error and incomplete lineage sorting, whereas nuclear introgression contributed only marginally. In contrast, cytonuclear discordance suggests several cases of plastid capture. Diversification rates increased through the Miocene and Pliocene, coinciding with repeated migrations, vicariance, and long-distance dispersal across the Northern Hemisphere, particularly involving the Madrean–Tethyan and Boreotropical floristic belts. East Asian habitat heterogeneity appears to have played a major role in later Malinae diversification. Finally, lineage-specific patterns of gene-copy retention show strong phylogenetic signal, suggesting that the ancient whole-genome duplication at the origin of Maleae contributed to subsequent lineage differentiation.

Keywords: Malinae; Maleae; Rosaceae; Hyb-Seq; phylogenomics; biogeography; evolutionary radiation; whole-genome duplication; gene-copy retention.



Founder events shaped the phylogeography of *Astragalus exscapus*—an ecological relict of Europe's extrazonal steppes

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The fragmented extrazonal steppes of Europe represent biodiversity hotspots and important warm-stage refugia for numerous steppe organisms, yet the historical processes that gave rise to the present-day distribution patterns of characteristic steppe species remain largely unresolved. Here, we investigated the evolutionary history and demographic dynamics of the threatened steppe plant *Astragalus exscapus* using genome-wide SNP data sampled across its entire distribution range. Phylogenomic analyses and ancestral range reconstructions identified the Pannonian Basin as the evolutionary centre of the species. During the Late Pleistocene, major lineages diverged as *A. exscapus* expanded from and within the Pannonian Basin, giving rise to genetically distinct lineages in the central Apennines, inner-Alpine dry valleys, and Germany. Demographic modelling consistently supported founder events over vicariance, indicating that repeated long-distance dispersal and establishment from small founder populations shaped the present-day distribution. Stairway Plot analyses revealed strongly asynchronous demographic trajectories among regions, suggesting lineage-specific responses to climatic oscillations. Despite its current barochorous dispersal strategy, low recruitment, and strong population fragmentation, the inferred history of repeated founder events indicates that historical dispersal occurred under ecological conditions fundamentally different from those of today. We propose that long-distance dispersal was facilitated by vertebrate vectors, potentially including large herbivores of the Pleistocene mammoth steppe, whose grazing, movement, and disturbance regimes likely promoted dispersal and establishment. Our results portray *A. exscapus* not only as a climatic relict of the Eurasian steppe biome but also as an ecological relict of formerly dynamic, disturbance-driven ecosystems.

Wide diversity in narrow geographic space: genetic, morphological and ploidy variation in three Central European *Crataegus* species with emphasis on their reproductive modes

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Hybridization, polyploidization, and apomixis are evolutionary forces that obscure genetic differentiation and boost morphological variability. These processes have shaped the family Rosaceae, particularly the genus *Crataegus*, which includes both diploid and polyploid species reproducing sexually or via apomixis. In Central Europe, *C. monogyna* and *C. laevigata* are predominantly diploid sexuals, while *C. rhipidophylla* is mainly a polyploid apomict. These species hybridize to form *C. × media*, *C. × macrocarpa*, and *C. × subsphaerica*. Our aim was to assess how hybridization, apomixis, and polyploidy shape *Crataegus* diversity by integrating genetic, morphological, and cytological data. Leaves and fruits were collected from ten natural populations where all three species coexist and hybridize. Species identification was performed with novel nuclear microsatellites, marking the first genetic-based *Crataegus* taxonomy in Central Europe. Ploidy levels were estimated by flow cytometry (FCM), including seed screening to infer reproductive modes. A combined morphological analysis of leaves and fruits was used to distinguish parental species and evaluate hybrid variability. Genotyping identified distinct genetic clusters for parental species and their hybrids, with geographic structuring within *C. laevigata* and *C. rhipidophylla*. Morphological data clearly separated genetically defined parental species, although hybrids can be difficult to distinguish from parents due to a big overlap in morphology. FCM indicated that *C. × media* is predominantly a diploid sexual hybrid like its diploid parents, while other tri- or tetraploid hybrids with polyploid *C. rhipidophylla* as a parent are apomictic. Ploidy rather than hybridization dictates the mode of reproduction.



An interactive tool for visualising phylogenetic conflict

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Reconstructing evolutionary relationships between plant species is frequently complicated by conflict between individual gene trees and the inferred species tree. Resolving this conflict is essential for accurate phylogenetic inference. However, interpreting quartet-based conflict at scale remains difficult: existing visualization approaches are largely static and lack the interactivity needed for efficient exploration of large phylogenomic datasets. Here we present an interactive visualization tool for exploring gene–species tree conflict across phylogenies of any size. It implements established graphical summaries (bar plots and pie charts of quartet proportions) alongside a novel application of ternary plots, which enable fast, perceptually intuitive discrimination between ILS and gene flow as sources of conflict. We demonstrate its utility using established land plant datasets. This tool is freely available as a python package, and requires only the output of ASTRAL as input.



Polyploid frequency along elevational gradients in the Eastern Alps

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Polyploidy, the presence of more than two chromosome sets in somatic cells, is widely recognized as an important feature of plant biodiversity. At global scales, an increase in polyploid frequency with latitude suggests a role of temperature in shaping the distribution of polyploid plants. However, patterns at finer, regional scales remain unclear. Here, we investigate how polyploid frequency varies along elevational gradients in the Eastern Alps. We analyzed a flora-wide dataset of approximately 42,000 georeferenced angiosperm samples collected along 101 elevational transects. Ploidy levels were determined using flow cytometry, resulting in a comprehensive cytogeographic dataset for the region. Contrary to expectations based on global patterns, polyploid frequency decreased with increasing elevation. Below the timberline, it increased with distance from glacial refugia, particularly among species with limited dispersal ability, suggesting an influence of postglacial colonization dynamics. Within species exhibiting multiple ploidy levels, cytotypes did not show consistent elevational segregation. Broad-scale niche differentiation was variable across species and often not statistically supported, with climatic variables generally more important than soil factors. Overall, these results highlight the role of regional historical and ecological processes, particularly dispersal and postglacial history, in shaping polyploid distributions.



Studying 3D corolla shapes in different pollination systems in *Aquilegia* (Ranunculaceae)

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The function of flowers in their interplay with pollinators is constrained by the three-dimensional arrangement as well as the shape and size of their floral organs. *Aquilegia* flowers are polysymmetric and their perianth comprises an inner whorl of five conspicuous petals that conceal their nectar reward in spurs. The spurs of different species differ in length and shape, likely as an adaptation to their specific pollinators. Indeed, previous studies have shown selection for spur length to ensure pollination success. In this study, we hypothesise that not only the length of the corolla spurs but also their shape reflects pollination systems in *Aquilegia*, thus defining three-dimensional (3D) floral syndromes. To test this hypothesis, we scanned flowers of twelve *Aquilegia* species pollinated by either a single functional group of nectar-collecting pollinators (large bees, hummingbirds or hawkmoths) or by two of these functional groups together (large bees and hummingbirds or hummingbirds and hawkmoths). By applying 3D geometric morphometrics, we study landmark- and semilandmark-sets defining the spur curvature as well as the spur opening where the pollinators insert their probing parts (proboscis or beak/tongue). A preliminary morphospace analysis showed a clear association between flower shapes and functional groups of pollinators, thus supporting our hypothesis. With the advances of 3D geometric morphometrics, we expect to be able to refine the definitions of floral syndromes in *Aquilegia*, which so far largely relied on categorical data and linear measurements of floral organs.



Buzz pollination in Melastomataceae: Exploring the vibrational niche of different flower morphologies

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In buzz-pollinated plants, bees vibrate anthers to stimulate pollen release. Researchers are only beginning to understand the evolutionary biomechanics of this active method of pollen collection that is found in important food crops like tomatoes, eggplants and blueberries. Buzz-pollination has evolved repeatedly and is thought to restrict pollen access and limit pollen loss to non-pollinating visitors. The associated flowers display great morphological diversity, but how flower morphology affects a flowers' biomechanical properties and controls pollen release remains largely unexplored. We tested whether floral morphology affects pollen release and if different flower types show an “optimal vibrational niche” at which a maximum amount of pollen is released. Using artificial vibration experiments spanning frequencies and amplitudes observed in pollinators in the wild, we compare four morphologically contrasting species of the pantropical plant family Melastomataceae. Preliminary analyses suggest that different morphologies are tuned to release pollen at different frequencies, and that pollen release generally increases with increasing vibration amplitude. This research contributes to our understanding of the vibrational niche breadth for each of the floral architectures and how release patterns shape interactions with bees in this functionally highly specialized pollination system.



Plant–Pollinator Interactions of *Gravesia* Across an Elevational Gradient in Marojejy National Park, Madagascar.

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In addition to influencing environmental condition such as humidity, temperature and precipitation, elevational gradients have the potential to impact pollinator behavior and interactions with plants. In plant lineages with wide elevational distributions, we may hence observe changes in pollination strategies. The Melastomataceae genus *Gravesia* is primarily distributed in Madagascar, where approximately 95% of all known species occur, which can be found from lowland to montane forests; however, little is known about its pollination ecology. We here examine the pollination ecology of *Gravesia* along an elevational gradient in Marojejy National Park, northeastern Madagascar, focusing on ten species, to test whether environmental variation influenced plant-pollinator interactions through influencing pollinator community structure and behavior. We made floral observations during the flowering period and all flower visitors were registered. In addition, we compared pollinator visitation rate and visitor composition between elevation zones. The preliminary results showed variation in bee pollinator communities and visitation frequency along the elevational gradient, with fewer bees visiting *Gravesia* flowers at higher elevations than in the lowlands, while buzz-pollinating bees at high elevations were generally larger-bodied. Reductions in bee abundance and diversity, coupled with size differences may have implications for the efficiency of pollen release from poricidal anthers and pollen deposition onto stigmas, resulting in lower reproductive success. Our results indicate that elevation might play a crucial role in shaping pollination strategies in *Gravesia* and enhances our understanding of the interactions between plants and their pollinators in the montane rainforests of Madagascar, a region known for its rich biodiversity.



Autonomous Selfing by Pollen Tube Shower in Melastomataceae with Poricidal Anthers

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Autonomous selfing is considered uncommon in Melastomataceae because the family is typically characterized by poricidal anthers and pronounced herkogamy, floral traits usually associated with animal-mediated pollen removal and outcrossing. Recent work in *Bertolonia*, however, showed that delayed selfing can occur via a “pollen tube shower,” in which pollen grains germinate inside poricidal anthers and pollen tubes exit through the anther pores to reach the stigma and ovules. Here, we investigated whether a comparable mechanism occurs in other plant species. We combined direct observations, pollination treatments, and microscopic visualization of pollen-tube growth in flowers collected at defined stages from anthesis to post-anthesis. The presence of a “pollen tube shower” was confirmed when pollen grains germinated within post-anthetic anthers, and pollen tubes emerged through the anther pores, contacted the stigma, and grew through the transmitting tissue toward the ovary. Bagged flowers produced fruit in those species, supporting autonomous selfing. Floral closure, reduced late-stage herkogamy, and/or stigmatic exudate were associated with selfing in *Sonerila* spp., suggesting that “pollen tube shower” is facilitated by coordinated post-anthetic changes in floral architecture. These results extend the known diversity of delayed selfing mechanisms in angiosperms and show that poricidal anthers do not preclude autonomous selfing. Its occurrence in distantly related tribes suggests that “pollen tube shower” may have evolved repeatedly within Melastomataceae. In these species, it may function as a delayed selfing route, providing reproductive assurance when cross-pollination fails.



Investigation of morphology, site ecology and distribution of *Molinia caerulea* and *M. arundinacea* along a transect between Ammersee and Lago di Garda

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The genus *Molinia* is widely distributed throughout temperate Eurasia. In the Eastern Alpine area, it comprises diploid *M. caerulea* and hexaploid *M. arundinacea*; both species are often collectively referred to as “*M. caerulea* complex”. The species’ high morphological and ecological variability has led to a variety of taxonomic concepts. For this reason, we examined ploidy, morphology, and habitat ecology of 386 individuals collected along a transect spanning from Ammersee in the northern Alpine foreland in Bavaria to Lago di Garda on the southern margin of the Alps in Italy. We have adopted an integrative approach combining flow cytometry, morphometry of generative and vegetative traits, small-scale vegetation surveys, and niche modelling. We demonstrate that morphologically, most of the samples can be clearly assigned to one of the two species; however, there is a wide overlap in trait values that renders field determinations incorrect in a significant number of individuals. The ecological niches of the two species overlap, but Landolt indicator values allowed us to identify trends regarding their respective preferred niches. By presenting new morphological reference values for distinguishing between the two species, our study will significantly improve the future discrimination between these two frequent and ecologically relevant species.



Diversity hotspots of (sub)alpine vascular plants in the Alps and their conservation status

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Mountains are biodiversity hotspots shaped by both environmental and historical factors and are of major importance for nature conservation. This study identifies hotspots of (sub)alpine vascular plants in the European Alps and evaluates their conservation status. Using grid-based distributional data from the IntraBioDiv project, which includes high-mountain vascular plant species from the Alps and Carpathians, we applied four biodiversity indices—species richness, endemic species richness, weighted species richness, and weighted endemic species richness. Hotspots were defined as the top 5%, top 5–10%, and top 10–20% richest grid cells for each index and overlaid with existing protected areas to assess their level of protection. Among 388 grid cells across the European Alps, 129 were identified as biodiversity hotspots by at least one index. Of these, 37, 32, and 60 belonged to the top 5%, top 5–10%, and top 10–20% categories, respectively. Hotspots were concentrated mainly in the south-western Alps, followed by the south-central and parts of the south-eastern Alps. Overall, 69% of hotspots represented conservation gaps, with less than 30% of their area covered by protected areas. Strong positive correlations between all four biodiversity indices and topographic complexity or elevational amplitude, together with the spatial congruence between hotspots and potential Last Glacial Maximum refugia, indicate that alpine biodiversity patterns are shaped by both ecological and historical processes. These findings reveal substantial shortcomings in the protection of high-elevation biodiversity hotspots across the Alps and highlight the need to establish new protected areas within the identified conservation gaps.

Artabgrenzung von *Riccia bicarinata*, *R. michelii* und *R. beyrichiana* (Ricciaceae, Marchantiales) in Europa anhand molekularer und morphologischer Daten

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Riccia ist die artenreichste Gattung der komplex-thallösen Lebermoose. Besonders aufgrund der hohen intraspezifischen morphologischen Variabilität gilt *Riccia* als taxonomisch schwierige Gattung, deren Systematik noch zahlreiche ungeklärte Fragen aufweist. In Europa betrifft eine dieser Fragen die Artengruppe aus *Riccia bicarinata*, *R. michelii* und *R. beyrichiana*, insbesondere die Identität und Abgrenzung von *R. bicarinata*. Insgesamt wurden 38 Proben von *R. bicarinata*, *R. michelii* und *R. beyrichiana* aus Europa, überwiegend aus dem Mittelmeerraum, mittels molekularer und morphologischer Methoden untersucht. Neun potenziell taxonomisch relevante morphologische Merkmale wurden erfasst und mit den bisherigen Artumgrenzungen aus der Literatur verglichen. Besonderes Augenmerk galt der Sporenmorphologie. Die morphologischen Ergebnisse stimmten weitgehend mit den bisherigen Artumgrenzungen überein, mit Ausnahme von *R. bicarinata*. Die Umschreibung und Abgrenzung von *R. bicarinata* konnte teilweise präzisiert werden. Die genetische Eigenständigkeit der drei Arten konnte erstmals durch phylogenetische Analysen dreier nukleärer Marker (ITS2, UNM und RPB1) bestätigt werden. Zudem wurde eine ausgeprägte genetische Variabilität und Struktur innerhalb von *R. michelii* und *R. beyrichiana* festgestellt. Bemerkenswert ist, dass drei morphologisch zunächst *R. beyrichiana* zugeordnete Proben nicht der *R. beyrichiana*-Klade angehören. Bei diesen handelt es sich vermutlich um ein bislang nicht beachtetes Taxon mit unklarem nomenklatorischem Status, das weiterer Untersuchungen bedarf. Ein neuer Bestimmungsschlüssel sowie Habitusfotografien und lichtmikroskopische Aufnahmen der vier Taxa werden vorgestellt.

Bodenanzeigende Pflanzen - - Betrachtungen zu einem interdisziplinären Thema

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"Bis heute klappt eine Lücke zwischen Kenntnissen und Zielen der geobotanischen Betrachtungsweise bei Botanikern und Geologen" meinte der Geologie-Ordinarius TOLLMANN. Ganz besonders betraf (betrifft?) dies die Beziehung Boden – Pflanzen. Forstleute und Ackerbauer besaßen wohl schon lange diesbezügliche empirische Kenntnisse (vgl. „Hausväterliteratur“). Weitaus länger freilich sind Indikatorarten den Erdwissenschaften, speziell dem Bergbau bekannt, waren doch die Bergleute auf das Ausbeißen von Erzadern angewiesen und achteten umso mehr auf Anzeichen für diese. Erste Bemerkungen gehen ins 5. vorchristliche Jahrhundert, auf den klassischen chinesischen Text des *Shan Hai Jing* zurück; in Europa finden sich erst zweitausend Jahre später Hinweise in AGRICOLAS klassischem Werk *De re metallica libri*. - In der Botanik hat im 19. Jahrhundert der Mediziner UNGER den Einfluss des Bodens auf das Vorkommen von Pflanzen klar erkannt (erstaunlicherweise haben auch mineralologisch versierte Botaniker wie etwa WULFEN zuvor keine Schlüsse aus ihren Funden gezogen). Nun beginnt eine eifrige floristische Suche danach, welche Pflanzen auf welchen Böden wachsen (Kalk/ Silikat, Serpentin usw.), zusehends ergänzt durch pflanzensoziologische Beobachtungen. – Bei den Erdwissenschaften steht weiterhin der angewandte Aspekt, also die Dokumentation nachgewiesener und vermuteter Zeigerpflanzen („Erzpflanzen“) im Vordergrund. Als Standardwerk der Zeigerpflanzenkunde kann das Werk *Bodenanzeigende Pflanzen* (1929) des preußischen Geologen LINSTOW gelten. Die praktische Umsetzung („*geobotanical prospecting*“) wird weitergeführt, in der UdSSR etwa durch MALYUGA, in den USA durch CANNON. – Botanikern/Ökologen erleichtern moderne Analysemethoden das Verständnis für die Mechanismen von Schwermetallaufnahme, -translokation und -resistenz und führen unter anderem zur Beschreibung von (Hyper-) Akkumulatorpflanzen (mit dem Nebenprodukt der *herbivore defence hypothesis*). Dieser Umstand macht die Auswertung von Herbarmaterial für die Erdwissenschaften interessant („*biogeochemical prospecting*“). Umgekehrt nähert sich die Botanik mit Ansätzen wie Phytosanierung, Phytoremediation, Phytoextraktion, Phytomining den (anwendungsorientierten) Zielen der Erdwissenschaften an. - Ob die von TOLLMANN postulierte Lücke damit geschlossen ist, bleibt freilich offen. Der von ihm angedachten „*abgerundete Synthese unter Berücksichtigung der regionalen Variationen*“ – welche heutzutage wohl nur mehr in interdisziplinärer Arbeit möglich ist – steht die immer weitergehende Spezialisierung (und Fragmentierung) der Wissenschaftsdisziplinen entgegen. Überdies ist ein weiterhin schwindendes Basisverständnis für die Erdwissenschaften zu erwarten: zum einen angesichts ihrer ohnedies latent vorhandenen Marginalisierung an den Schulen, zum anderen auf Grund der um 90% [sic!] reduzierten erdwissenschaftlichen Semesterwochenstunden für LehramtskandidatInnen an der Universität.

Punz W. 2004 Von den Erzpflanzen zu den Metallophyten. Jahrbuch Geol Bundesanstalt 144: 101-104



Nicolaus Thomas Host (1758–1834): Botanik zwischen Wiener Hof und „Vaterland“

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Nicolaus Thomas Host, in Fiume (St. Veit am Flaum, heute Rijeka, Kroatien) geboren und an der Universität Wien Medizin studiert, fand als Leibarzt Kaiser Franz II. (I., ab 1804) im Zentrum der habsburgischen Monarchie in Wien eine äußerst privilegierte Stellung, bei der es auch für seine botanische Forschung Platz gab. Wiewohl gebunden an den Hof gelang es ihm, den neuen botanischen Garten im Belvedere relativ eigenständig zu betreiben. Dieser wurde alsbald als „Alpengarten“ bezeichnet – zurecht, da er den heimischen Wildpflanzen des Kaiserreiches und insbesondere den „Alpenpflanzen“ des „Vaterlandes“ gewidmet war. Als Gartentypus stellte er eine Weltnovität dar. Als Botaniker profilierte sich Host nicht zuletzt auch mit seinen Publikationen zur Flora der österreichischen Provinzen (1797, 1827, 1834), zu Gräsern (1801, 1809) und Weiden (1830).

Ziel dieses Beitrags ist es, zunächst anhand neu erschlossener Archivalien die Kenntnisse über seine bisher wenig erforschte Biografie zu erweitern. Dabei gilt es zu diskutieren, welche Arbeitsstrategien seine Publikationstätigkeit voranbrachten: Wie beeinflussten die Kultivierung der Pflanzen im Alpengarten, die höfischen Bedingungen sowie die Austauschbeziehungen zu Akteuren der botanischen Community seine Forschungsarbeit? Während sich etwa das Verhältnis zum Laibacher Gartendirektor Franz de Paula Hladnik für ihn als äußerst fruchtvoll erwies, war die Kontaktaufnahme mit dem in Klagenfurt lebenden kenntnisreichen Exjesuiten Franz Xaver von Wulfen geradezu desaströs. Ihre unterschiedlichen Lebensstile und Vorstellungen von einer botanischen *Persona* lassen sich anhand der Briefkorrespondenzen nachweisen und somit die Annahme der Autorin festigen, dass die sogenannte *Res publica literaria* doch nicht so reibungslos funktionierte, wie es uns die Historiografie gerne vermitteln will.



Die Erforschung der Moosflora im pannonischen Raum: Von der Großstadt bis zum Nationalpark

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Forschung ist stets auch eine Frage der Perspektive. Die seit 1984 von unserer Arbeitsgruppe an der Universität Wien durchgeführten Untersuchungen zur Moosflora des pannonischen Raumes umfassen ein breites Spektrum an Fragestellungen aus der Ökosystem-, Landschafts- und Vegetationsökologie sowie der Biodiversitäts- und Biogeographieforschung. Der Vortrag gibt einen Überblick über ausgewählte Forschungsschwerpunkte und deren Entwicklung im Laufe von mehr als vier Jahrzehnten. Der Bereich der Bioindikation, der einen weiteren wesentlichen Forschungsschwerpunkt darstellt, bleibt dabei in dieser Präsentation unberücksichtigt. Im Bereich der Ökosystemforschung stehen urbane Lebensräume im Mittelpunkt, wobei die Untersuchungen von experimentellen Studien zu begrünten Mooswänden bis hin zu Konzepten eines nachhaltigen „Green Urban Space“ reichen. Landschaftsökologische Untersuchungen befassen sich mit Mustern und Determinanten der Moosdiversität in unterschiedlichen Agrarlandschaften sowie mit den Wechselwirkungen zwischen Landnutzung, ökonomischen Rahmenbedingungen und Artenvielfalt. Vegetationsökologische Fragestellungen werden anhand der Erforschung von Moosgesellschaften an pannonischen Lösswänden und deren synsystematischer Einordnung dargestellt. Abschließend werden aktuelle Ergebnisse zur Arten- und Lebensraumvielfalt des Pannonikums präsentiert. Diese bilden die Grundlage für die derzeit entstehende „Moosflora des Pannonikums“ einschließlich einer aktualisierten Roten Liste gefährdeter Moosarten und geben einen Ausblick auf zukünftige Forschungsperspektiven.



Linking genetic diversity, past evolution, and projected habitat loss in narrow endemic plants of the northeastern Limestone Alps (Austria)

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Mountain systems, such as the European Alps, are hotspots of endemism. Within the Eastern Alps, the northeasternmost Limestone Alps (NELA) stand out as a particularly significant center of narrow vascular plant endemism. This richness in endemism has been linked to factors such as topographic heterogeneity, limited Quaternary glaciation, and the presence of long-term climatic refugia throughout the late Pleistocene. Despite the uniqueness and conservation importance of NELA endemics, their evolutionary history and the intraspecific distribution of genetic variation remain poorly understood. This knowledge gap is especially concerning, as NELA and its mountain biota are expected to be disproportionately affected by future climate change, given the region's relatively low elevations and the limited availability of above-treeline habitats. To address these gaps, we studied eight endemic vascular plant taxa representing different ecological niches and spanning the montane to alpine zones in NELA. Through dense, range-wide sampling, we obtained over 3000 individuals, which we sequenced using a reduced-representation sequencing approach to infer genetic essential biodiversity variables. Our findings reveal that the distribution of genetic variation is largely species-specific and not directly linked to species ecology or altitudinal zonation. Using niche models, we predict a decline in suitable habitats under future climatic conditions, likely leading to large-scale population extirpations. This pattern was particularly pronounced in alpine species, where the most genetically diverse populations and lineages were found to be disproportionately affected.



Rediscovering Pyxidantheae (Melastomataceae): a hidden radiation for understanding diversification and interaction in Neotropical mountains

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Pyxidantheae (Melastomataceae) is a neotropical tribe that comprises more than 200 species and exhibits striking variation in traits mediating interactions with mutualists, namely its flowers, fruits and mite domatia. Recent field work and ecological studies have significantly increased the knowledge of the tribe, with almost 20 new species described and an expanded knowledge about interactions with pollinators, dispersers and mites. Our study aims to couple taxonomic information with evolutionary analyses to understand Pyxidantheae's diversity in light of interactions with mutualists. Flowers show adaptations to either vertebrate pollinators (birds, bats, rodents) or bees, while largest floral diversity exists among bee-pollinated species, perhaps driven by competition for bee pollinators and selection for differential pollen placement. Birds are the most important dispersers, and fruit diversity is more related to phylogenetic history. Mite domatia are evolutionarily labile and appear to be linked to warm and moist microclimates. Pyxidantheae will serve as an excellent model for analyzing diversification dynamics in tropical mountains and their relationship to different animal guilds.



Effects of environmental and human factors on islet vegetation in the Cyclades, Central Aegean (Greece)

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Within the Mediterranean Sea Basin, uninhabited small islets have particularly high conservation value. They act as refugia for narrow-range plant endemics and other specialized taxa, while also supporting ecologically important wildlife species like nesting seabirds. This study assesses the role of biogeographic and local factors on plant species richness, vegetation cover and plant community composition on Cycladic islets, to inform sustainable management strategies. Braun-Blanquet vegetation relevés were conducted on 26 islets. The effects of biogeographical and local biotic factors on islet plant species richness and vegetation cover were quantified via generalized linear mixed models. Non-metric multidimensional scaling and TTwo-way INDicator SPecies ANALysis were used to assess the effects on plant community composition. Island area emerged as the most important large-scale driver of plant species richness and vegetation cover. Grazing by goats and rabbits, as well as invasive rat presence, and high seabird nesting density, all significantly reduced species richness. While vegetation cover was also significantly reduced by grazing, we found no effect of rats and a positive effect of seabirds was detected, presumably through guano fertilization. Seabirds changed the species composition towards simplified nitrophilous communities, which support some Aegean endemics. The effects of all local factors persisted even after disturbances were removed, indicating profound and long-lasting vegetation change. We show that nesting seabirds are one of the most important local drivers of small island plant communities, by importing substantial marine-derived nutrients. While additional restoration measures may be necessary, conservation strategies should aim to restore natural islet dynamics by primarily removing goats, rabbits and rats, and minimizing human disturbance.



Two Decades of Declines in Alpine Snowbed Plant Populations in the Northeastern Calcareous Alps of Austria

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Snowbeds represent a unique habitat for specialist plant species characterised by a relatively good water and nutrient supply but a short growing season due to the long-lasting snow cover. Consequently, snowbed vegetation is expected to be strongly affected by ongoing changes in temperature and precipitation regimes. In this study, we assessed the development of six snowbed species (*Achillea atrata*, *Achillea clusiana*, *Arabis caerulea*, *Gnaphalium hoppeanum*, *Saxifraga stellaris* and *Sedum atratum*) over a period of 20 years in 210 snowbed patches of four mountains in the northeastern Calcareous Alps of Austria. The number of patches occupied by the snowbed specialists declined significantly for all species except for the endemic *A. clusiana*, with small populations being most at risk of extirpation. Consistently, a substantial reduction in population sizes was observed for all species apart from *A. clusiana*. Thereby, *A. caerulea* completely disappeared from the observed snowbeds. These patterns were primarily driven by declining snow cover (NDSI) and increasing vegetation density (NDVI). Conversely, the establishment of new populations was rare. Without effective mitigation of climate change, the observed massive population decline is likely to be intensified in upcoming decades, posing a severe threat to specialist snowbed plants as upward migration is impeded by the restricted altitudes of the northeastern Calcareous Alps.



Structural variation and adaptive radiation

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Adaptive radiations generate from a common ancestor a large number of species that diversify into an array of ecological niches over short evolutionary times. Whether they are driven solely by ecological opportunity or also require an elevated genomic potential remains unclear. Structural genomic variation, including chromosomal rearrangements, transposable element (TE) activity, and gene family evolution, may stimulate evolutionary novelty and diversification. The species-rich Neotropical *Tillandsia* subgenus *Tillandsia* (Bromeliaceae) is characterized by vast phenotypic diversity and repeated evolution of Crassulacean Acid Metabolism (CAM), a water-conserving photosynthetic pathway regarded as a key innovation. Using high-quality genome assemblies of species with contrasting photosynthetic phenotypes, we combined analyses of genome synteny, chromosomal rearrangements, TE dynamics, sequence evolution, gene family evolution and diel gene expression. We show that *Tillandsia* genomes have undergone structural reorganization associated with karyotype evolution, gene duplication and a highly dynamic TE landscape, creating a rich substrate for evolutionary innovation. However, we find the transition to CAM to be driven primarily by regulatory evolution: CAM-associated genes display pronounced diel expression shifts but limited evidence for adaptive coding sequence evolution. In contrast, CAM-related gene families exhibiting differential expression have undergone accelerated expansion in constitutive CAM lineages, linking gene family evolution to functional diversification. Together, our results suggest that structural genomic variation creates the conditions for regulatory innovation, while gene family expansion and expression rewiring underpin the emergence of complex adaptive traits. This supports the view that adaptive radiations are facilitated not only by ecological opportunity but also by genome evolution.



Genomic drivers of the adaptive radiation of New Caledonian Persimmons

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Adaptive radiations arise through the dynamic interplay of speciation, ecological diversification, and extinction, yet the genomic processes that fuel rapid diversification remain poorly understood. Due to its complex geological history, complemented by strong climatic zonation and sharp elevation gradients, New Caledonia, a biodiversity hotspot characterized by a complex geological history, steep environmental gradients, and extensive ultramafic substrates, provides an exceptional natural laboratory for studying these processes. Although *Diospyros* (persimmons, Ebenaceae) colonized the archipelago on four independent occasions, only one of these events led to an adaptive radiation of about 30 extant species occupying nearly all terrestrial habitats. To investigate the drivers of this radiation, we combined soil and leaf ionomic profiling, comparative transcriptomics, multiple newly assembled genomes, and whole genome resequencing of hundreds of accessions within a phylogenetic framework. Soil and leaf chemistry reveal the edaphic pressures associated with ultramafic habitats and the physiological strategies that enable adaptation to these metal-rich, nutrient-poor environments. Transcriptomic and population genomic analyses identify convergent molecular patterns associated with ultramafic adaptation across independently evolved habitat specialists. Further genome-wide analyses test three alternative sources of adaptive variation: i) introgression of beneficial alleles from related species, ii) environment-specific sorting of ancestral standing genetic variation, and iii) lineage-specific de novo mutations. Although the evolution of island biotas is intuitively expected to be mainly shaped by drift rather than natural selection, our results suggest that multiple adaptive processes play important roles in the radiation of New Caledonian persimmons.



Plants along the border - assessment and study of plant diversity along the Austria-Czech border as a basis for nature conservation planning and public outreach

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“Plants along the border” (ATCZ00182) is a joint project of the Faculty of Science at the University of South Bohemia, and the Biodiversity Center of Upper Austria. Long term goal is to contribute to the conservation of the rich, yet diminishing plant diversity in the CZ/AT border region as part of the program Interreg Austria-Czech Republic 2021-2027. To understand distribution patterns of plant life in the region, data from various sources — including ZOBODAT, the Floristic Mapping of Austria, the Upper Austria Nature Conservation Department’s database, and the Upper Austria Biotope Mapping — is pooled in ZOBODAT for Upper Austria and visualized together with the Czech data from PLADIAS on the project platform at: <https://floravltavodonau.eu/de/> Using the platform Observation.org as citizen science activities complete knowledge on the current distribution of selected flagship species and other species relevant to nature conservation, such as invasive plants. These activities not only expand the scientific database, but also enable the active involvement of the local population in the research and protection of regional plant diversity. Based on this joint data collection, the current distribution and trends of selected plant species (flagship species and invasive species) are analyzed. The results form the basis for developing conservation strategies and recommendations for action in collaboration with the stakeholders involved and help establish priorities for the protection of biodiversity.



Pflanzenwissen in den Kulturwissenschaften

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Der Vortrag präsentiert das kürzlich erschienene *Pflanzen: Kulturwissenschaftliches Handbuch* (hg. v. Isabel Kranz u. Joela Jacobs, Metzler 2026) mit dem Ziel, den interdisziplinären Dialog zwischen den Kultur- und Naturwissenschaften zu stärken. Nach einem knappen Überblick werden ausgewählte Beispiele aus dem Handbuch herangezogen, um unterschiedliche Zugänge zu Pflanzenwissen zu veranschaulichen und nach den Möglichkeiten von zukünftigem Austausch und Kooperationen zwischen den Disziplinen zu fragen. Kurz zum Inhalt: Das Handbuch untersucht die Rolle der Pflanzen in den Wechselbeziehungen von Natur und Kultur. Alle Kapitel betrachten Pflanzen sowohl als Lebewesen als auch in ihrem symbolischen und metaphorischen Gehalt – in Literatur, Kunst, Religion und Kulturgeschichte. Ein erster Abschnitt widmet sich den einzelnen Teilen der Pflanze (Wurzel, Ast, Samen etc.), die als Denkfiguren in Theorie und Philosophie präsent sind. Der ursprünglich aus den Agrar- und Geowissenschaften stammende Begriff der Kulturtechnik ermöglicht es im zweiten Teil, Praktiken mit, von und durch Pflanzen zu untersuchen. Im dritten Abschnitt stehen Räume im Mittelpunkt, in denen Pflanzen leben bzw. untersucht oder gezüchtet werden und die das kulturelle Imaginäre in besonderer Weise geprägt haben. Der vierte Teil untersucht Muster und Modelle von Pflanzen, die als ästhetische Objekte neues Wissen sowohl über die Welt der Flora als auch über die zum Einsatz gebrachten künstlerisch-medialen Techniken hervorbringen.



Shared and Species-Specific Epigenetic Responses to Warming in Alpine Plants

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Climate change strongly impacts alpine ecosystems, driving shifts in species distributions to higher elevations and demanding rapid adaptation for survival. Long-term evolutionary responses may be insufficient under current rates of change. Short-term acclimation via phenotypic plasticity could therefore be critical for population persistence. Epigenetic mechanisms, particularly DNA methylation and its influence on gene regulation, are promising candidates to mediate such rapid responses, yet their role remains poorly understood beyond model organisms. We investigated molecular responses to warming in four unrelated alpine plant species using a multi-year in situ transplantation experiment, combining fine-scale temperature monitoring with enzymatic methylation sequencing and transcriptome profiling, mapped to newly assembled reference genomes. Across all species, experimental warming induced a remarkably consistent molecular stress response, including the expression of genes involved in heat, drought, and general stress responses. Warming also caused widespread changes in DNA methylation, particularly increased methylation of transposable elements, suggesting a conserved epigenetic response that may help maintain genome stability under stress. Increased transposable element methylation also extended into adjacent regulatory regions, including putative promoters, suggesting potential consequences for gene regulation. Integrating expression and methylation data revealed that only a subset of differentially expressed genes overlapped with differentially methylated regions, and this relationship varied among species. Our results demonstrate that alpine plants exhibit a shared epigenetic response to warming, while the functional consequences for gene regulation are more complex and species-dependent. These findings provide new insights into the molecular mechanisms underlying plant responses to rapid climate change.



Widespread thermophilization but weak link to climate warming in Europe's summit plant communities

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Over the past decades, considerable changes in alpine vegetation have been observed and often attributed to climate warming. This attribution is particularly intuitive in the case of thermophilization, the shift of plant community composition towards more warmth-demanding species, but the causal link between thermophilization and warming has rarely been explicitly tested. Here we combined long-term macro- and microclimatic temperature time series with vegetation surveys in 724 permanent plots across 53 European mountain summits monitored over 21 years to evaluate a possible thermophilization signal and related it to rates of change in ten temperature metrics. We found both a thermophilization signal of alpine plant communities and an increase in temperatures across European summits. However, while these two trends were clearly related when averaged across mountain regions, their relationship was weak at the scale of individual plots, especially when considering microclimatic temperature metrics. Instead, substrate conditions, and particularly the availability of thermophilic colonizers in the surrounding vegetation had a major influence on plot-level thermophilization rates. We conclude that the response of plant communities to climate change strongly depends on the abiotic and biotic context. A better understanding of this complexity will require intensified monitoring efforts to reduce the uncertainty associated with vegetation and biodiversity scenarios under further climate change.



The high alpine-subnival vegetation types of Dena Mountain, Southern Zagros (SW Iran)

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This study presents a phytosociological analysis of high alpine vegetation types of Dena Mountain in the Southern Zagros Mountains (SW Iran). The main objectives were to identify and classify high-elevation plant communities, clarify their syntaxonomic relationships, and assess the key environmental factors influencing species composition. The study area comprises Dena Mountains (4,409 m a.s.l.), with many summits exceeding 4000 m a.s.l. which support rich and diverse alpine and subnival vegetation types. A total of 172 phytosociological relevés were recorded in summer 2019 and 2025 from the elevations between 3700 up to 4300 m a.s.l. of Dena, documenting 111 vascular plant species. Vegetation data were databased in Turboveg, classified using the TWINSpan algorithm in Juice, and the resulting units were interpreted within a syntaxonomic framework following the International Code of Phytosociological Nomenclature. Floristic patterns and ecological gradients were explored using Detrended Correspondence Analysis. A total of ten associations were identified, in four alliances, three orders and three classes. The classes belong to three main vegetation types, i.e. snowbed habitats, alpine thorn-cushion grasslands and high alpine-subnival scree communities. Preliminary results indicate a clear differentiation of alpine plant communities related to snow cover duration, elevation, substrate characteristics, and topographic factors. Final analyses are expected to refine the delimitation and syntaxonomic placement of the identified vegetation units. This contribution provides the first quantitative phytosociological baseline for alpine vegetation of the Southern Zagros mountain range and offers a foundation for future ecological and conservation-oriented studies in this biodiversity-rich but poorly documented mountain system.



Correcting for Observation Error in Vegetation Surveys

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Two years ago, at the Botany Meeting in Innsbruck, I presented raw data showing how observation error in vegetation surveys varied as a function of observer identity, species group, and species abundance. Since then, I have worked with teams from the Nutrient Network (NutNet) and GRASSland Communities Experiment (GRACE) Projects to quantify the effects of these errors on estimates of plant diversity change. In accordance with previous studies, these findings show that observation error leads to biases in estimates of biodiversity change – in particular, moderate under-estimates of local-scale (alpha diversity) change, and substantial overestimates of temporal turnover (beta diversity). In this talk, I will discuss how these biases complicate the interpretation of resurvey data, explain the challenges and methodological limitations that have limited previous attempts to address these biases, and introduce some field and statistical methods for quantifying and accounting for their impacts in analyses of biodiversity change.



Conservation Status of Vascular Plants in Austria

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In the recent report under Article 17 of Habitats Directive, the conservation status of vascular plants of Community Interest listed in the annexes of Habitats Directive was assessed for the period 2019-2024. The assessment of conservation status follows a methodology introduced by the European Commission in 2005. Since then, four assessments have been carried out, in 2007, 2013, 2019 and 2025. Conservation status of species is assessed by comparing the current situation with a favourable reference status and by analysing trends over the last 12 years in the species' range, population and habitat, as well as by evaluating the future prospects of those three parameters. The outcome of these assessments is expressed in three conservation status categories: favourable (FV), unfavourable-inadequate (U1) and unfavourable-bad (U2). In cases where an assessment is not possible, the conservation status is classified as "unknown" (XX). The Red List status may appear comparable to conservation status, as both are assessed on largely similar datasets. Nevertheless, there is an important difference between these two concepts: Red Lists use the extinction risk of a species as benchmark, whereas the conservation status focuses on the long-term survival of a species. Consequently, the latter uses favourable reference values as benchmark for assessment. Austria hosts 39 vascular plants and 13 moss species of Community interest listed in the Annexes of Habitats Directive. About a fifth of the assessments for vascular plants (20,75%) are favourable, almost a third (30,19%) is unfavourable-bad. For mosses, the assessment is even worse, as 5 % of the assessments are favourable and 42 % are unfavourable-bad. A comparison of the conservation status assessment from 2025 with the Red Lists from 2022 shows a largely consistent assessment, but also reveals species that were rated as having a favorable conservation status but simultaneously a high level of threat according to the Red Lists.



Nature's Palette: Plants as Sources of Textile Dyes

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Research into historical textile dyeing is closely related to dye plants, and in addition host plants serve as habitats for dye insects. Ultra-performance liquid chromatography with photodiode array detection coupled to mass spectrometry (UPLC-PDA-MS) is applied to detect main and minor dyes. These chemical fingerprints enable the identification of dye plants and dye insects. Analyses of Bronze and Iron Age textiles from Hallstatt salt mines revealed that the main dyeing methods, direct, mordant and vat dyeing, were already known. Other conclusions can also be drawn, for example the trade of dyeing materials. Late antique textiles from Egypt, held in the Viennese Papyrus Collection, point to trade routes from India to Egypt. Another aspect concerns ancient written sources such as the *Papyrus Graecus Holmiensis*, the *Papyrus Leidensis X*, epigraphic texts, botanical literature and dye recipe books. Roman lead labels (2nd century CE), found in a Carnuntum cesspit, were used in a dyeing workshop. The Latin inscriptions refer to clients, prices, clothing colours and dyes. Carl Linnaeus in his *Öländska och Gothländska Resa* (1745) and his student Engelbert Jörlin in his dissertation *Plantae tinctoriae* (1759) provide insight into dye plants known in Sweden in the mid-18th century. Studying the Austrian dye recipe books of Josef Zötl (1827) and his son (1859) illustrated that nearly the same natural dyes were applied as in previous times. In the second half of the 19th century, a gradual replacement of natural dyes started with the introduction of the first synthetic dye Mauveine in 1856.



Poster



**Pflanzensoziologische Untersuchungen ausgewählter
Vegetationseinheiten im Kontext einer Tagfaltererhebung in den Seetaler
Alpen (Steiermark)**

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Im Rahmen einer Tagfaltererhebung in den Seetaler Alpen (Steiermark) wurden 2025 ergänzende pflanzensoziologische Untersuchungen entlang eines Höhengradienten durchgeführt. Ziel der Studie war es, die Vegetationszusammensetzung ausgewählter Lebensräume zu erfassen und deren potenzielle Bedeutung für die Habitatqualität von Tagfaltergemeinschaften zu analysieren. Die Vegetationsaufnahmen erfolgten nach der Methode von Braun-Blanquet in standardisierten Aufnahmeflächen von 12 m² entlang definierter Tagfalter-Transekte. Insgesamt wurden 18 Vegetationsaufnahmen in drei Höhenstufen (untere subalpine, obere subalpine und alpine Zone) durchgeführt und 84 Pflanzentaxa dokumentiert. Die Auswertung der Artenzusammensetzung ermöglichte die Zuordnung zu drei charakteristischen Pflanzengesellschaften: *Nardetum alpigenum* (1.572-1.735 m.ü.A.), eine *Calluna vulgaris*-dominierte Zwergstrauchheide, wahrscheinlich *Calluno-Vaccinietum* (1.832-2.054 m.ü.A.), sowie *Caricetum curvulae* (2.108-2.213 m.ü.A.). Mit zunehmender Höhe zeigte sich ein deutlicher Wandel der Vegetationsstruktur von beweideten Borstgrasrasen über Zwergstrauchheiden bis hin zu alpinen Sauergrasrasen. Mehrere Arten traten höhenstufenübergreifend konstant auf, darunter *Nardus stricta*, *Potentilla aurea* und *Geum montanum*. Besondere Bedeutung kommt dem Nachweis naturschutzrelevanter Arten wie *Dianthus superbis* subsp. *alpestris* sowie der endemischen *Valeriana celtica* subsp. *norica* zu. Die Ergebnisse verdeutlichen die hohe vegetationsökologische Diversität der Seetaler Alpen und liefern eine wichtige Grundlage für die Interpretation von Tagfaltervorkommen entlang alpiner Höhengradienten. Die Kombination aus Pflanzensoziologie und Lepidopteren-Monitoring ermöglicht eine integrative Betrachtung alpiner Lebensräume und ihrer Biodiversität.



Der Kletterpflanzen – NAVIGATOR

Ein digitales Tool zur Unterstützung bei der Artenauswahl von Kletterpflanzen

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Kletterpflanzen leisten einen wertvollen Beitrag für zukunftsfitte, lebenswerte Städte und Gemeinden. Doch ihre Auswahl ist komplex: Standort, Licht, Wasser, Art der Fassade, Rankhilfen und Klimatoleranz müssen berücksichtigt werden. In Zusammenarbeit von „Natur im Garten“ und GRÜNSTATTTGRAU wurde ein Online-Tool zur standort- und systemspezifischen Auswahl von Kletterpflanzen entwickelt. Der „Kletterpflanzen-Navigator“ ist eine kostenlose, öffentlich zugängliche Webapplikation, die eine einfache und fundierte Pflanzenauswahl ermöglicht. Er bietet Filterfunktionen für über 60 Pflanzenarten und richtet sich an Städte und Gemeinden, Planende sowie Privatpersonen. Das Projekt erleichtert die Pflanzenauswahl und zeigt die Verwendungsmöglichkeiten von Kletterpflanzen. Nach umfassender Literaturrecherche wurden die Grundlagen zusammengetragen und in einem iterativen Prozess mit Feedbackrunden in Fokusgruppen diskutiert. Eingrenzung der Anwendungsmöglichkeiten: Das Tool soll die Pflanzenauswahl erleichtern und einen Einblick in die Vielfalt der Kletterpflanzen geben. Durch die Filtermöglichkeiten *Rankhilfe *max. Wuchshöhe *Lichtbedarf *Blühzeitpunkt *Eignung für Schulgärten *Heimisch und *Blühfarbe kann eine Eingrenzung für den Einsatz von Kletterpflanzen am Gebäude erfolgen. Zusätzlich bietet ein Infotext weitere Informationen zu Bau-, Pflanzung und Pflege von Fassadenbegrünungen. Der Kletterpflanzennavigator dient als Unterstützung der Artenauswahl und kann keinesfalls eine Fachplanung ersetzen!



Does transgenerational plasticity (TGP) facilitate invasion success? The role of maternal exposure to competition („Hotel Mama" effect)

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Biological invasions are among the most severe threats to biodiversity, and, to date, there is no sign that invasion rates are saturating. Transgenerational plasticity (TGP) is one factor that may facilitate invasion success. There is increasing evidence that TGP - a form of non-genetic inheritance in which the parental environment affects the phenotype of subsequent generations - can enhance offspring performance. TGP effects have been documented across diverse traits and environments - e.g., maternal light conditions shape offspring life-history strategy (annual vs. perennial), and maternal soil environments increase offspring stress tolerance, as indicated by greater photosynthetic efficiency. Despite recent efforts to better understand TGP's role in plant invasion success, little is known about whether maternal exposure to intense interspecific competition is transmitted to the offspring generation as a competitive advantage. Here, we test the "Hotel Mama" effect - that is, whether maternal exposure to interspecific competition alters offspring performance via transgenerational plasticity - and compare responses between neophytes and natives. We grew 17 Asteraceae species (F0, native and neophyte) in two contrasting competitive environments (high vs. low competition)-and asked whether maternal exposure to strong competition confers a competitive advantage in fitness (survival, growth and reproduction) to offspring (F1) when grown again under competitive conditions. We expect adaptive TGP that manifests as a match between maternal and offspring competitive environments, with stronger positive effects in neophytes than in native species. This study will identify TGP effects under realistic competitive pressure and clarify whether invasion success is substantially facilitated by TGP.



Gefährdete Flechten digital erfasst. Digitalisierung der Rote-Liste-Arten des Universitätsherbariums Graz (GZU)

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Das Herbarium der Universität Graz (GZU) zählt mit etwa 1,2 Millionen Belegen zu den bedeutendsten botanischen Sammlungen Europas. Die von Prof. Dr. Josef Poelt begründete und seit den 1970er Jahren aufgebaute Flechtensammlung gehört zu den renommiertesten ihrer Art weltweit. Sie umfasst mindestens 220.000 Herbarbelege und bietet eine besonders umfangreiche Dokumentation der Flechtenflora der Steiermark. Seit 2003 wird der Gesamtbestand des GZU digitalisiert. Derzeit sind rund 15 % der Sammlung über das Herbarverwaltungssystem und die Belegdatenbank JACQ zugänglich; die etwa 10.000 Typusbelege sind vollständig digitalisiert und mit hochauflösenden Bildern versehen. Im Rahmen eines universitätsintern finanzierten Projekts (2024–2026) wurde die Digitalisierung ausgewählter Bestände des Flechtenherbariums vorangetrieben. Der Fokus lag auf den in der Roten Liste Österreichs (1999) geführten Arten, da diese für zukünftige Datenverknüpfungen besonders relevant, gut erfassbar und im Projektzeitraum bearbeitbar waren. Ziel des Projekts war die vollständige digitale Erfassung der Metadaten aller GZU-Belege gefährdeter Flechtenarten Österreichs. Jeder digitalisierte Beleg wurde mit einem QR-Code versehen. Die Informationen sind nun sowohl über die JACQ Virtual Herbaria Website als auch über die Portale GBIF.org, GBIF-Austria, den Biodiversitäts-Atlas Österreich und OSCA online zugänglich. Ein beträchtlicher Anteil der gelisteten Flechtennamen wurde für diese Arbeit in das nomenklatorische Backbone des Systems eingearbeitet und steht jetzt dadurch auch in den genannten Portalen zur Verfügung. Das Projektziel wurde mit der Digitalisierung von rund 20.000 Herbarbelegen erreicht, darunter auch Belege von in Österreich seltenen Arten, die aus unterschiedlichen Gründen nicht in die Rote Liste aufgenommen wurden. Die im Rahmen dieses Projekts generierten Daten stellen eine wertvolle Grundlage für den Naturschutz und die Biodiversitätsforschung dar.



Demographic response of alpine biota to climate change

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Cold-adapted species are under high pressure by ongoing global warming. A better understanding of how these species may respond to the current climate change can be achieved by investigating past range dynamics. In this biome-wide project, we study the demographic response of 30 representative species of the alpine flora and fauna to past climate fluctuations across the entire arc of the European Alps. The study organisms include 20 plant species (angiosperms) and 10 animal species (arthropods). For the genetic analyses we chose the Restriction site associated DNA sequencing (RADseq) to determine phylogenetic relationships. These phylogenetic relationships are then utilised in the subsequent demographic modelling and species distribution modelling. In this way, we aim to answer the following research questions: (1) Did high-elevation species respond to Pleistocene climate oscillations by postglacial expansion or by postglacial contraction? (2) Were these range shifts affected by the ecological characteristics of these species? (3) Are past population size and range changes predictive of changes expected under current global climate change? By investigating the response of cold-adapted species to the ongoing global warming, we will contribute to a deeper understanding of whether the climate crisis will directly translate into a biodiversity crisis even in allegedly well-buffered areas such as the European Alps.



The *Botrychium lunaria* complex in Austria

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Botrychium lunaria (Ophioglossaceae) is native to the northern hemisphere, with a few isolated occurrences in the southern hemisphere. Until recently, it was assumed that the species exhibits a high degree of morphological plasticity, primarily attributed to varying site conditions. Following the initial taxonomic split of the species into *B. lunaria* (Eurasia) and *B. neolunaria* (North America), it was hypothesized that the species complex also comprises further cryptic species in Europe. Phylogenetic analyses based on four plastid markers have shown that there are a total of six lineages in Switzerland, two of which (*B. tunux*, *B. onondagense*) have been previously known only from North America. Based on these findings, it can be assumed that additional species from this complex are also present in Austria. To address this, herbarium specimens were examined and selected, and in the summer of 2025, random samples of *B. lunaria* s.l. were collected in the Austrian Alps. Silica-gel dried plant material was processed and the same four plastid markers were sequenced and analyzed using maximum likelihood phylogenetic analysis. The applicability in the field of the diagnostic morphological characters devised for the Swiss flora is discussed.



Cytogeographic revision of *Artemisia austriaca* s.l. (Asteraceae) in the Pannonian region and beyond

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Artemisia austriaca is usually considered a Eurasian steppe species distributed from Austria to China, having three different ploidy levels (2x, 4x, and 6x). In central Europe, *A. austriaca* s.l. comprises the allegedly Pannonian endemic *A. austriaca* ($2n=6x=48$), described from eastern Austria, and the non-native *A. repens* ($2n=2x=16$), described from Siberia and growing in zonal steppes from the Pontic region eastwards. The most reliable diagnostic feature is the size of capitula. Recently, it became evident that those two taxa have often been confused or subsumed under *A. austriaca* (s.l.). Therefore we revised specimens in one dozen major herbaria, measured genome sizes and estimated DNA ploidies in 56 populations (median: 4 individuals per population): Hungary: 24, Austria: 21, Bulgaria: 6, Romania: 2, Slovakia: 1, Ukraine: 1, Germany: 1. The absolute genome size of *A. austriaca* was measured for the first time. We could show that the uniformly hexaploid *A. austriaca* has its distribution centered in central and eastern Lower Austria and northern Burgenland as well as in central regions of Hungary (Transdanubian Mountains and Great Hungarian Lowland). Records of *A. austriaca* for Pannonian areas in Serbia and Ukraine refer to the non-native *A. repens*. In regions where *A. austriaca* is rather common, it can rarely be found in secondary habitats. Due to confusion with *A. repens*, *A. austriaca* is less common in the whole Pannonian region than previously thought. It is suffering from land use change and the spread of *Robinia pseudoacacia*. Like in Austria, also in Hungary *A. austriaca* should be red-listed.



Smart Bark: Seasonal dynamics of lenticel conductance

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Bark is among the least studied components of a tree, in particular the outer bark, i.e. the periderm and rhytidome. This is despite the importance of bark for overall tree function and survival, which has largely been overlooked until a recent revival of interest. Recent research in tree physiology focuses not only on leaf and wood hydraulics but also on empirical estimation of water loss via periderm and eventually the lenticels. Potential regulatory mechanisms in lenticels for bark transpiration remain, however, an enigma. This is also because lenticel structure has been so far analyzed only in ~0.1% of the ~73,000 globally existing tree species and - regarding the high variability in bark anatomy – we need to gain greater knowledge in order to understand their functioning. In order to learn more about potential regulatory mechanisms of lenticels for bark transpiration, we investigated their spatial distribution and anatomical design together with their annual phellogen activity and related these structural traits to changes in bark permeability throughout the year. Within the “Smart Bark” project, the seasonal dynamics of bark conductance together with the annual activity of the phellogen of lenticels was analysed in four angiosperm tree species (*Fagus sylvatica*, *Prunus avium*, *Robinia pseudoacacia*, *Salix viminalis*). By gaining more knowledge on the seasonal variability in the permeability of lenticels, and, consequently of the outer bark, we aimed to increase our knowledge about structure-function relationships of lenticels and improve predictions of tree drought vulnerability.

Wiederholung historischer Vegetationsaufnahmen: Veränderungen montaner Arten und der Standortbedingungen in Wäldern um Graz

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Historische Vegetationsaufnahmen ermöglichen die Analyse langfristiger Veränderungen der Waldvegetation. Ziel dieser Arbeit war es, den Wandel montaner Arten in den Wäldern der Grazer Umgebung innerhalb der letzten 100 Jahre zu untersuchen und zu bewerten, inwieweit dieser mit dem Klimawandel oder anderen Veränderungen der Standortbedingungen zusammenhängt. Hierfür wurden 78 historische Waldvegetationsaufnahmen von Josef Eggler (1925–1927) im Jahr 2025 im Rahmen des Forschungsprojekts DIVERSE (Interreg) erhoben. „Montane Arten“ wurden dabei als jene Arten definiert, die den Höhenstufen submontan - nival zugeordnet sind und mindestens dreimal in historischen oder rezenten Aufnahmen vorkamen (n=30). Zur Charakterisierung der Standortbedingungen wurden die ungewichteten Ellenberg-Zeigerwerte von 59 Relevé-Paaren, mit jeweils mindestens einer montanen Art, berechnet. Die Ergebnisse zeigen Verschiebungen zu schattigeren, wärmeren, kontinentaleren und nährstoffreicheren Standortbedingungen. Gleichzeitig ging die Häufigkeit montaner Arten deutlich zurück: 73% der untersuchten montanen Arten nahmen ab. Neun Arten konnten in den aktuellen Aufnahmen nicht mehr nachgewiesen werden. Der beobachtete Rückgang montaner Arten steht im Einklang mit den erwarteten Auswirkungen der Klimaerwärmung, lässt sich jedoch nicht monokausal darauf zurückführen. Vielmehr deuten die Veränderungen der Standortbedingungen darauf hin, dass neben dem Temperaturanstieg auch die Verdunklung der Wälder infolge veränderter Bewirtschaftung, zunehmende Stickstoffeinträge sowie Konkurrenzprozesse wesentlich zur Veränderung der Artenzusammensetzung beitragen.



A Century of Forest Vegetation Dynamics around Graz: Integrating Historical Vegetation Surveys with GIS-Based Spatial Analysis

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Central European forests have undergone substantial changes over the past century due to land-use change, natural succession and changing forest management. Long-term vegetation resurveys provide a valuable opportunity to investigate these changes and their effects on forest ecosystems. Conducted within the INTERREG Alpine Space project DIVERSE (Integration of bioDIVERSity conservation within bioEnergy production for a low-carbon energy mix in the Alpine region), this study investigates longterm changes in forest vegetation in the Graz region (Austria) by comparing historical vegetation surveys conducted by Josef Eggler between 1925 and 1928 with vegetation resurveys carried out in 2025. A major focus of the study is the development of a GIS-based workflow for integrating historical vegetation data with spatial analyses. Eggler's historical vegetation map was georeferenced, digitised and classified using an Extreme Gradient Boosting (XGBoost) classifier to reconstruct historical forest types and their spatial distribution. These spatial datasets are combined with vegetation resurveys, historical cadastral records and environmental variables to analyse long-term changes in forest cover, vegetation composition and landscape structure. Preliminary analyses indicate substantial changes in forest vegetation and landscape structure over the past century. Ongoing analyses aim to assess how these changes relate to historical land use, landscape dynamics and environmental conditions. By integrating historical vegetation surveys with GIS-based spatial analysis, this study contributes to a better understanding of long-term vegetation dynamics and historical land-use legacies in forest ecosystems.



Reproduktive Fitness von *Pulsatilla grandis* und Populationsgröße an zwei österreichischen Trockenstandorten

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Kleine Populationen sind durch ihre geringe genetische Diversität gefährdet, in einen sich selbst verstärkenden Aussterbezyklus aus abnehmender Populationsgröße und weiterer genetischen Verarmung zu geraten. Aufbauend auf den Ergebnissen einer Erhebung der genetischen Vielfalt von *Pulsatilla grandis* in Österreich wurden in zwei Jahren Bestäubungsversuche mit *P. grandis* durchgeführt, um einen möglichen Zusammenhang zwischen Populationsgröße und reproduktiver Fitness zu testen: 2025 am Bisamberg (NÖ, <200 Individuen) und am Mödlinger Eichkogel (NÖ, wahrscheinlich >1000 Individuen). Um standortbedingte Faktoren auszuschließen, wurden aus denselben Populationen Pflanzen angezogen und 2026 im Botanischen Garten der BOKU University Wien der Bestäubungsversuch wiederholt. In beiden Jahren zeigte sich, gemessen an der Anzahl und Masse der entwickelten Früchte (Nüsschen), eine geringere Fitness in der kleinen Population. Da die beiden Gebiete ökologisch sehr ähnlich sind, aber die genetische Diversität der kleinen Population geringer ist, spricht der konsistente Unterschied dafür, dass die reduzierte Fitness der kleinen Population auf genetische Verarmung (z. B. Inzuchteffekte) zurückzuführen ist. Auch wenn die Aussagekraft durch die Untersuchung von nur zwei Populationen und die geringe Individuenzahl im Bestäubungsversuch begrenzt ist, weisen die Ergebnisse doch auf ein nur selten untersuchtes Naturschutzproblem hin.

Individual-poor populations are at risk of entering a self-reinforcing extinction vortex of declining population size and further genetic erosion. Based on a survey of genetic diversity in *Pulsatilla grandis* in Austria, we carried out pollination experiments to test for a link between population size and reproductive fitness over the course of two years: in 2025 on Bisamberg (Lower Austria, <200 individuals) and Eichkogel in Mödling (Lower Austria, likely >1000 individuals). To control for site factors, we repeated the pollination experiment in 2026 in a common-garden setting at the BOKU University Vienna Botanical Garden using plants grown from seeds from the same populations. In both years, fitness, measured as the number and mass of developed fruits (achenes), was lower in the individual-poor population. Because the two sites are ecologically very similar, but the individual-poor population exhibits reduced genetic diversity, the consistent difference points to genetic impoverishment (e.g. inbreeding) as the cause of reduced fitness. While inference is limited as only two populations and a modest sample size were used in our pollination experiments, the results point to a rarely studied conservation concern.



Evolution of Organismal Stress Responses: Differential Gene Expression of five Moss Species following Metal Stress

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Pollution, including that caused by heavy metals, is a direct driver of global biodiversity decline, creating stressful conditions for various organisms. Depending on the severity of such stressors, organismal responses may vary, and further studies are warranted to better understand them. Mosses are particularly suited for investigations of heavy metal stress as they can absorb metals directly through their lamina and are frequently used as bioindicators. Moreover, mosses comprise a broad range of tolerance across their estimated 12,000 species. This project aims to investigate the gene expression response of five moss species to metal exposure. To do so, RNAseq will be performed to measure the differential gene expression (DGE) of five moss species including two Cu-tolerant species (*Pohlia drummondii* and *Mielichhoferia elongata*), one salt-tolerant species (*Entosthodon hungaricus*), a cosmopolitan species (*Hypnum cupressiforme*), and a model organism (*Physcomitrium patens*). All were grown on media containing FeCl₃, CuCl₂, and no metal (control). Our results will (1) further our understanding of the mechanisms by which mosses respond to metal stress on the gene expression level and (2) enable us to compare DGE between five species, gaining insight into the evolution of this stress response and tolerance mechanisms. Our results will contribute to a growing body of literature on how organisms respond and adapt to stressful environments.



Eignen sich moderne Verfahren zur Erweiterung der Schärfentiefe in der Makrofotografie auch für die botanische Forschung?

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Fotografische Dokumentationen im Makro- und Mikrobereich sind eng mit der botanischen Forschung verbunden. Neben der Qualität der benutzten Optiken stellt dabei insbesondere der geringe Schärfenbereich eine Herausforderung dar. Eine hervorragende Lösung bietet die Rasterelektronenmikroskopie, die auch geringere Vergrößerungen abbilden kann. Nachteile sind die Abbildung als Graustufenbild, der hohe Anschaffungspreis sowie Unterbringung und Betriebskosten. Eine gute, alternative Lösung bot das in den 1990er Jahren in Wien entwickelte PTL-Verfahren (pull through light), bei dem das zu fotografierende Objekt durch einen Lichtvorhang gezogen wurde, dessen Dicke unter der Auflösungsgrenze des Films liegen musste. Da auf den Lichtvorhang fokussiert wurde, erhielt man ein durchgehend scharf abgebildetes Objekt in Farbe. Mit dem Übergang zu digitalen Sensoren in der Fotografie mit sehr hohen Auflösungen, konnte das Verfahren nicht mehr angewendet werden. Heute übernimmt Foto-Stacking diese Funktion: ein Stapel von vielen Einzelaufnahmen eines Objekts mit unterschiedlichen Fokuspunkten wird per PC zu einem einzigen Bild mit durchgehender Schärfe verrechnet. Dabei kommen zwei Verfahren zum Einsatz: das Verändern der Fokusebene des Objektivs durch die Kamerasoftware (focus bracketing) und das Verschieben der Fokusebene durch Bewegung der Kamera. Die zweite Methode führt zu besseren Ergebnissen. Dabei können auch Mikroskop-Optiken (long working distance, allerdings mit verringerter Numerischer Apertur) in Kombination mit motorischen Einstellschlitten verwendet werden. Trotz Unzulänglichkeiten bei der Verrechnung der Bildstapel (oft mehr als 200 Bilder) mit Abbildungen von Objekten mit sich kreuzenden Strukturen oder Haaren, sind die Ergebnisse für morphologische Dokumentationen gut. Von Vorteil sind die Darstellung in Farbe sowie der Anschaffungspreis.



Heat limits in tropical plants: leaf temperatures and effect of heat dose on tropical plants

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Tropical forests harbor approximately half of the world's terrestrial biodiversity and play a crucial role in global carbon cycling, yet they are increasingly exposed to high temperatures and heat waves under climate change. Evolved in warm climates, tropical plants are assumed to tolerate acute and prolonged heat through physiological and biochemical acclimation and reduced leaf heating (e.g., transpirational cooling). At the La Gamba research station (Costa Rica), we studied five species representing diverse families, growth forms, and ecological niches. Leaf and air temperatures were monitored using thermocouples, and leaf surface temperatures were mapped with infrared thermography. To examine heat dose effects, leaves were exposed to a temperature series (34–66°C) for 1–512 min. Heat-induced damage was quantified using chlorophyll fluorescence (Fv/Fm), and leaf heat tolerance was expressed as LT50 values. Dose–response relationships were calculated and compared with temperate species. Contrary to expectations, leaf temperatures frequently exceeded ambient air temperature by more than 15°C, indicating limited ability for transpirational cooling despite favorable water availability. Although the studied species exhibited high absolute heat tolerance, their sensitivity to prolonged heat exposure was comparable to that reported for temperate species, suggesting a shared physiological constraint on tolerance to sustained heat. These findings indicate that tropical plants may be more vulnerable to ongoing warming and increasingly frequent heat extremes than previously assumed, and they underscore the importance of considering leaf energy balance and heat dose (time–temperature integration), not just instantaneous heat thresholds, when projecting tropical forest responses to climate change.



September flood 2024 at the Danube – consequences for plant dispersal

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Extreme flooding events are expected to make a significant contribution to long distance dispersal of plants. The heavy flood of September 2024 affected areas, which had otherwise been cut off from the Danube for a long time and transported large quantities of sediments containing plant diaspores. Our main questions were: Which plant species could profit from the flood? Are common, ruderal or invasive species the only beneficiaries or can the increased connectivity give a chance for rare species to reach distant sites? We sampled organic material of drift lines at 4 locations upstream of the city of Vienna. After cold stratification the samples were deposited on sterilized soil in a greenhouse for germination for a period of one year. About 70 taxa of vascular plants could be detected. The most numerous group (1/3 of all seedlings) were annual ruderal and mudbank species, followed by nearly equal amounts (20-15%) of seedlings of perennial ruderals, agricultural grassland species and species of semi-dry grasslands. The last-mentioned group includes species, which can be considered as target for nature conservation. But they were mainly present at one location from the Danube island reflecting the close surroundings of the sampling site, while distant transport remains questionable. Woody species were underrepresented among the seedlings although numerous large fruits (*Aesculus*, *Quercus*, etc.) could be observed in the drift material. For most of these propagules floating and deposition in the drift line is expected to be a sink, as they tend to lose their viability during the transport.



Six decades of flowering phenology and leaf nutrient contents from herbarium specimens in Mongolian steppe species

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Herbaria offer a valuable way to study how plants have responded to environmental change over long periods and across large geographic areas. We use around 4,000 herbarium specimens, collected mainly between 1960 and 2025 across Mongolia, to investigate long-term changes in plant phenology in typical steppe ecosystems. The dataset includes 16 species representing the major plant families of the Mongolian steppes. For each specimen, we recorded the phenological stage, including vegetative growth, budding, flowering, fruiting, and the end of fruiting. These observations allow us to estimate species-specific flowering onset, end, and duration over the past six decades. We also measured leaf nitrogen, phosphorus, and carbon concentrations non-destructively using near-infrared spectroscopy, making it possible to examine links between phenology and leaf nutrient status. We use species-specific models to analyse long-term changes in flowering phenology and test whether leaf nutrient concentrations, particularly nitrogen and phosphorus, are associated with flowering timing. Based on previous studies, we expect plants with higher leaf phosphorus concentrations to flower earlier, whereas higher nitrogen concentrations are expected to be associated with later flowering. This study demonstrates how herbarium collections can be used to investigate long-term changes in flowering phenology and measure leaf nutrient contents non-destructively. It provides new insights into the relationship between leaf nutrient status and flowering phenology in Mongolian steppe species.



Biodiversity hotspots of vascular plants in the Hindu Kush mountain range and their conservation status

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Mountains are associated with relatively high biodiversity and a high richness in endemic species. This is also visible in the number of Global Biodiversity Hotspots lying in mountainous areas. This study aims to identify the plant diversity hotspots and their conservation status in the Hindu Kush mountain range in Afghanistan and NW Pakistan. All recorded specimens of the species of three big families in the region, i.e. Asteraceae, Brassicaceae and Lamiaceae, were extracted from the Flora Iranica and then georeferenced. Based on this data, four well-established biodiversity indices, i.e. Species Richness, Endemic Richness, Weighted Species Richness, and Weighted Endemic Richness were calculated in grid-cell sizes of 50 × 50 km. The hotspots were defined as the top 5 %, top 5–10 %, and top 10–20 % richest grid cells for each index separately. To assess the state of their protection, the identified hotspots were overlaid with existing protected areas. Hotspots with less than 10 % protection were considered as conservation gaps. The majority of the identified hotspots were classified as conservation gaps, indicating that these areas should be prioritized for future conservation efforts.



Diverging responses of taxonomic, functional, and phylogenetic plant diversity to biogeographic parameters in arid habitat islands of southern Africa

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Habitat islands conceptually bridge true islands and habitat patches, adding new perspectives to island biogeographic principles that shape community assembly processes. Despite growing interest, empirical studies are scarce and the drivers of biodiversity in these systems, such as different aspects of island shape, isolation and habitat diversity, remain unclear. Our aim was to assess how biogeographic parameters influence taxonomic, functional, and phylogenetic plant diversity on habitat islands using quartz islands in South Africa as our model system. We conducted floristic surveys on 20 quartz islands in the harsh and arid summer-rainfall region around Pofadder (Nama-Karoo, South Africa) to quantify species richness, functional dispersion, and phylogenetic mean pairwise distance. Via remote sensing, we derived island metrics and evaluated their effects on the diversity metrics, using multivariate regression analysis. We fitted negative binomial generalized linear models for species richness and linear models for functional and phylogenetic diversity. Island area emerged as the strongest predictor of species richness, consistent with island biogeographic theory. Connectivity was a significant predictor for functional dispersion and explained most of the variation. The mean pairwise distance was significantly influenced solely by the area of the nearest neighbour island, although its explanatory power was only moderate. Our findings highlight that different facets of diversity respond distinctively to biogeographic parameters. Integrating taxonomic, functional, and phylogenetic perspectives is therefore essential for a comprehensive understanding of biodiversity patterns on habitat islands and for providing valuable insights for conservation.

Evolution of clonality in an alpine-arctic saxifrage during interglacial-glacial cycles in the southeastern Alps: a population genomics approach

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Shifts from sexual reproduction to clonality have profound implications for the evolutionary potential, genetic variability, and persistence of a population. To begin answering fundamental questions regarding how clonality evolves and persists, as well as the consequences of reduced sexual reproduction, we aim to investigate the evolution of partial clonality within an endemic variant of a widespread alpine-arctic saxifrage, *Micranthes stellaris* var. *prolifera*. While *M. stellaris* reproduces sexually throughout most of its range, populations with partial clonality through vegetative diaspores (pseudovivipary) are restricted to the siliceous southeastern Alps in well-known glacial refugia. Although the phylogeography of *M. stellaris* throughout its range is understood, the relationship between clonal and non-clonal populations, as well as environmental and geographic structuring of the variants within contact zones is so far unclear. As such, we aim to clarify the demographic history of *M. stellaris* during glacial -interglacial cycles using population genomics, with special attention to the contact zones between the restricted and widespread varieties. We will also use clinal analysis to quantify relative contributions of genetic drift and selection and to identify candidate genomic mechanisms of pseudovivipary. This project opens the door for future comparative analysis between parallel origins of clonality within the well-supported clade *Stellaris*, in which multiple losses or gains of clonality have occurred.



Auf den Spuren von Handel-Mazzetti: Eine digitale Reise durch die Vielfalt des chinesischen Südwestens

Zoe Springer¹

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Im Juli 1914 begann der österreichische Botaniker Heinrich von Handel-Mazzetti seine fünfjährige Forschungsreise durch die chinesischen Provinzen Yunnan, Sichuan, Guizhou und Hunan. Die Kaiserliche Akademie der Wissenschaften hatte ihn entsandt, um die Biodiversität des chinesischen Südwestens zu erkunden. Heute liegt der Großteil seiner Sammlung in den Wiener Herbarien. Als Experte für die Flora und Phytogeographie Südwest-Chinas hebt er sich vor allem durch seine holistische Arbeitsweise von seinen Zeitgenossen ab. Zwar ist sein Reisetagebuch verschollen, doch die penibel beschrifteten Herbarbelege ermöglichen eine genaue Rekonstruktion seiner Reiserouten, denn er hielt auf jedem einzelnen Etikett das Funddatum und die dazugehörige Diariumsnummer fest. Um den Prozess der Georeferenzierung zu untersuchen und einen Überblick über die chinesischen Sammlungsbestände in Wien zu schaffen, wurden die Herbarbelege der Gattung *Adenophora* FISCH. aus den Herbarien des Naturhistorischen Museums Wien (W) und der Universität Wien (WU) als Beispiel herangezogen und in die Datenbank JACQ aufgenommen. Im Vordergrund stand dabei die Interpretation der teils uneinheitlichen, lautmalerischen Übersetzung chinesischer Ortsnamen und die Zuordnung der aktuellen Ortsbezeichnung. Anschließend konnten die entsprechenden Koordinaten über den Vergleich mit öffentlichen Kartendiensten ermittelt und in die neu erstellten Datensätze eingetragen werden. Da Handel-Mazzettis Herbar-Etiketten von Landkarten in beeindruckendem Detail begleitet werden, bieten sie einen besonders guten Einstieg in die Georeferenzierung chinesischer Ortsnamen. Die erhobenen Koordinaten vollenden nicht nur die Digitalisierung, sie können über den Vergleich der Diariumsnummern auch auf Belege verschiedenster Pflanzengruppen übertragen werden.



COBIGA – der Biologische Korridor La Gamba in Costa Rica (Regenwald der Österreicher)

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Das biologische Korridorprojekt COBIGA (Corredor Biológico La Gamba) im Süden Costa Ricas wird von der Tropenstation La Gamba (www.lagamba.at) durchgeführt und verfolgt das Ziel, stark fragmentierte Tieflandregenwälder der Golfo-Dulce-Region wieder mit den Bergwäldern der Fila Cal zu verbinden. Der Korridor ist Teil des nationalen costaricanischen Netzwerks biologischer Korridore sowie des überregionalen AMISTOSA-Korridors zwischen dem Nationalpark Corcovado und dem Nationalpark La Amistad. Im Zentrum des Projektes stehen die Renaturierung ehemaliger Weideflächen, die Förderung natürlicher Sukzession sowie die Schaffung funktionaler Lebensraumverbindungen für bedrohte Tier- und Pflanzenarten. Dabei werden sowohl aktive Wiederbewaldungen mit zahlreichen heimischen Baumarten als auch passive Renaturierungs-Strategien kombiniert. Parallel dazu erfolgt ein wissenschaftliches Monitoring der Vegetationsentwicklung, Biodiversität und ökologischen Prozesse. Moderne Methoden wie Bioakustik, Kamerafallen sowie LiDAR-gestützte Analysen ermöglichen neue Einblicke in die Dynamik tropischer Wiederbewaldungssysteme. Erste Ergebnisse zeigen eine bemerkenswerte Rückkehr zahlreicher Tierarten in renaturierte Flächen, darunter Tapire, Ozelots, große Vogelarten sowie verschiedene Bestäuber-Gruppen. Neben dem Biodiversitätsschutz leistet COBIGA auch einen wichtigen Beitrag zum Klimaschutz durch langfristige Kohlenstoffbindung sowie zur regionalen nachhaltigen Entwicklung durch lokale Beschäftigung, Umweltbildung und internationale Forschungskooperationen. Der Vortrag gibt einen Überblick über die Entstehung, Ziele und bisherigen wissenschaftlichen Erkenntnisse des Projektes und diskutiert die Bedeutung biologischer Korridore für Naturschutz und Renaturierung in den Tropen.

Inflationsbekämpfung im Reich der Karthäuser-Nelken (*Dianthus carthusianorum* agg.)

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Die Karthäuser-Nelken in einem weiten Sinn (*D. carthusianorum*-Gruppe bzw. *D. carthusianorum* agg.) sind im zentralen, östlichen und südlichen Europa verbreitet. Die Variation in diesem weiten Areal zusammen mit einer breiten Standortsamplitude haben einige frühere Autoren veranlasst, sehr viele Varietäten und Unterarten zu beschreiben. Die Conclusio aus einer aktuellen Revision der Sammlungen GZU, W, WU ist, dass die derzeitige systematische Gliederung der Gruppe sehr stark zu hinterfragen ist, worauf auch in der Neuauflage der Flora von Österreich inklusive einiger Nachbarregionen hingewiesen wird. Der Verdacht liegt nahe, dass ein großer Teil der Variation in den Merkmalsausprägungen besonders des vegetativen Bereichs (Wuchshöhe, Blattbreite, Bereifung) und der Blütenanzahl mit der Variation in den Standortbedingungen kovariert (i.e. phänotypische Plastizität). Dieser Beitrag skizziert auch die Probleme mit den differentialdiagnostischen Merkmalen der Infloreszenz und der Blüten (Außenkelchblätter, Kelch- und Kronblatt-Dimensionen), die Rolle der Gyno-Diözie und weist darauf hin, dass eine entsprechende Blüten-Präparation von frischen Aufsammlungen das Bestimmen wesentlich erleichtert.



**One or More Species?
Disentangling Diversity in *Pseudorchis* (Orchidaceae)**

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Native orchids in Europe are of high conservation interest, as many species are threatened by habitat loss and land-use change. Unresolved taxonomic differentiation inhibits targeted mapping and Red List assessments. The taxonomically challenging genus *Pseudorchis* (Orchidaceae) has undergone repeated systematic revisions in recent decades due to its morphological and geographical variability. Overlapping ecological and morphological traits among the proposed taxa led to their synonymisation in recent literature. In our study, we applied an integrative approach combining ecological, morphological and genomic data to reassess the taxonomic delimitation of the Central European *Pseudorchis* taxa. Extensive fieldwork across Central Europe was conducted including vegetation surveys and habitat assessments of neighbouring plants. Morphological variation was quantified using floral and vegetative characters and relative genome size estimation and RADseq-based analyses were employed to investigate patterns of genetic differentiation. We found two genetically distinct lineages with partially overlapping morphological traits that differed in relative genome size and ecological preferences and were associated with either basophilic or acidophilic habitat conditions. These findings support the recognition of two distinct taxa within the genus *Pseudorchis* occurring in ecologically distinct habitats.



How to deal with pollen thieves: strategies along an elevational gradient

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Buzz pollination is believed to have evolved as a pollen dosing mechanism. It is found in approximately 8% of Angiosperms and poses the dominant mode of pollination in the family Melastomataceae. Situated within this family, the Genus *Pleroma* displays the typical syndrome of free-standing poricidal anthers, where buzzing action is necessary to extract pollen through a pore at their tip. In these flowers pollen is the only reward, and thereby fulfills a dual role of attractant and reproductive agent, making it a valuable resource. Using video monitoring on five *Pleroma* species along an elevational gradient in the Atlantic Rainforest (Brazil), we could observe three kinds of visitors extracting pollen. Pollinators, who would touch the stigma, thieves, who would not, and robbers, who in addition to not touching the stigma would damage the anthers. Analysis shows that while size mismatch between bee and flower will often lead to thievery, robbery is catalyzed by the bees inability to buzz, making them opt for biting instead. As floral damage may lead to poorer attraction of pollinators and thereby possibly to lower reproductive success, we hypothesize that repellent structures within the anthers might be produced to deter robbers. Using microtome cuts, we found calcium oxalate druses and oils, which possibly decrease the number of robbers if both are present in sufficient amounts.



Der Steirische Wald vor 100 Jahren – Ausgangspunkt für ein vegetationskundliches Resampling-Projekt aus Graz

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Bis zur Mitte des 19. Jahrhunderts dienten die Wälder der Energielieferung (Brennholz, Holzkohle), als Bau und Grubenholz sowie der Viehzucht und Ernährung (Waldweide, Streunutzung, Jagd, Beeren, Honig). In der Steiermark war besonders der Bergbau vom Wald abhängig und bezog riesige Mengen von Grubenholz und Holzkohle für die Eisenverhüttung und die Salzsiederei, sofern Transportwege, insbesondere Flüsse, zur Verfügung standen. Der Wald war die bei weitem wichtigste, teilweise einzige Energiequelle des Landes. Den Grundbesitz an Wald teilten sich Adel und Kirche, während die Nutzung des Waldes überwiegend den Bauern überlassen war. Gesetze und Regeln gab es nur lokal, die Waldnutzung war rücksichtslos bedarfsorientiert. Der Wald in der Steiermark war so bis zur Mitte des 19. Jahrhunderts nicht nur in der Fläche stark geschrumpft, sondern in seinen Restflächen auch qualitativ stark verändert. Die Standorte waren durch Holzentnahme und Waldweide stark aufgelichtet, die Baumschicht meist von Pionierbäumen (Kiefer, Birke) durchsetzt, die Böden an Nährstoffen verarmt, die Humusschicht degradiert. Erst im ausgehenden 19. Jahrhunderts sollte sich das grundlegend ändern. Das österreichische Reichsforstgesetz vom 1. Januar 1853 regelte unter anderem waldschonende Entnahme- und Holzbringungsverfahren (z. B. Hauptentnahmezeit von Stangenholz im Winter), die behördliche Bewilligung zur Umwidmung von Wald, die Wiederaufforstungspflicht innerhalb von 5 Jahren, das Verbot von Waldweide auf jung aufgeforsteten Flächen, eine mehr nachhaltige Bodenstreu- und Aststreunutzung, sowie die Notwendigkeit der Bestellung von Forstwirten. Damit waren erstmals viele Prozesse geregelt, die bislang mehr oder weniger unkontrolliert abliefen. Die Baumschicht und die Humusaufgaben der Böden konnten sich nun erstmalig entwickeln, die Fruchtbarkeit der Böden stieg wieder an. Dieses Gesetz legte somit den Grundstein für unsere heutige moderne Forstgesetzgebung. Der wohl wichtigste Faktor für die Änderung des Waldbildes war aber der zu dieser Zeit beginnende Ausbau der Eisenbahn. Damit konnte zum ersten Mal auch mineralische Kohle über weitere Strecken von den Bergbaugebieten in Voitsberg-Köflach und Fohnsdorf zu den Industriegebieten um den Erzberg und den Salzsiedestätten im Salzkammergut transportiert werden. Der Bedarf an Holzkohle sank in nur wenigen Jahrzehnten auf ein Minimum, der Wald verlor damit bis zum Beginn des 20. Jahrhundert sein führende Bedeutung als Energielieferant. Aus der Brenn- und Kohlholzwirtschaft wurde allmählich eine Nutzholzwirtschaft, zu der in der Steiermark auch die neu aufkommende Papier- und Zelluloseindustrie beitrugen. Wurde die Holz-Biomasse bisher zu ca. 80 % zur Energiegewinnung und zu 20 % als Bau- und Nutzholz verwendet, kehrte sich diese Relation in den wenigen Jahrzehnten von 1850 bis ca. 1925 zu Gunsten des Nutzholzes um. Die zu dieser Zeit (1925 bis 1927) von Josef Eggler (Graz) überlieferten Vegetationsaufnahmen dokumentieren gerade noch diese Jahrhunderte andauernde Phase der unregelmäßigen Waldnutzung. Der Vergleich mit aktuellen Vegetationsaufnahmen im Rahmen des Forschungsprojekts DIVERSE (Interreg) überspannt also 100 Jahre Waldentwicklung unter dem Zeichen moderner Forstwirtschaft.



Vibration properties of bees on Melastomataceae during buzz pollination

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Buzz pollination is a specialized foraging behavior in which bees use thoracic vibrations to extract pollen from flowers with poricidal anthers. Although the buzz pollination mechanism has been studied using artificial vibrations, and recent studies have characterized natural bee buzzes, the relationship between natural vibrations produced by bees, pollen release, and energetic investment of the buzz remain poorly understood. Here, we investigated how the vibrational properties of natural buzzing vary among bee species and how this variation relates to pollen release and the energetic costs of buzzing. Field recordings were conducted near Mount Kinabalu (Borneo), where virgin flowers of the Melastomataceae genus *Melastoma* were mounted on a test stand with a piezo microphone and highspeed camera to record buzz pollination vibrations produced by naturally foraging bees. Each flower was collected after a single bee visit to quantify how much pollen was remaining in the anthers. The high-speed video recordings were used to track bee head movement, providing direct estimates of vibration amplitude and thereby allowing to estimate the mechanical energy invested during buzz pollination. Preliminary analyses indicate species-specific differences in vibration frequency, duration, and amplitude, suggesting distinct buzzing strategies among bee species visiting the same flower morphology. By combining vibrational measurements, pollen release, and analyses of energy input, we can provide a more comprehensive understanding of the biomechanics and energetic efficiency of buzz pollination in the wild. Because recent experimental work suggests that bee vibrations may be constrained by high ambient temperatures, our results provide important and novel baseline knowledge on the biomechanical and energetic constraints of buzz-pollinating bees under natural conditions.



25 Jahre sa|bot|ag Salzburger Botanische Arbeitsgemeinschaft

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Die Arbeitsgemeinschaften am Haus der Natur sind im Bundesland Salzburg die zentrale Anlaufstelle für naturwissenschaftliche Bürgerforschung. Die dort angesiedelte Salzburger Botanische Arbeitsgemeinschaft (sa|bot|ag) setzt einen ihrer Schwerpunkte auf die floristische Erforschung des Landes Salzburg und schließt etwa Kartierungslücken oder verfasst floristische Publikationen. Zudem arbeiten die Mitglieder der sa|bot|ag u.a. am und mit dem Herbarium SZB, welches im Haus der Natur lokalisiert ist und viele historische Belege ab ca. 1850 aufweist. Einige Mitarbeiter:innen der sa|bot|ag sammeln jedes Jahr zudem Herbarbelege und spenden diese an das Haus der Natur, wodurch neben den historischen auch viele rezente Belege vorliegen. Die Herbarbelege werden in der Biodiversitätsdatenbank am Haus der Natur erfasst, verwaltet und abrufbar gemacht. So lassen sich auf Knopfdruck Verbreitungskarten für alle Arten erzeugen. Zusätzlich zu den Herbarbelegen erheben die Mitarbeiter:innen der sa|bot|ag auch Beobachtungs- und Kartierungsdaten. Wichtigstes Werkzeug dafür ist mittlerweile die Erfassungsplattform Observation.org geworden, mit der einerseits eigene Kartierungen durchgeführt und andererseits fotografisch belegte Citizen Science-Daten validiert werden, um diese für die floristische Forschung zu nutzen. Die sa|bot|ag widmet sich neben der Forschung auch der Wissensvermittlung und bietet alljährlich im Sommersemester mehrere Exkursionen an, während im Wintersemester vor allem Vorträge und Workshops stattfinden. So wurden seit 2006 bereits 252 Veranstaltungen von 64 Vortragenden/Leitenden abgehalten. Im Jahr 2026 feiert die sa|bot|ag ihr 25-jähriges Bestehen, im Zuge dessen am 30. Oktober ein Symposium im Haus der Natur abgehalten wird.



Distribution of *Festuca trichophylla* (Gaudin) K. Richt. in Europe

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Festuca trichophylla (= *F. trichophylla* subsp. *trichophylla* sensu Euro+Med PlantBase), a member of the *F. rubra* group, is a rare and endangered European plant species occurring in wet meadows preferably on calcareous soil. Due to confusion in the taxonomic treatment of this species in European literature, we aim to provide updated distribution data. The results presented here are mainly based on detailed studies of morphological characters and a review of herbarium material from all the countries mentioned below. Based on verified herbarium specimens and recent records, this taxon is documented from Portugal, Spain, France, Italy, Switzerland, Germany, Austria, Hungary, Slovenia, Croatia and Romania. Due to unverified data, continuous confusion with cultivars of *F. rubra* subsp. *litoralis* marketed as ‘*Festuca rubra trichophylla*’, and the inclusion of the mysterious “*F. rubra* (*F. trichophylla*) subsp. *asperifolia*“, the current data on distribution and conservation status of this taxon in leading international databases (Euro+Med, POWO, GBIF) is unclear and in need of revision. The alleged presence of *F. trichophylla* in the Czech Republic is based erroneous labels of herbarium records transferred to databases. Furthermore, this taxon is not present in Bosnia and Herzegovina and in Greece; these records result from the incorrect assignment of *F. rubra* subsp. *asperifolia* to *F. trichophylla* s. lat. by the Euro+Med PlantBase authors. Here, *F. trichophylla* is reported reliably for the first time for Hungary and Slovenia, while several additional new records are presented for Croatia.

Shift from Bee to Vertebrate Pollination in the Genus *Medinilla* Along an Elevational Gradient in Marojejy National Park, Madagascar: First Evidence from African Melastomataceae.

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The Melastomataceae are among the tropical plant families most closely associated with bee pollination, with nearly 95% of the species relying on bees as their primary pollinators. Although this specialization is considered a defining characteristic of the family, the genus *Medinilla* exhibits remarkable floral morphological diversity, suggesting diversification in its pollination systems. Natural history information remains scarce, however, with no data available for Malagasy species, where 19% of the genus's diversity is found. With its distribution ranging from lowland to montane forests, we here tested whether pollination systems change as environmental conditions become increasingly harsher at high elevations. We characterized the pollination systems of eleven *Medinilla* species along an elevational gradient in Marojejy National Park, northeastern Madagascar. We conducted daytime and nighttime observations using camera traps and compared the composition and behavior of floral visitors. We found a clear elevational shift in the composition of floral visitors. At lower elevations, bees and wasps were the predominant visitors to *Medinilla* flowers. In contrast, several abundant high-elevation species with campanulate flowers were visited primarily by vertebrates, including nectar-feeding birds, small lemurs, and rodents, whereas insect visits became rare. These findings indicate a transition from bee pollination to vertebrate pollination in campanulate-flowered *Medinilla* species inhabiting montane environments and represents the first evidence from Africa of a shift from bee to vertebrate pollination within the Melastomataceae.



**Allelopathic and synergistic effects of invasive neophytes on the
germination of native and alien flora in Tyrol:
A study on the influence of germination rate in natural soil substrate**

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Invasive neophytes can influence plant community composition through allelopathy, the release of secondary metabolites that can suppress or delay the germination of competing species. Previous bioassays showed that aqueous extracts of invasive species caused concentration-dependent germination delays or even complete inhibition, their relevance under more natural soil conditions remains less clear because processes such as adsorption, dilution, microbial activity, and rainfall may modify allelochemical impacts. This study investigates the allelopathic and interactive effects of aqueous extracts from invasive neophytes on the germination of native and alien plant species in Tyrol. Extracts from *Buddleja davidii*, *Impatiens glandulifera*, *Reynoutria japonica*, *Robinia pseudoacacia*, *Solidago canadensis*, and *Solidago gigantea* are applied in different concentrations to seeds planted in steam-sterilized soil substrate under near-natural outdoor conditions. Native target species include *Lolium pratense*, *Salvia pratensis*, *Trifolium pratense*, and *Urtica dioica*, while *Lepidium sativum* serves as a reference species. In addition, extracts from selected native species and combined extracts of *Reynoutria japonica* and *Solidago gigantea* are used to test whether effects on germination are additive, synergistic, or antagonistic. While field work is still ongoing, this study aims to clarify whether allelopathic effects observed in simplified laboratory systems, persist in soil-based conditions and whether interactions between invasive species may intensify or reduce their impact on native and alien flora.

The Seindl dry grassland (Klöch, Stmk) as refuge for endangered bryophyte species

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The Seindl is part of the Klöcher Massif and is located in southeastern Styria. The small-scaled dry grassland on its eastern slope serves as an important refuge for endangered bryophyte species, as well as for vascular plants. The area is characterized by exposed basalt rocks, often surrounded by open soil microhabitats, which provide particularly suitable conditions for an interesting, ephemeral bryophyte flora. So far, 35 bryophyte species are recorded, including several species which are rare in the Styrian lowlands. Of special interest is the finding of *Riccia ciliata* (syn. *R. intumescens*). The population at the Seindl is the second recent one in Styria. Throughout Europe, the species strongly decreased over the last decades and is classified as endangered (EN). Further threatened species recorded are *Entosthodon fascicularis* (VU) and *Mannia fragrans* (VU). All three species are restricted to xerothermic, open habitats in the lowlands, like dry grassland, which are generally rare in Styria. The record of *Microeurhynchium pumillum*, a moss species with an oceanic-submediterranean distribution, at this site was the first confirmed finding in Austria. This implies that, due to its location, the Seindl dry grassland may also function as a potential gateway for southern species spreading northwards in terms of climate change. Over the last few decades, the area has become increasingly overgrown with scrubs, which affects also the bryophyte flora and could lead to extinction of species adapted to open soil habitats. Targeted measures should be implemented in future to preserve the extraordinary biodiversity within bryophytes and vascular plants. The monitoring of the bryophyte flora of this particular area will be continued in future.

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PROGRAMM

Donnerstag 24. September / Thursday 24th September

16:00-17:00 Registrierung / registration

17:00-18:00 Dellinger Agnes Integrating ecogeography and pollination in the study of flower evolution (Keynote)

18:00-20:00 Icebreaker am NHM / ice breaker at the NHM

Freitag 25. September / Friday 25th September

8:00-8:30 Registrierung / registration

8:30-8:45 *Eröffnung / opening*

8:45-9:30 Sheppard Christine From release to resistance: biotic interactions in plant invasions (Keynote)

9:30-9:45 Haring Verena GRACE Resurvey of Central European grassland vegetation to study the impacts of country-level landscape dynamics on biodiversity

9:45-10:00 Speißer Benedikt Interactive effects of microplastics and arbuscular mycorrhizal fungi on grassland communities

10:00-10:15 Westrich Friederike Rapid change and thermophilization of summit plant communities in the central Eastern Alps (Italy)

10:15-10:30 Mehregan Iraj Climate, geography, and landscape connectivity shape the phylogeography of Persian oak (*Quercus brantii*) across the Zagros Mountains

10:30-11:00 Kaffeepause / coffee break

11:00-11:15 Kudrnovsky Helmut *Typha minima* Licciana - ein Erfolgsmodell der Wiederansiedlung einer Wildflussart?

11:15-11:30 Jungmeier Michael Der Echt-Speik (*Valeriana celtica* subsp. *norica*) als Herausforderung für Forschung und Naturschutz

11:30-11:45 Willner Wolfgang Interpretation der FFH-Lebensraumtypen: eine unendliche Geschichte

11:45-12:00 Sauberer Norbert Zwergbinsenfluren in Ostösterreich: Flora, Vegetation und Naturschutz

12:00-12:15 Hohla Michael Campingplätze als überraschender Lebensraum für heimische und eingeschleppte Pflanzen

12:15-12:30 Nadler Kurt Tipps zur felddbotanischen Ansprache heimischer *Hylotelephium*-Arten

12:30-13:30 Mittagspause / lunch break

13:30-14:15 Wickett Norman Building and applying tools for high-throughput phylogenetics across the plant tree of life (Keynote)

14:15-14:30 Huber Elke Hidden diversity of *Astragalus onobrychis*: two new species in the Alps and the Apennines

14:30-14:45 Heimer Valentin Polyploidy and hybridisation shaped the evolutionary history of *Luzula* sect. *Luzula* in the Eastern Alps

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14:45-15:00	Spögler Elias	Phylogenetic, ecological and morphological characterization of a new species of <i>Homogyne</i> (Asteraceae) from the Southeastern Limestone Alps (Italy)
15:00-15:15	Kropf Matthias	Uncovering clonal genetic structures in steppe plants in the Pannonian region of eastern Austria
15:15-15:30	Ivesic Caroline	Divergent <i>Droseras</i> - Trap leaf specialization and intraspecific variation in the round-leaved sundew <i>Drosera rotundifolia</i>
15:30-16:00	Kaffeepause / coffee break	
16:00-16:30	<i>Poster Pitches</i>	
16:30-16:45	Ufimov Roman	From ancient genome duplication to Cenozoic migration: phylogenomics and biogeography of Rosaceae subtribe Malinae
16:45-17:00	Maylandt Clemens	Founder events shaped the phylogeography of <i>Astragalus exscapus</i> -an ecological relict of Europe's extrazonal steppes
17:00-17:15	Pířová Soňa	Wide diversity in narrow geographic space: genetic, morphological and ploidy variation in three Central European <i>Crataegus</i> species with emphasis on their reproductive modes
17:15-17:30	Shipilina Daria	An interactive tool for visualising phylogenetic conflict
17:30-17:45	Zeni Teresa	Polyploid frequency along elevational gradients in the Eastern Alps
18:00-19:00	<i>Poster Session</i>	<i>siehe Appendix / see Appendix</i>

Samstag 26. September / Saturday 26th September

8:45-9:30	Claßen-Bockhoff Regine (Keynote)	Umbel arrangement and development in Apiaceae: Typology vs. evo-devo plant morphology
9:30-9:45	Hawranek Anna-Sophie	Studying 3D corolla shapes in different pollination systems in <i>Aquilegia</i> (Ranunculaceae)
9:45-10:00	Fresner Isabella	Buzz pollination in Melastomataceae: Exploring the vibrational niche of different flower morphologies
10:00-10:15	Ramiliarisona Lalaina	Plant-pollinator interactions of <i>Gravesia</i> across an elevational gradient in Marojejy National Park, Madagascar
10:15-10:30	Errante Andrea	Autonomous selfing by pollen tube shower in Melastomataceae with poricidal anthers
10:30-11:00	Kaffeepause / coffee break	
11:00-11:15	Merkle Johanna	Investigation of morphology, site ecology and distribution of <i>Molinia caerulea</i> and <i>M. arundinacea</i> along a transect between Ammersee and Lago di Garda
11:15-11:30	Noroozi Jalil	Diversity hotspots of (sub)alpine vascular plants in the Alps and their conservation status
11:30-11:45	Volkers Fritz	Artabgrenzung von <i>Riccia bicarinata</i> , <i>R. michelii</i> und <i>R. beyrichiana</i> (Ricciaceae, Marchantiales) in Europa anhand molekularer und morphologischer Daten

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11:45-12:00	Punz Wolfgang	Bodenanzeigende Pflanzen - Betrachtungen zu einem interdisziplinären Thema
12:00-12:15	Klemun Marianne	Nicolaus Thomas Host (1758-1834): Botanik zwischen Wiener Hof und "Vaterland"
12:15-12:30	Zechmeister Harald	Die Erforschung der Moosflora im pannonischen Raum: Von der Großstadt bis zum Nationalpark
12:30-13:30	Mittagspause / lunch break	
13:30-13:45	Kirschner Philipp	Linking genetic diversity, past evolution, and projected habitat loss in narrow endemic plants of the northeastern Limestone Alps (Austria)
13:45-14:00	Urrea Johan	Rediscovering Pyxidanthae (Melastomataceae): a hidden radiation for understanding diversification and interaction in Neotropical mountains
14:00-14:15	Volz Marlene	Effects of environmental and human factors on islet vegetation in the Cyclades, Central Aegean (Greece)
14:15-14:30	Müller Roman	Two decades of declines in alpine snowbed plant populations in the Northeastern Calcareous Alps of Austria
14:30-14:45	Paun Ovidiu	Structural variation and adaptive radiation
14:45-15:00	Khastgir Teerna	Genomic drivers of the adaptive radiation of New Caledonian Persimmons
15:00-15:15	Bräuchler Christian	Plants along the border - assessment and study of plant diversity along the Austria-Czech border as a basis for nature conservation planning and public outreach
15:15-15:45	Kaffeepause / coffee break	
15:45-16:00	Kranz Isabel	Pflanzenwissen in den Kulturwissenschaften
16:00-16:15	Brück Florian	Shared and species-specific epigenetic responses to warming in alpine plants
16:15-16:30	Hausharter Johannes	Widespread thermophilization but weak link to climate warming in Europe's summit plant communities
16:30-16:45	Piaia Louis	The high alpine-subnival vegetation types of Dena Mountain, Southern Zagros (SW Iran)
16:45-17:00	Clark Adam	Correcting for observation error in vegetation surveys
17:00-17:15	Ellmauer Thomas	Conservation status of vascular plants in Austria
17:15-17:30	Hofmann-de Keijzer Regina	Nature's palette: plants as sources of textile dyes
19:00-22:00	Konferenzdinner / coference dinner	

Sonntag 27. September / Sunday 27th September

8:00-17:00 *Exkursionen / excursions*

Appendix: Poster

P1	Jakobitsch Thorsten & al.	Pflanzensoziologische Untersuchungen ausgewählter Vegetationseinheiten im Kontext einer Tagfaltererhebung in den Seetaler Alpen (Steiermark)
P2	Pfattner Stefanie & al.	Der Kletterpflanzen – NAVIGATOR. Ein digitales Tool zur Unterstützung bei der Artenauswahl von Kletterpflanzen
P3	Robitza Andrea & al.	“Hotel Mama” effect: Do offspring benefit from maternal exposure to competition? A neophyte–native comparison
P4	Bilovetz Peter & al.	Gefährdete Flechten digital erfasst. Digitalisierung der Rote-Liste-Arten des Universitätsherbariums Graz (GZU)
P5	Schlick-Steiner Iris & al.	Demographic response of alpine biota to climate change
P6	Rehrmbacher Jasmin & al.	The <i>Botrychium lunaria</i> complex in Austria
P7	Pachschwöll Clemens & al.	Cytogeographic revision of <i>Artemisia austriaca</i> s.l. (Asteraceae) in the Pannonian region and beyond
P8	Michels Gustav & al.	Smart Bark: Seasonal dynamics of lenticel conductance
P9	Hable Kaline & al.	Wiederholung historischer Vegetationsaufnahmen: Veränderungen montaner Arten und der Standortbedingungen in Wäldern um Graz
P10	Wolf Selina & al.	A century of forest vegetation dynamics around Graz: Integrating historical vegetation surveys with GIS-based spatial analysis
P11	Hafner Sophia & al.	Reproduktive Fitness von <i>Pulsatilla grandis</i> und Populationsgröße an zwei österreichischen Trockenstandorten
P12	Just Josefine & al.	Evolution of organismal stress responses: Differential gene expression of five moss species following metal stress
P13	Eberwein Roland	Eignen sich moderne Verfahren zur Erweiterung der Schärfentiefe in der Makrofotografie auch für die botanische Forschung?
P14	Bertel Clara & al.	Heat limits in tropical plants: leaf temperatures and effect of heat dose on tropical plants
P15	Rasran Leonid & al.	September flood 2024 at the Danube - consequences for plant dispersal
P16	Vincze Anna & al.	Six decades of flowering phenology and leaf nutrient contents from herbarium specimens in Mongolian steppe species
P17	Bause Lana & al.	Biodiversity hotspots of vascular plants in the Hindu Kush mountain range and their conservation status
P18	Bürger Alexander & al.	Diverging responses of taxonomic, functional, and phylogenetic plant diversity to biogeographic parameters in arid habitat islands of southern Africa
P19	Groffman Dominique & al.	Evolution of clonality in an Alpine-Arctic saxifrage during interglacial-glacial cycles in the southeastern Alps: a population genomics approach

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P20	Springer Zoe	Auf den Spuren von Handel-Mazzetti: Eine digitale Reise durch die Vielfalt des chinesischen Südwestens
P21	Weissenhofer Anton & al.	COBIGA - der Biologische Korridor La Gamba in Costa Rica (Regenwald der Österreicher)
P22	Greimler Josef	Inflationsbekämpfung im Reich der Karthäuser-Nelken (<i>Dianthus carthusianorum</i> agg.)
P23	Paukner Lisa & al.	One or more species? Disentangling diversity in <i>Pseudorchis</i> (Orchidaceae)
P24	Nazari-Montazer Juliane & al.	How to deal with pollen thieves: strategies along an elevational gradient
P25	Berg Christian & al.	Der Steirische Wald vor 100 Jahren - Ausgangspunkt für ein vegetationskundliches Resampling-Projekt aus Graz
P26	Gericke Julian & al.	Vibration properties of bees on Melastomataceae during buzz pollination
P27	Pflugbeil Georg & al.	25 Jahre sa bot ag. Salzburger Botanische Arbeitsgemeinschaft
P28	Karrer Gerhard & al.	Distribution of <i>Festuca trichophylla</i> in Europe
P29	Randriatsitohaina Richard & al.	Shift from bee to vertebrate pollination in the genus <i>Medinilla</i> along an elevational gradient in Marojejy National Park, Madagascar: First evidence from African Melatomataceae.
P30	Heckemanns Amandine & al.	Allelopathic and synergistic effects of invasive neophytes on the germination of native and alien flora in Tyrol: A study on the influence of germination rate in natural soil substrate
P31	Pörtl Martina & al.	The Seindl dry grassland (Klöch, Stmk) as refuge for endangered bryophyte species