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Photo Story

Vegetation diversity in the Swiss Alps Impressions from the 16th EDGG Field Workshop

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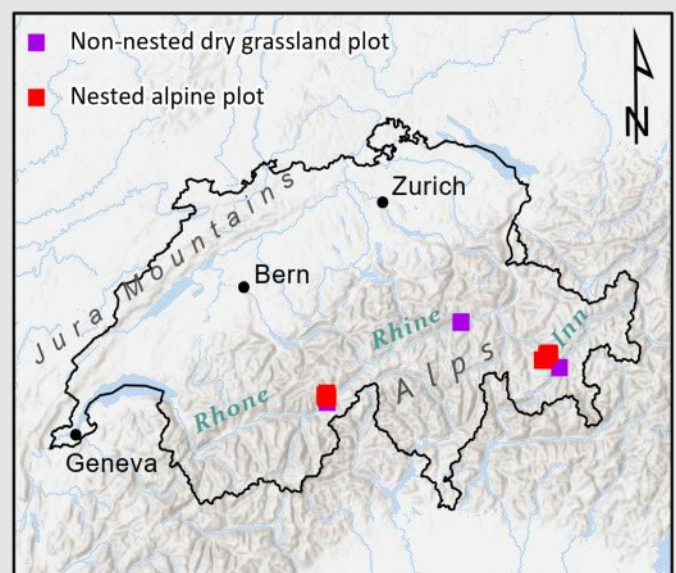
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EDGG Field Workshops have brought vegetation scientists together since 2009. They aim to collect high-quality biodiversity data for multiple taxonomic groups across several different spatial grain sizes in a standardised manner. Since the initiation, one or two such events with participants from a multitude of countries have been conducted each year. The collected data have given rise to numerous regional studies on biodiversity patterns and on syntaxonomy. In 2017, the GrassPlot database was founded to collect all the Field Workshop data together with similar data from other projects in one place and make them accessible for overarching analyses across the whole Palaeartic biogeographic realm. Since 2020 an increasing number of such studies has been published on topics such as species-area relationships, alpha diversity and fine-grain beta diversity. Many further studies are currently in preparation.

EDGG Field Workshops are not only a core source of data for GrassPlot, they are also events to learn the local flora and vegetation within a short time and to collaborate intensively with colleagues from many different countries and different academic levels (Bachelor students to professors) united by their enthusiasm for fine details of the vegetation



Service layers: Esri, USGS

Map of Switzerland showing the sampling sites of the 16th EDGG Field Workshop.

of grasslands and other non-forested habitats. Field workshop participants are excited when finding 10 species within a single square centimetre and are thrilled to determine tiny, non-flowering plants. Many participants have become “addicted” to the Field Workshops, and try not to miss a single one, wherever it is conducted. With the arrival of the COVID-19 pandemic, a large Field Workshop planned for May 2020 in Ukraine had to be cancelled. When the situation improved somewhat in autumn 2020, a few members organised a spontaneous Field Workshop dedicated to the grasslands and other open vegetation of the subalpine and alpine belts of the Swiss Alps. Up to then, EDGG Field Workshops had been focused on dry grasslands *sensu lato*, and this was the first event where the focus was shifted to other vegetation types hitherto underrepresented in GrassPlot. The regular Field Workshop along the Ukrainian latitudinal transect was postponed to May 2021, but again had to be cancelled. Instead, a few members of the EDGG conducted two ad hoc Field Workshops, one in Southern Ukraine in May and a second in Switzerland in September. We considered them “ad hoc” as they were planned spontaneously at short notice, without a regular application scheme and without financial support from EDGG or IAVS. Since both were nevertheless very effective in sampling standard EDGG data, the EDGG Field Workshop Coordinators have meanwhile agreed to give them an official number post hoc.

The 16th EDGG Field Workshop took place in the Swiss Alps from 12 to 22 September 2021. In total there were 15 participants from six countries (Germany, Italy, Japan, Poland, Switzerland, Ukraine), although not all of them participated the whole time. The main aim was to complement the dataset of subalpine and alpine habitats collected during the 14th EDGG Field Workshop in 2020 with data from different regions, but we also used the marginal days (starting day, end day and transfer day) to fill some gaps in the already quite comprehensive dataset of the 12th EDGG Field Workshop with dry grassland vegetation of the central valleys of Switzerland with subcontinental climate. We spent five days in a holiday flat in the popular car-free tourist destination Bettmeralp next to the Great Aletsch Glacier in the canton of Valais, and five days in a group house in the tiny and absolutely non-touristic village of Preda in the canton of Grisons. In between, there was a transfer day during which part of the group travelled by one of the most scenic railway connections in the world from Valais to Grisons, with a stop at a nice common pasture with dry grasslands in the gravel plain of the young Rhine Anterior, while another part of the group carried all the equipment and food by car. Un-

like during regular Field Workshops, we had to prepare the meals ourselves, but this was quite enjoyable, as this yielded a diversity of regional food types from Grisons (*Capuns*), Swabia (*Käsespätzle*), the Ukraine (*Borscht*, *Banosh*) and Sicily (Aeolian salad, oven *Caponata*).

We often had nice late summer weather, but even when there was heavy rain or snowfall on one day, this did not discourage us from sampling. In total, we collected 31 nested plots with grain sizes from 0.0001 to 100 m² according to the EDGG standard methodology, i.e. not only vascular plants, but also terricolous bryophytes and lichens. The plots came from both acidic and limestone bedrock and covered an elevational gradient from 1750 to 2670 m a.s.l. The studied vegetation types were highly diverse and included almost every non-forest and non-aquatic vegetation type that occurs at these elevations in Switzerland, including natural and secondary grasslands, dwarf shrub heaths, screes, moraines and gravel bars, snow patches and fens, natural and ruderal tall forb communities and intensively trampled habitats. Additionally, we sampled ten 10-m² plots of dry grassland vegetation in four localities (740 to 1780 m a.s.l.). Beyond species combination and cover, we also recorded extensive structural and environmental parameters and took soil and biomass samples for further analyses.

While there is still a lot of work to be done with the determination of the bryophytes and lichens from these often very cryptogam-rich stands as well as the determination of some critical vascular plants, we can already provide some preliminary results (note that numbers might slightly change when determinations are completed). In the subalpine-alpine dataset, the vascular plant species richness at 10 m² ranges from 10 species in an acidic fen at Bettmeralp to 79 species in a base-rich fen in the flood plain of the Albula river in Preda, which is significantly more than the maximum of 66 vascular plant species found in an alpine limestone grassland in 2020. One stand of rocky alpine grasslands on acidic bedrock in Bettmeralp was probably the richest in non-vascular plants, with 21 species of bryophytes and 26 species of lichens in 10 m². The dry grasslands had a total species richness (including terricolous bryophytes and lichens) between 32 and 43, making them not outstandingly rich compared to dry grasslands in other European regions.

All in all, this was a scientifically productive and personally inspiring event.

Further reading

Biurrun, I., Pielech, R., Dembicz, I., Gillet, F., Kozub, L., Marcenò, C., Reitalu, T., Van Meerbeek, K., Guarino, R., (...) & Dengler, J. 2021. Benchmarking plant diversity of Palaeartic grasslands and other open habitats. *Journal of Vegetation Science* 32: e13050.

Dembicz, I., Dengler, J., Steinbauer, M.J., Matthews, T.J., Bartha, S., Burrascano, S., Chiarucci, A., Filibeck, G., Gillet, F., (...) & Biurrun, I. 2021. Fine-grain beta diversity of Palaeartic grassland vegetation. *Journal of Vegetation Science* 32: e13045.

Dengler, J., Boch, S., Filibeck, G., Chiarucci, A., Dembicz, I., Guarino, R., Henneberg, B., Janišová, M., Marcenò, C., (...) & Biurrun, I. 2016. Assessing plant diversity and composition in grasslands

across spatial scales: the standardised EDGG sampling methodology. *Bulletin of the Eurasian Dry Grassland Group* 32: 13–30.

Dengler, J., Guarino, R., Moysiienko, I., Vynokurov, D., Boch, S., Cykowska-Marzencka, B., Babbi, M., Catalano, C., Eggenberg, S., (...) & Dembicz, I. 2020a. On the trails of Josias Braun-Blanquet II: First results from the 12th EDGG Field Workshop studying the dry grasslands of the inneralpine dry valleys of Switzerland. *Palaeartic Grasslands* 45: 59–88.

Dengler, J., Cykowska-Marzencka, B., Bruderer, T., Dolnik, C., Neumann, P., Riedel, S., Seiler, H., Zhang, J. & Dembicz, I. 2020b. Sampling multi-scale and multi-taxon plant diversity data in the subalpine and alpine habitats of Switzerland: Report on the 14th EDGG Field Workshop. *Palaeartic Grasslands* 47: 14–42.



The Field Workshop team on 14 September 2021 above the Great Aletsch Glacier in Valais (upper photo). From left to right: Iwona Dembicz, Christian Dolnik, Jürgen Dengler, Denys Vynokurov, Dariia Shyriaieva, Beata Cykowska-Marzencka, Hallie Seiler & Yuki Yaida. Lower photos, from left to right: Susanne Riedel & Alexander Indermaur, Salvatore Pasta & Chiara Catalano, Riccardo Guarino & Dorothee Putfarken.

Day 1 (12 September 2021)

On the first day, eight of us met in Betten Talstation and made the first three 10-m² plots in dry grasslands above the station. In the evening, we headed to our accommodation in Bettmeralp at 1970 m a.s.l. and finished the day with a delicious, home-cooked dinner.



Dry, rocky steppe grasslands with prominent stands of *Phleum phleoides* and *Odontites luteus*.



We made our way to Bettmeralp via excellent public cable car transport. Having arrived at our flat, we enjoyed the impressive view of the Rhône Valley.



Our accommodation, the holiday flat "Cactus" in Bettmeralp, where we prepared our first shared dinner after settling in for the night.

Day 2 (13 September 2021)

The second day started with perfect weather and a local attraction – the seasonal descent of cattle from their mountain pastures. We took a gondola lift to Bettmerhorn (2872 m a.s.l.) to save time and enjoy the views of the surrounding mountains. During this day we made three EDGG Biodiversity Plots.



The second morning's attractions: Alpabzug with beautiful Eringer cows, and riding the gondola lift together.



The Great Aletsch Glacier.



Hard at work on our second plot in a Nardion grassland. Sometimes, field work can be quite tiring!

Day 3 (14 September 2021)

Next day greeted us with excellent weather and very interesting moraine communities. We made next three 100-m² plots while enjoying the perfect view of the Great Aletsch Glacier.



On our way to the glacier moraine.



Two beautiful plots with a clear view of the glacier.



Excellent dinner of Borscht made by our Ukrainian participants.

Day 4 (15 September 2021)

Faced with cold, rainy weather, we decided to visit closer and easier locations for the next plots, including heavily grazed pastures.



The first plot in a stand of *Poion alpinae*.



Caricion fuscae with *Eriophorum angustifolium* and *Sphagnum subsecundum*.



Dry, rocky pioneer community with numerous species of *Cladonia* and a happy lichenologist.

Day 5 (16 September 2021)

The gloomy, overcast weather continued on day five. We made plots chosen during previous day, mainly in heavily used places.



Rumicion alpini with significant die-back at the end of the season.



Nardion with a few small flowers remaining.



A moist plot dominated by *Epilobium angustifolium*.

Day 6 (17 September 2021)

After five very intensive days in Bettmeralp, we moved to the second locality in the canton of Grisons, the very tiny village of Preda located in Albula river valley. We separated in two groups: one travelled by train, the second by car, doing the grocery shopping along the way. The train-team made a stop in Waltensbourg/Vuorz in the region of Surselva (Grisons), where they made three 10-m² plots in grasslands communities. Four more participants joined us in Preda, bringing our team to a total of 12 people.



Some of the plots made in Waltensbourg/Vuorz (Surselva).



Our accommodation in Preda: the group house "Sonnenhof."

Day 7 (18 September 2021)

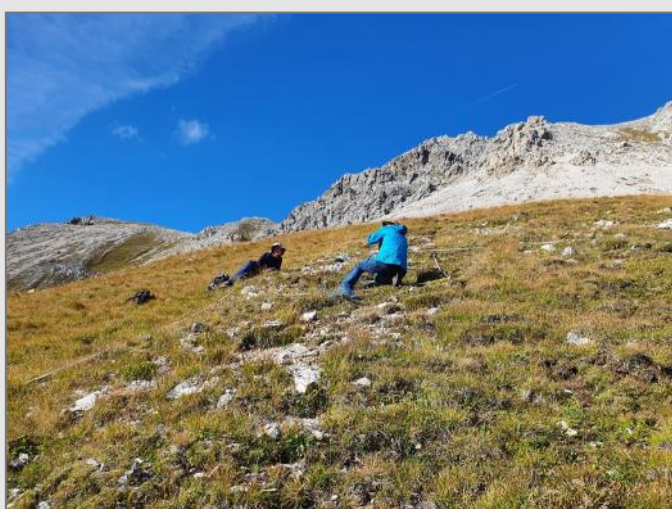
Our first full day in Preda we spent below Piz Muot, above Val Zavretta. We made five EDGG Biodiversity Plots (100 m²) in different types of alpine vegetation. The weather was sunny and the day was very fruitful. We finished with a delicious Swabian dish, *Käsespätzle*, prepared mostly by Jürgen.



Beautiful views in Val Zavretta.



One group worked in an *Elynio-Seslerietea* stand on a windy ridge...



...while others made plots on steep grasslands and screes.



Day 8 (19 September 2021)

This rainy day we chose to spend close to our accommodation near the Albula river, completing a total of six EDGG Biodiversity Plots. In the afternoon, after a hearty lunch of oven Caponata prepared by the Italian participants, we entertained ourselves by determining plants and lichens.



Plots in the floodplain of the Albula river.



Intensive identification process made after intensive fieldwork.

Day 9 (20 September 2021)

As the weather forecast had predicted, snow began to fall on the ninth day. Susanne and Alex joined us for two days, sharing their extensive knowledge of alpine habitats. Two participants had to participate on-line conferences, so part of the group stayed close to the group house and made plots in various vegetation types in the close surroundings. The rest of the group returned to Val Zavretta and made two EDGG Biodiversity Plots in nice places we had noticed on day seven. The day was long and cold, but we could warm up in the evening over a plate of *Capuns*, a traditional dish from Grisons made by Susanne and Alex.



EDGG Biodiversity Plots made near the group house. Left: searching for species in a dense *Molinion* grassland; right: plot on an open, but species-rich gravel bar.



Our plots under a thin layer of snow in Val Zavretta.



Enjoying home-made *Capuns* and red wine after a long day in the field.

Day 10 (21 September 2021)

Our last full day in Preda was spectacular. We chose Val Mulix as the next object of our research. The morning greeted us with great weather and amazing views. We made five EDGG Biodiversity Plots



Extremely beautiful views on the way to the research plots.



Lunch in the field at 2535 m a.s.l. and view to the surroundings.



Caricion curvulae at 2670 m a.s.l.

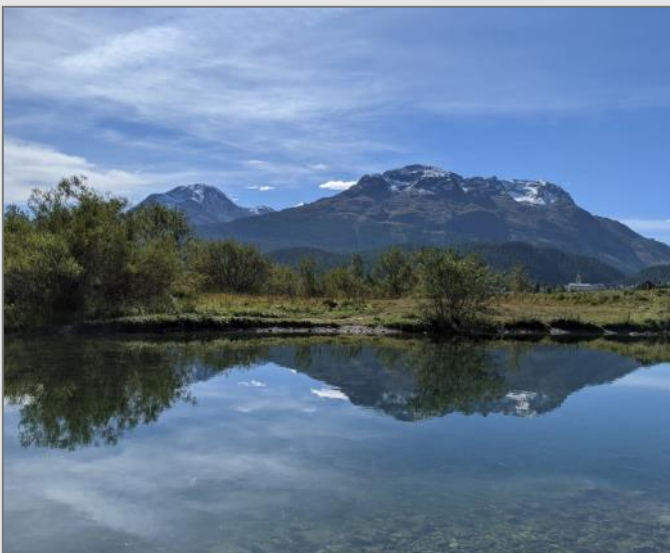


Day 11 (22 September 2021)

During our last day we made two “normal” 10-m² plots in dry grasslands near Samedan in the Engadin Valley. After a picnic and swimming in the Inn river, we once again had to return to our everyday lives, taking wonderful memories of the Field Workshop with us.



The last two dry grassland plots near Samedan, Upper Engadin.



The young Inn river in the Upper Engadin, location of our last picnic.

Selected pictures of plants and lichens



Leontopodium alpinum



Daphne striata



Crepis terglouensis



Gentiana asclepiadea



Erigeron alpinus



Racomitrium sp. and *Stereocaulon* sp.



Hieracium alpinum

The participants of the 16th EDGG Field Workshop in Switzerland



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