

EDGG Field Workshops 2019 – the international re-search expeditions to study grassland diversity across multiple scales and taxa: Call for participation

General Information

Background

Since 2009 (Dengler et al. 2009; Turtureanu et al. 2014) the Field Workshops (formerly: Research Expeditions) are one of the major annual activities of EDGG. They aim to sample Palaeoartctic grasslands across multiple scales (0.0001–100 m²) and multiple taxa (vascular plants, bryophytes and lichens) to generate standardised high-quality biodiversity data, together with *in situ* environmental and structural data. The method of data sampling, first proposed by Dengler (2009), has been revised and improved from year to year and has been recently described in detail (Dengler et al. 2016b). Together with the generation of high-quality datasets, the exchange of knowledge between participants from different countries and with diverse scientific interests and backgrounds is an important aim of the EDGG Field Workshops.

Data collected in these expeditions have already been used for a series of regional studies on phytosociological classification (Dengler et al. 2012; Pedashenko et al. 2013; Kuzemko et al. 2014), patterns and drivers of plant diversity (Turtureanu et al. 2014; Kuzemko et al. 2016; Polyakova et al. 2016). Data have also been used for a comparative overview on mean and maximum richness values of Palaeoartctic grasslands (Dengler et al. 2016a). Recently, various animal taxa including spiders (Polchaninova et al. 2018), grasshoppers (see Dengler et al. 2016b) and leafhoppers (Filibeck et al. 2018) have also been collected on the same plots to allow multi-taxon studies beyond the original three groups (vascular plants, bryophytes, lichens).

The multi-scale vegetation plot data from EDGG Field Workshops are fed into the “GrassPlot” database of EDGG (Dengler et al. 2018; <http://bit.ly/2qKTQt2>) to facilitate broader scientific utilization. This database is becoming a major source for macroecological studies, for example, on species-area relationships, alpha diversity, beta diversity or assembly rules. Finally, the Field Workshop data are also provided to national vegetation-plot databases, the European Vegetation Archive (EVA; Chytrý et al. 2016) and the global database “sPlot” (Bruehlheide et al. 2019) to make them as useful as possible.

Applications

In general only EDGG members can participate in EDGG Field Workshops, but if non-members apply this will be considered as an application for free membership of the EDGG. Any application for participation or travel grants must be sent both to the Field Workshop Coordinator Jürgen Dengler (juergen.dengler@uni-bayreuth.de) and the respective local contact person (see below). **Deadline for applications for both events in 2019 is the 31st of March 2019.** Confirmation of participation and feedback on travel grant applications will be given as soon as possible after this deadline, likely around the 10th of April.

All applicants except those who already participated in four or more Field Workshops have to **submit a motivation letter** (10 lines maximum), explaining why they are interested in participation and what they would contribute to the success during and after the Field Workshop. High priority will be given to applicants who are competent in bryophyte or lichen determination or who are willing to carry out the soil analyses afterwards. Experts of non-plant taxa, such as grasshoppers, leaf hoppers, spiders, butterflies, fungi or soil metagenomics are also welcome to join if they are able and willing to carry out their sampling in a way that allows joint analyses with the vegetation biodiversity data. Such applicants are requested to discuss a potential sampling design prior to application with Jürgen Dengler and Idoia Biurrun and to clarify with the local organiser whether there are any legal constraints. The motivation letter is the most important criterion if there are more applications for participation than places, or for travel grants than money available.

If you apply for participation, please include in your e-mail apart from the motivation letter the following information:

- Name
- Age
- Professional status (e.g. PhD Student, Postdoc, Professor, Unemployed)
- Affiliation
- Address
- Mobile phone (we need to be able to contact you, e.g. when you get lost in the field)

- Dietary requirements (no/vegetarian/other: please specify)
- If you are not an EDGG member yet, you need to agree explicitly to join EDGG (for free)
Travel grant application (Yes/No)

Travel grants

Regular travel grants are provided by our parent organisation IAVS, while EDGG might provide some additional travel grants from own money. Travel grants are only available to members of IAVS in 2019. Priority for travel grants have three groups of persons: (a) participants of at least four previous Field Workshops, (b) specialists for bryophytes and lichens or persons who offer to analyse the soil samples, and (c) persons who offer to host one of the future Field Workshops (as they are required to have participated in at least one Field Workshop before they can host one themselves). The amount of money provided to a particular grantee is not a fixed sum, but depends on the available money, the demonstrated need of the respective person and his/her relevance for the success of the Field Workshop. Accordingly travel grants can cover parts of the registration fee, the full registration fee or possibly even the travel costs to get to the event. Recipients of IAVS travel grants are expected to give an oral presentation related to the topic of the Field Workshop.

You should always apply according to the rules for IAVS travel grants, but we will automatically assign you to the EDGG travel grants (which, for example, do not require to give a presentation) where possible. If you would like to apply for travel grants for both Field Workshops you have to submit one travel grant application with each Field Workshop application.

If you wish to apply for a travel grant, please provide the following additional pieces of information together with your normal applications:

- IAVS member in 2019 (Yes/No)
- Specification whether you have already applied or plan to apply for another IAVS travel grant (e.g. IAVS Symposium, EVS conference or Eurasian Grassland Conference) in 2019
- Number of previous Field Workshops that you participated in
- Indication whether you are member of the current (2017–2019) or future (2019–2021) Executive Committee of EDGG
- Indication whether you are a bryophyte or lichen specialist or whether you are willing to analyse the soil samples
- Indication whether you are willing to organise a future Field Workshop (give target region and potential years)
- Motivation letter (see above, essential for all with less than four prior attendances)
- Approximate travel costs from your place to the starting point of the Field Workshop and back
- How much other funding do you receive (e.g. from your institution)?
- Could you participate if you do not get a travel grant?
- Title of your planned presentation (you will have to give one if you are supported by IAVS)

12th EDGG Field Workshop: Inneralpine dry valleys of Switzerland (On the trails of Josias Braun-Blanquet II), 11–19 May 2019

Topic and aims of the Field Workshop

Braun-Blanquet (1961) in his monograph of the inneralpine xerothermic vegetation provided a profound study of the dry grasslands and other elements of the xerothermic vegetation complexes, such as dry forests and dry ruderal communities. Inneralpine dry valleys refer to those deeply insected, mostly east-west oriented valleys in the (central) Alps that through their morphology and geographic position receive very low rainfall, sometimes even with slight summer drought, combined with very high solar insolation. Therefore, these valleys in some respect have a climate that resembles that of continental steppes. Braun-Blanquet (1961) distinguished 13 such inneralpine xerothermic “islands”, from the Durance valley (France) in the Southwest to Carinthia and Styria (Austria) in the East. Six of these islands are particularly extreme with annual precipitation values often below 600 mm or locally even below 500 mm: Durance valley (France), Maurienne and Tarentaise (France), Susa-Bardonecchia and Fenestrelle (Italy), Aosta (Italy), Valais (Switzerland) and Vintschgau (Italy).

While the 11th EDGG Field Workshop studied the three Austrian xerothermic “islands”, which are the least extreme, Carinthia and Styria, Puster and upper Drau valley and the Inn valley in Tyrol, the 12th EDGG Field Workshop now deals with the Swiss sites, namely the continuation of the Tyrolian Inn valley on Swiss side (called Engadine), the valleys of Central Grisons (Rhine and tributaries) and the Valais (Rhône valley) as one of the most extreme xerothermic islands of the Alps.

The sampling has two main aims: (a) to analyse the biodiversity patterns of the dry grasslands in these valleys across multiple taxonomic groups and grain sizes and (b) to study the syntaxonomic position of these grasslands from a European perspective. Understanding the biodiversity patterns is particularly interesting in comparison with the main distribution ranges of continental and subcontinental dry grasslands in Europe (Turtureanu et al. 2014; Kuzemko et al. 2016) and in the overall framework of the Palaeoarctic (see Dengler et al. 2016a). We are also curious whether our findings are similar to Austria (see Magnes et al. 2018) and the Aosta valley (Wiesner et al. 2015).

Addressing the syntaxonomic position of the dry grasslands in the inneralpine dry valleys of Switzerland is particularly

relevant as there were essentially no broad-scale, data-driven syntaxonomic syntheses of the dry grassland vegetation since Braun-Blanquet (1961), while elsewhere in Europe there had been big advancement (e.g. Willner et al. 2017, 2019). Currently, Swiss geobotanists largely use the typology of habitats of Switzerland (Delarze et al. 2015), whose units mostly correspond to phytosociological alliances. In this book at least xeric and meso-xeric communities are separated at alliance level, whereas Braun-Blanquet (1961) mostly joined them in single regional associations. However, other recent developments of the dry grassland classification are not reflected and evident problems not addressed, e.g.: (i) In Central and Eastern Europe, the xeric *Festuco-Brometea* communities are since long split into one order on deep soils (*Festucetalia valesiacae*; E1.2b in Schaminée et al. 2016) and one on rocky sites (*Stipo pulcherrimae-Festucetalia pallentis*; E1.1g), while in Switzerland both types are still merged under the name “*Stipo-Poion*”, despite species and communities of both groups being widespread (see Schaminée et al. 2016; J. Dengler unpubl. observations). (ii) While the delimitation of the two vicariant alliances of meso-xeric grasslands *Cirsio-Brachypodion pinnati* and *Bromion erecti* has internationally been well elaborated (Willner et al. 2019), their distinction and distribution in Switzerland is still only vaguely known (see Delarze et al. 2015). Possibly the inner-alpine meso-xeric stands with *Brachypodium rupestre* instead of *B. pinnatum* might even be closer to the Apennine alliance *Polygalo mediterraneae-Bromion erecti*. (iii) The maps in Delarze et al. (2015) suggest that in the inner-alpine dry valleys of Switzerland three alliances of shallow skeletal soils should occur side by side (*Alyso-Sedion*, *Sedo-Veronicion*, *Sedo-Scleranthion*), which raises the question how are they distinguished floristically and ecologically.

The data collected during this Field Workshop will be used by the participants for joint scientific publications. They will be joined with some other recent data with identical or similar sampling: (i) J. Dengler et al. (see Dengler 2018; Dengler et al. in prep.) sampled the dry grasslands of Ausserberg, Valais, with 10-m² plots and EDGG Biodiversity Plots; (ii) J. Dengler’s research group sampled the dry grasslands of the military training area “Calanda” in Chur (Rhine valley) with 10-m² plots; (iii) J. Dengler’s group will conduct an international summer school “Biodiversity Monitoring” in the Albula valley (between the Rhine valley and the Engadine) in August 2019, including sites for the DarkDivNet network (see <https://www.botany.ut.ee/macroecology/en/darkdivnet>), whose dry grassland plots will be recorded as EDGG Biodiversity Plots. All data from the Field Workshop will be fed into the EDGG-associated GrassPlot database (Dengler et al. 2018) and into the emerging Swiss national vegetation database (working title “Veg.CH”).

Fauna, flora and vegetation

As a consequence of their climate, the inner-alpine dry valleys in general host animal and plant species as well as vegetation types adapted to these conditions that are oth-

erwise absent or rarely found in the entire Alps. Among these particular species are many that are typical for the steppic grasslands of eastern Central Europe and the steppes of Eastern Europe. Here they have an isolated outpost of their distribution range, often their westernmost occurrences. The consequence of this isolation is that some taxa even formed endemic species or subspecies restricted to the inner-alpine dry valleys. This diverse step-pic element is enriched with widespread Central European dry grassland species and some (sub-) Mediterranean species adapted to summer drought. The distribution patterns of dry grassland species of Swiss inner-alpine dry valleys is exemplified by four typical maps of vascular plants (Fig. 1).

In general, flora and fauna are very diverse and include many rare and threatened species. According to P. Wiedemeier (ZHAW, pers. comm.), the south-facing slopes above the Rhone in the Canton of Valais are among the richest sites in terms of butterfly species of that size (i.e. a few square kilometres) in the whole of Europe. Some typical vascular plant, non-vascular plant and animal species are shown on Fig. 2. Switzerland has extensive online information platforms for its biodiversity, including detailed distribution maps for nearly all macroscopic species: vascular plants (<https://www.infoflora.ch/en/>), bryophytes (<https://www.swissbryophytes.ch/index.php/de/verbreitung>), lichens (<http://merkur.wsl.ch/didado/swisslichens.map>), fungi (https://www.wsl.ch/didado/fungusweb2.search_map?sprache_app=E) and animals (<https://lepus.unine.ch/carto/index.php?lang=en>).

The bedrock in the Swiss inner-alpine valleys is diverse, but often neither limestone nor very acidic (i.e. granite, gneiss), but rather types that lead to soils of intermediate soil pH, thus hosting a vegetation with a conspicuous mixture of basiphytes and acidophytes. Vegetation types of the xerothermic vegetation complexes are quite diverse (Braun-Blanquet 1961; Dengler 2018). We will focus on all types of dry grassland communities of the class *Festuco-Brometea* (xeric, meso-xeric, rocky), but also include stands of rocky outcrops (*Sedo-Scleranthetea*) and tall-forb communities of dry, nutrient-poor sites (*Trifolio-Geranietea*) if they cover some spatial extent, rather than occur as punctual or linear elements. Thus our sampling will mainly deal with the following alliances (nomenclature according to Mucina et al. 2016): *Stipo-Poion xerophilae*, *Festucion valesiacae* (hitherto not recognized in Switzerland), *Cirsio-Brachypodion pinnati*, *Bromion erecti*, *Sedo albi-Veronicion dillenii*, *Sedo-Scleranthion*, *Alyso alyssoidis-Sedion* and *Geranion sanguinei*.

Itinerary of the Field Workshop

Our itinerary (Table 1, Fig. 3) includes all the inner-alpine dry valleys of Switzerland, from west to east: the Rhone valley (Figs. 4a–b), the Rhine valley (Fig. 4c) and the Inn valley (whose Swiss part is called Engadine; Fig. 4d), always with their tributaries. The Rhone valley belongs to the Canton of Valais (speaking German and French) and the other two valleys to the Canton of Grisons (speaking German and Rhaeto-Romanic). We stay in four different accommoda-

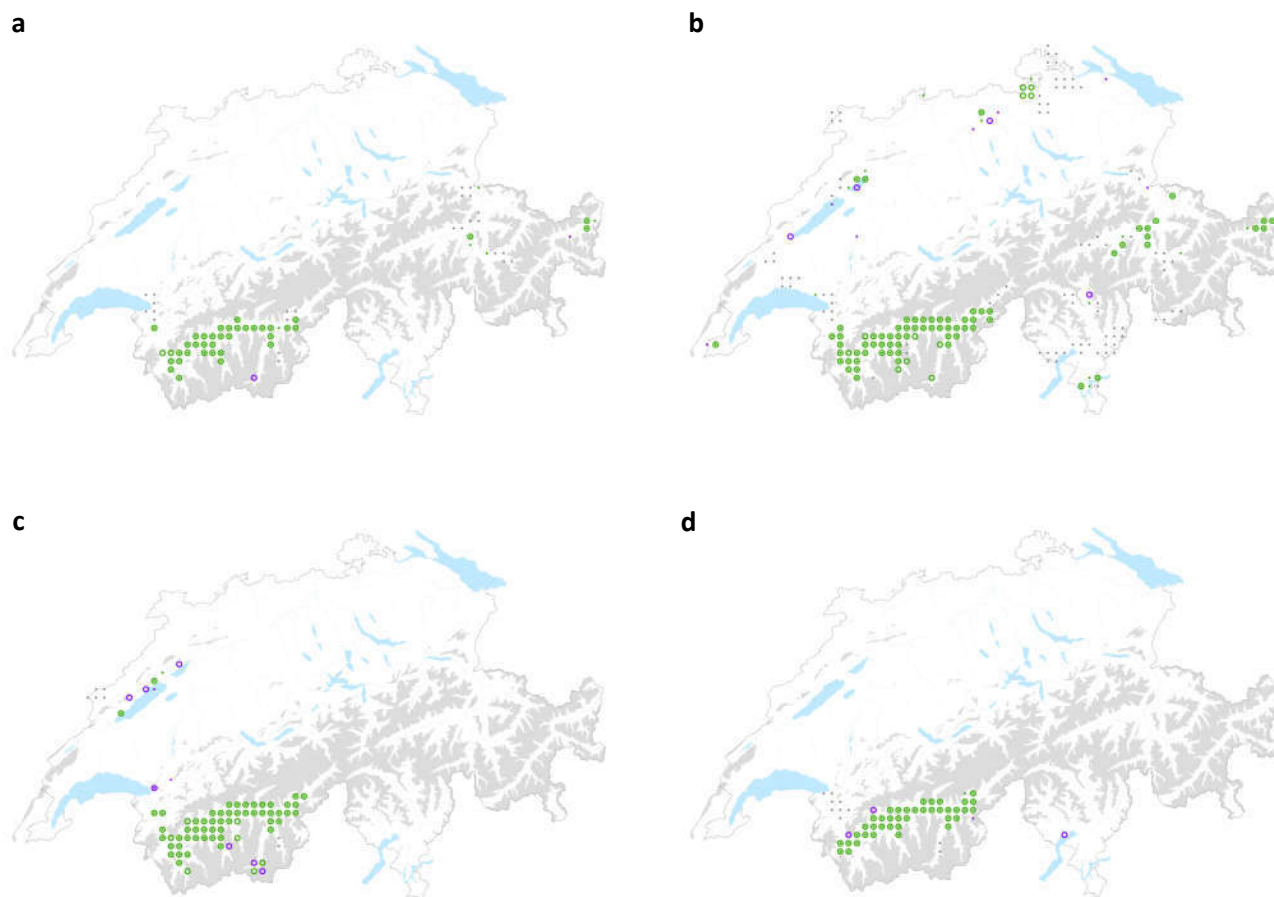


Fig. 1. Distribution of four typical vascular plant species of Swiss inneralpine dry valleys: (a) *Stipa capillata*, (b) *Odontites luteus* (both eastern steppic elements), *Koeleria vallesiana* (western element, widespread in dry grasslands of the Iberian Peninsula) and *Centaurea valesiaca* (endemic). Maps kindly provided by <https://obs.infoflora.ch/app/atlas/en/index.html>. Dots are observations before 2002, circles after 2002; green symbols refer to approved records, violet to not (yet) approved records.

tions, each for one to three nights, and each providing us with a group room. One day is planned in Wergenstein (above the Posterior Rhine), where the Zurich University of Applied Sciences (ZHAW) has its outstation.

Among the three valleys, the Rhone valley is the driest and most continental, followed by the Lower Engadine and the Rhine valley (Fig. 5). The valley bottoms in the studied parts of the valleys are at 370–800 m a.s.l. (Rhone), 550–950 m a.s.l. (Rhine and tributaries) and 1030–1500 m a.s.l. (Lower Engadine), but the studied dry grasslands might be located several hundred meters above.

Our sampling includes the regional reserves Naturpark Pfyn-Finges and Naturpark Beverin, but most of the great dry grasslands are not part of natural parks or nature reserves. However, their majority is protected as habitats of national priority in the category TWW (*Trockenwiesen und -weiden* = dry meadows and pastures). One can easily find and visualise them with the web browser of the Swiss administration (<https://map.geo.admin.ch/?lang=en>). You only need to select Geocatalog / Nature and Environment / Nature protection / Dry grasslands and Dry grasslands appendix 2. You can zoom in, select one such polygon and click on it. Then its basic data are shown as well as a link to

an “objectsheets”, which contains a map and a short description, including a list of vegetation types and often also of typical species.

Important travel information

Starting point of the Field Workshop is Wädenswil in the Canton of Zurich, where we will collect participants from the railway station. Zurich has plenty of connections via train, bus and airplane from most bigger cities in Europe and beyond. You can easily reach Wädenswil from the Zurich airport, the central station (Zurich HB) or the international bus stop in Zurich with the metro (S-Bahn). We intend to leave from Wädenswil on Saturday, 11 May, at approximately 11:00 in the morning and return to Wädenswil/Zurich on Sunday, 19 May, at approximately 16:00 in the afternoon. Please ensure that you organise your train/bus/flight journeys so that they fit with this plan. Upon request, Jürgen Dengler (juergen.dengler@zhaw.ch) can offer to stay in his flat in Wädenswil on the night before or after the expedition (i.e. 10/11 or 19/20 May) if you otherwise do not have a suitable connection.

We will provide essentially all the equipment needed for field sampling (i.e. measuring tapes, rulers, metal pins,



Fig. 2. Some typical species of inneralpine dry valleys of Switzerland: (a) *Eresus kollari*, Valais; (b) *Mantis religiosa*, Valais; (c) *Arcyptera fusca*, Lower Engadine; (d) *Rhytidium rugosum*, Lower Engadine; (e) *Odontites luteus*, Valais; (f) *Pulsatilla montana*, Valais; (g) *Centaurea valesiaca*, Valais. Photos: J. Dengler.

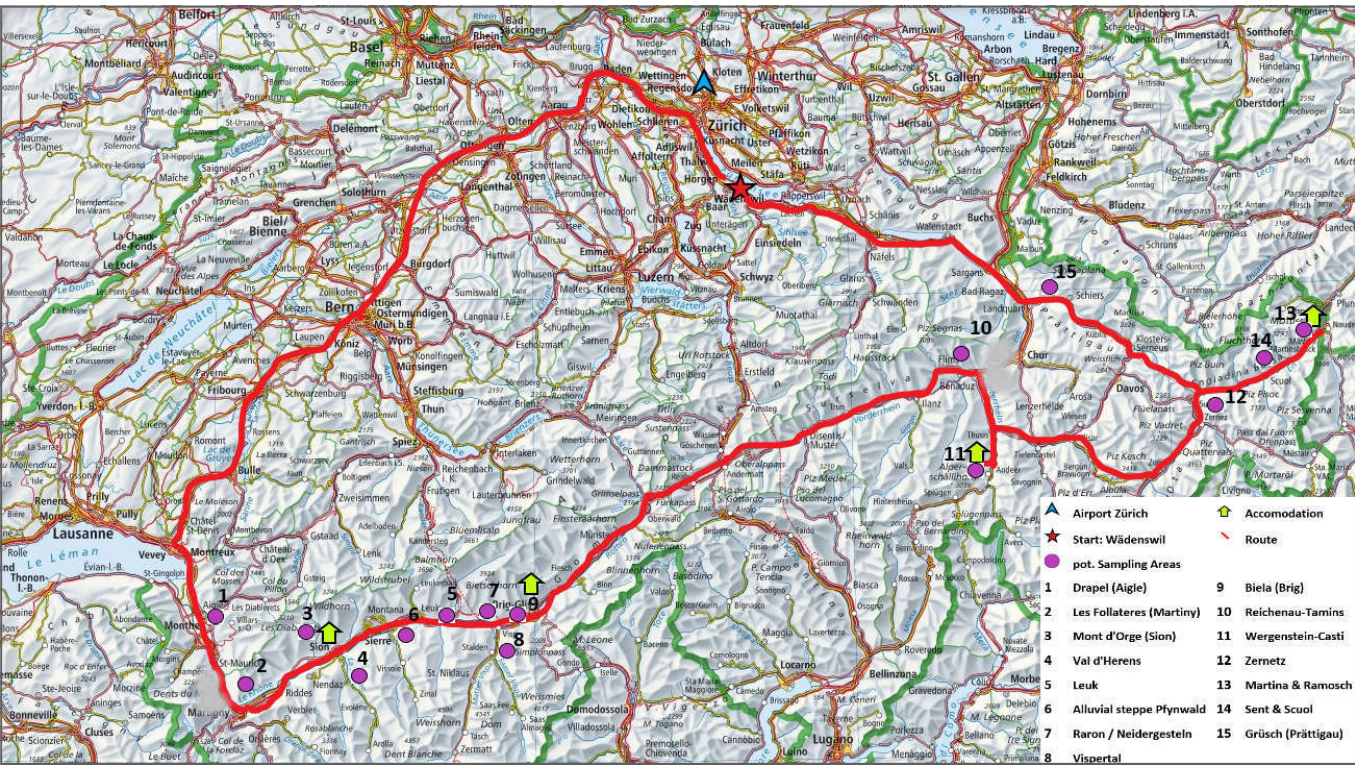


Fig. 3. Itinerary of the 12th EDGG Field Workshop in the inneralpine dry valleys of Switzerland with some confirmed and potential sampling sites marked.

Table 1. Preliminary itinerary of the 12th EDGG Field Workshop in the inneralpine dry valleys of Switzerland.

Day	Times (approx.)	Journey (duration of pure journey)	Dry grassland sites (preliminary)	Accommodation
11 May (Saturday)	11:00 18:00	Wädenswil – Sion (3 h)	On the way: Drapel (Aigle)	
12 May (Sunday)	08:30 18:00	Around Sion	Les Follateres (Martiny)	Youth Hostel Sion
13 May (Monday)	08:30 18:00	Around Sion	Morning: Mont d'Orge (Sion); afternoon: Val d'Herens	
14 May (Tuesday)	08:30 18:00	Sion – Brig (1 h)	Morning: Leuk; afternoon: Alluvial steppe Pfywald	
15 May (Wednesday)	08:30 18:00	Around Brig	Morning: Raron / Neidergesteln; afternoon: Vispताल	Hotel Olympica Brig
16 May (Thursday)	08:30 18:00	Brig – Wergenstein (2.5 h)	Morning: Biela (Brig); on the way: Reichenau-Tamins	Pension Mantarella Donat
17 May (Friday)	08:30 18:00	Wergenstein – Martina (2 h)	Morning: Wergenstein-Casti; on the way: Zernetz	
18 May (Saturday)	08:30 18:00	Around Martina	Morning: Martina & Ramosch; afternoon: Sent & Scuol	Berghaus Outdoor-Center Rezia-Martina
19 May (Sunday)	08:00 16:00	Martina – Zurich airport / central station (3 h)	On the way: Grüşch (Prättigau)	

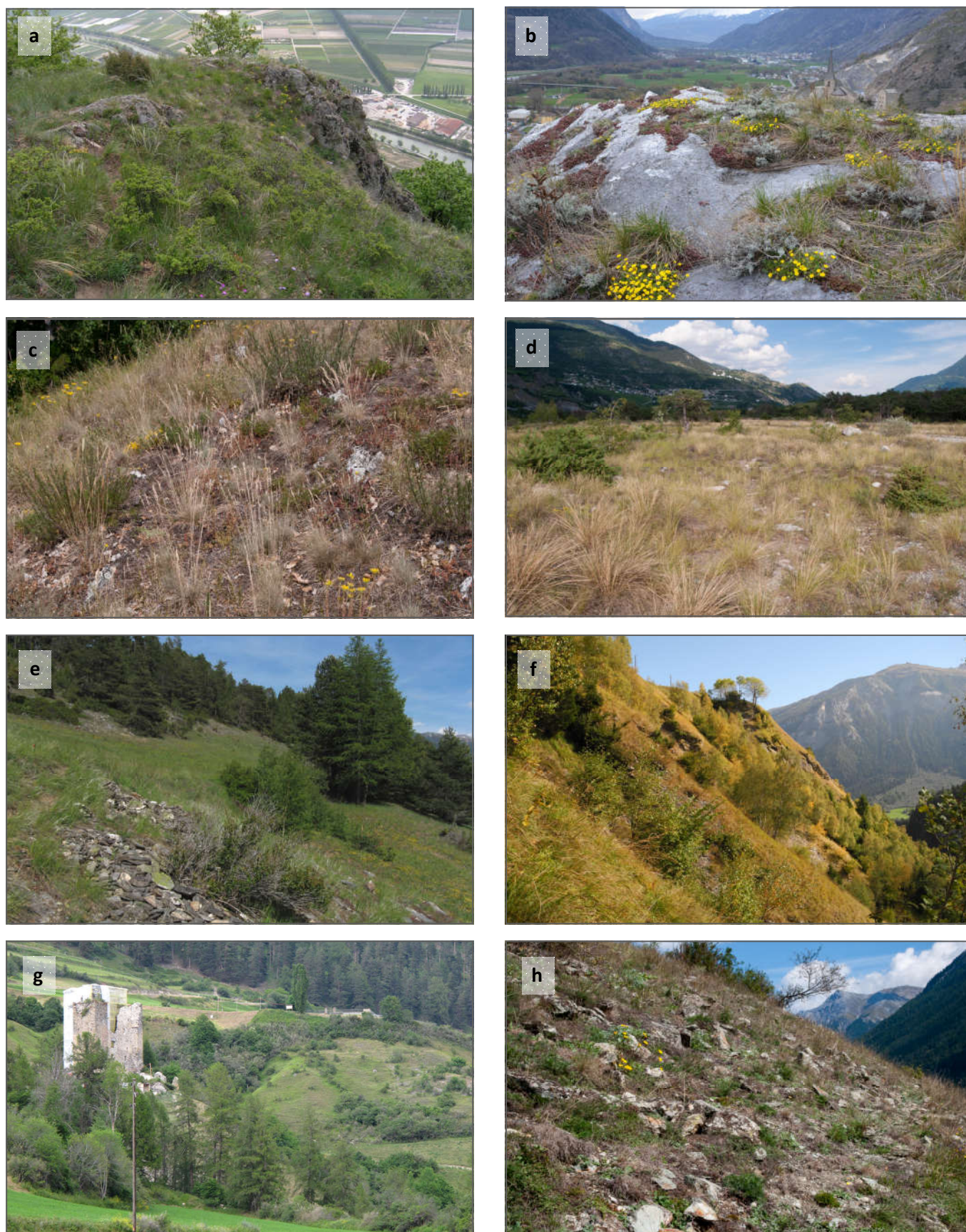


Fig. 4. Examples of dry grasslands in the three study regions of the Field Workshop: (a) rocky steppe “Follateres” above Martigny; (b) rocky steppe “Heidnischbiel”, Raron; (c) rocky steppe in Varen; (d) alluvial steppe on gravel deposits of the Rhone in the Pfynwald; (e) dry grasslands in Zeneggen, Vispertal, all Valais; (f) dry grasslands “Casti Nicca” near Wergenstein, Posterior Rhine valley; (g) xerothermic complexes, Tschanueff; (h) dry grasslands in Sent, both Lower Engadine. Photos: a, b, e, g – S. Eggenberg; c, d, h – J. Dengler; f – S. Nagelmüller.

Visp (Rhône valley) 639 m a.s.l.
[MAT: 9.4 °C; MAP: 596 mm]

Chur (Rhine valley) 556 m a.s.l.
[MAT: 10.0 °C; MAP: 849 mm]

Scul (Engadine) 1304 m a.s.l.
[MAT: 5.5 °C; MAP: 706 mm]

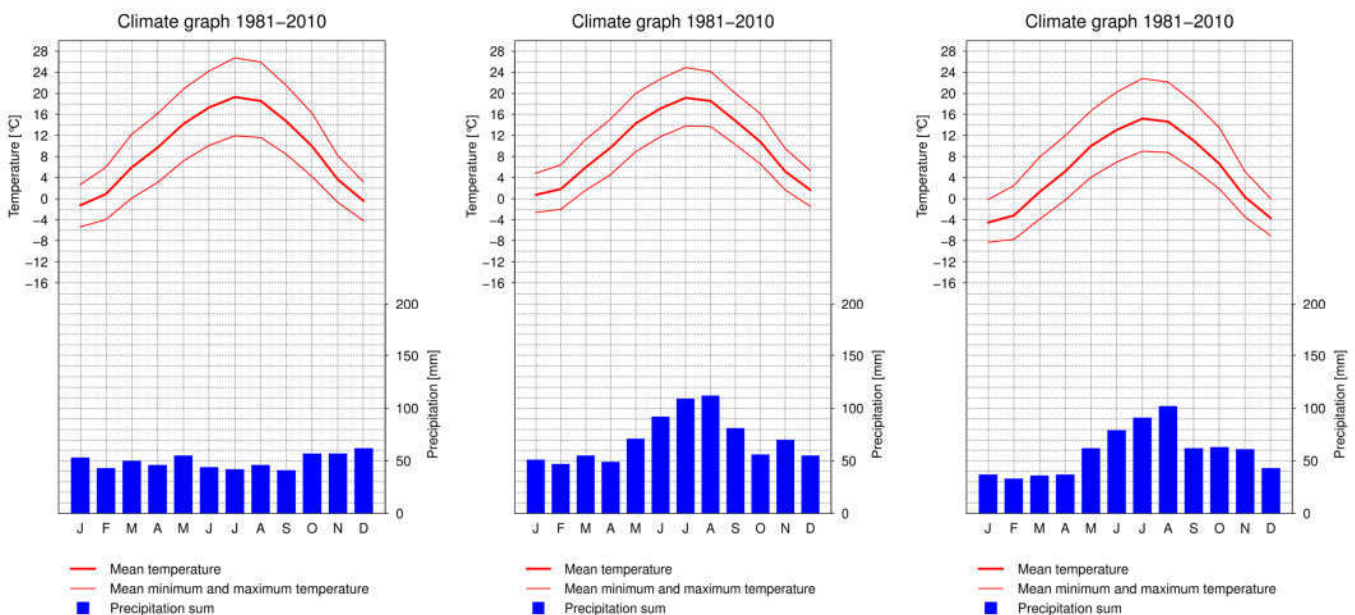


Fig. 5. Climate of three representative stations along our itinerary. Diagrams kindly provided by <https://www.meteoschweiz.admin.ch/home/klima/schweizer-klima-im-detail/klima-normwerte/klimadiagramme-und-normwerte-pro-station.html> (MAT: mean annual temperature; MAP: mean annual precipitation).

relevé forms, some penetrometers and GPS devices) as well as a bunch of good floras (in German), a binocular and a microscope. Whether some additional equipment should be brought by participants, will be communicated with the confirmed participants later.

You need to bring a towel with you. Moreover, for our last accommodation in Martina you need bedlinen. If you do not want to carry this with you, you alternatively can rent it for 15 CHF in the place.

Fees and application

Despite Switzerland being one of the most expensive countries in the world, we can offer participation for a reasonable price due to two reasons: (a) most of the time we will stay in 3- and 4-bed rooms and (b) the Vegetation Ecology Group of ZHAW supports this event financially. The fees comprise all costs of food and beverages (except for alcoholic ones), travelling and accommodation starting on 11 May in Wädenswil and ending on 19 May in Wädenswil or at Zurich airport, as well as a printed “reader” with some basic information on the itinerary and the sites.

The fees for **full participation** are:

- 700 CHF for postdocs, senior scientists or other regularly employed persons who are not IAVS members
- 600 CHF for postdocs, senior scientists or other regularly employed persons who are IAVS members
- 600 CHF for students, PhD students and unemployed persons who are not IAVS members

- 500 CHF for students, PhD students and unemployed persons who are IAVS members

People who participate for the whole duration can also apply for travel grants, which cover the fees partly or fully (for details see under “Travel grants” above).

Partial participation in the Field Workshop is also possible if there are free places, but only for at least two complete subsequent days and one night. Partial participants who join later than the first day are requested to have studied the methodological instructions very carefully before coming. The fees are without differentiation into categories:

- 80 CHF per night (half board, i.e. dinner and breakfast included)
- 20 CHF per day (picnic included)

Please understand that we cannot accept any other arrangements (other accommodation, travel during the day independently of the group) for logistic and group-dynamic reasons.

Upon request it might be possible in some of the accommodations to offer 1- or 2-bed rooms if you are willing to cover the additional costs. If interested, you can get into contact with jamyra.gehler@zhaw.ch.

Payment has to be made in cash on the first day of participation, with possible travel grants already subtracted. For **cancellations**, we charge the following fees:

- Until 20 April: 50% of your regular fees
- After 20 April: 80% of your regular fees

Applications should be sent via e-mail to jamyra.gehler@zhaw.ch AND juergen.dengler@zhaw.ch with all required documents and **not later than 31 March 2019**. The subject line of the mail should be “EDGG Field Workshop Switzerland”. Please carefully read the general information given in the sections “Application” and “Travel grants” above and provide all the documents required. A maximum of 14 (potentially 18) participants is possible, including approx. 4 organisers from the ZHAW. If we should receive more applications than there are available places, we will decide after the deadline according to the criteria listed above in the general part.

If you need an **invitation letter** for visa application, please get in touch with jamyra.gehler@zhaw.ch as early as possible.

13th EDGG Field Workshop: Grasslands of Armenia along the elevational gradient, 26 June – 6 July 2019

Topic and aims of the Field Workshop

Armenia is a Southern Caucasian republic, bordering with Georgia (in the North), Azerbaijan (in the East), Turkey (in the West and South-West), and Iran (in the South). It is a landlocked country with a total area of 29,740 km² (2,974,259 ha) with a total of 1479 km of border, at a distance of about 145 km from the Black Sea, 175 km from the Caspian Sea, 750 km from the Mediterranean Sea and 960 km from the Persian Gulf. It lies between 38°50' and 41°18' northern latitude and between 43°27' and 46°37' eastern longitude, and measures 400 km along its main axis (north-west to south-east) and 200 km (east-west), with a narrow projection (Zangezur) in the south-east. Armenia is a mountainous country, having its lowest point of 375 m a.s.l. and culminating at 4095 m a.s.l. with an average altitude of 1850 m a.s.l. (76.5% of its territory is 1000–2500 m a.s.l.).

Four main geomorphological regions can be recognized within Armenia. 1. Mountain ridges and valleys in the north-east of the country which bear witness of extensive erosion. 2. Areas covered by lava of relatively recent (upper Pliocene) origin within Asia Minor characterized by gentle slopes with little evidence of erosion but, in which larger rivers have carved out deep gorges and canyons. 3. A series of ridged mountains in the south of Armenia, which constitute the Minor Caucasus system and show intense erosion. 4. The Ararat Valley representing the lowest part of the Ararat depression which is covered with alluvial and proluvial sediments.

A wide range of climatic zones have been recorded within Armenia. The country is located centrally in the subtropical zone, and thus is dominated by arid to semi-desert conditions. The altitudinal zonation adds diversity resulting from altitudinal clines. In general the climate is best characterised as dry continental, in some areas with an annual rhythm more or less similar to the Mediterranean one. The average temperature varies from 2.7°C to 14.1°C. Average

annual precipitation is around 600 mm; it varies depending on altitude from 250 to 1000 mm. Most precipitation falls in the spring. Long-lasting snow cover exists in the mountains above 1300 m, where the annual snowfall could attain 2 m. In the northern part of Armenia humidity comes from the Black Sea in the west, in the southern part from the Caspian Sea in the east, the central part is in the rain shadow of mountain ridges and is therefore the driest area (Fig. 6).

There is only one big river in Armenia – Arax, but the river net is rather dense – 215 rivers longer than 10 km. There are many lakes in Armenia. Lake Sevan is the most famous and important for economy and biodiversity conservation.

The sampling has two main aims: (a) to analyse the biodiversity patterns of the Armenian grasslands across multiple taxonomic groups and grain sizes and (b) to study the syn-taxonomic position of these grasslands in a general European context. Understanding the biodiversity patterns is particularly interesting in comparison with the main distribution ranges of continental and subcontinental dry grasslands in Armenia and in the overall framework of the Palaeoarctic (see Dengler et al. 2016a).

All data from the Field Workshop will be fed into the EDGG-associated GrassPlot database (Dengler et al. 2018).

Fauna, flora and vegetation

Armenia occupies a very small area (less than 30,000 km²) in the South Caucasus, but it has extremely rich landscape and biological diversity. About 3800 species of vascular plants grow here (about half of the flora of the whole Caucasus), 428 species of algae, 399 species of bryophytes, 464 species of lichens, 4207 species of fungi, and 549 species of vertebrate animals are registered in Armenia. The estimated number of species of invertebrate animals is 17,200 species (Anon. 2014). Flora and fauna of Armenia include 142 plant and 479 invertebrate animal local endemic species. This rich biodiversity is attributed to the natural ecosystem's diversity.

Armenia is situated between two very distinct phyto-geographical domains: the Boreal and Ancient Mediterranean Subkingdoms and at the junction of two floristic provinces – Caucasian and Armeno-Iranian (Takhtajyan 1986).

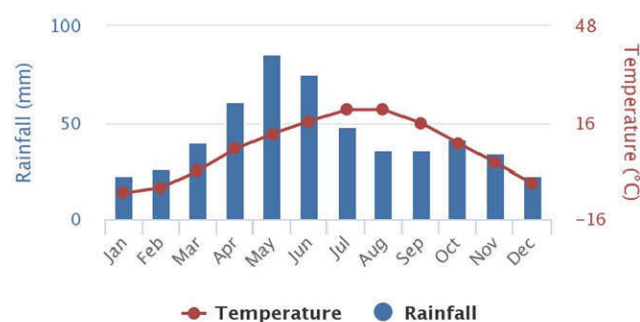


Fig. 6. Average monthly temperature and precipitation in Armenia for the period 1901–2015.

The peculiarity of each, enhanced by vertical zonation, is the cause of the great variety of the country's vascular flora and vegetation. About 3800 vascular plant species occur on its territory and 12 floristic regions (Fig. 7).

All the main Caucasian ecosystems (besides humid subtropics) are represented in Armenia – deserts and semi-deserts, steppes, meadow-steppes, forests and open woodlands, sub-alpine and alpine vegetation as well as intrazonal ecosystems. All these represent the habitats of plant and animal species of Armenia.

The diversity of landscapes and orography is an important determinant of Armenia's diverse vegetation. The lower mountain belt (480–1200 m a.s.l.) is covered by semi-desert (or phryganoid) formations, gypsophilous or halophilous vegetation. There are salt marsh areas as well as the Transcaucasian sand desert. The middle and upper mountain belts (1200–2200 m a.s.l.) are characterized by various kinds of steppe and forest vegetation, meadow-steppes, shrub steppes and thorny cushion (tragacanth) vegetation. The altitudinal span of the forest belt varies from 500 to 1500 (–2000) m a.s.l. depending of the region, and may approach 2400 m a.s.l. when open park-like tree stands are included. The subalpine and alpine belts (2200–4000 m a.s.l.) are covered by meadows and carpets.

Itinerary of the Field Workshop

Our itinerary (Table 2, Figs. 8-10) includes dry grasslands from seven floristic regions of 12 distinguished in the country (Upper Akhuryan, Shirak, Sevan, Areguni, Aparan, Yerevan, Darelegis).



Fig. 7. Map of floristic regions of Armenia (based on data of Tamanyan & Fayvush 2009).

The studied parts of country are between 850 -3000 m a.s.l.

Because there is no available online data about flora and vegetation of selected sites, below you can find description of habitats classified according to the EUNIS classification (*AM means specific habitats only from Armenia):

- Jajur pass. Very rare habitat in Armenia (F2.33711-AM-Steppe shrub with *Asphodeline taurica*), it is known only from Shirak range in vicinity of Jajur pass.
- Vicinity of Shirakmut village. E1.2E1-AM – Mountain *Stipa-Festuca* steppes. The most distributed habitats in the steppe belt of Armenia. Steppe scrub with *Asphodeline taurica* Vicinity of Talin town. E1.2E13-AM – Mountain *Stipa-Festuca* steppes with with dominance of different species of the genus *Stipa* (*Stipa transcaucasica*, *S. lessingiana*, *S. capillata*).
- Sevan pass. E2.322-AM – Sub-alpine forbs meadows. These habitats are wide distributed in Armenia in upper mountain and sub-alpine belts.
- Vicinity of Sevan town. F7.4I212-AM –Traganth communities with dominance of *Astragalus lagurus* and *A. aureus*. These habitats are common from middle mountain to sub-alpine belt.
- Vicinity of Chkalovka village. E1.2E1-AM – Mountain *Stipa-Festuca* steppes. The most distributed habitats in the steppe belt of Armenia.
- Selim pass. E2.323-AM – Sub-alpine sedge meadows. These habitats are common in North and Central Armenia.
- Ardanish peninsula. F7.4I21-AM – Traganth milk vetch communities. Very wide distributed habitats in Armenia. They exist in all floristic regions from middle mountain to sub-alpine belt; F7.4I25-AM – Traganth communities with dominance of *Acantholimon* spp. These habitats are distributed in middle and upper mountain belts in Shirak, Aparan, Areguni, Yerevan, Darelegis and North Zangezur floristic regions.
- Vicinity of Shorja village. E2.162-AM – Forbs meadow-steppes. These habitats are distributed wider than grass meadow-steppes, they are developed on the slopes of different steepness and orientation.
- E1.2E1-AM – Mountain *Stipa-Festuca* steppes. The most distributed habitats in the steppe belt of Armenia.
- F7.4I21-AM – Traganth milk vetch communities. Very wide distributed habitats in Armenia. They exist in all floristic regions from middle mountain to sub-alpine belt.
- Vicinity of Tigranashen village. F7.4I23-AM – Traganth communities with dominance of *Gypsophila aretioides*. These habitats are rather rare in Armenia.
- Vicinity of Ararat town. D6.24-AM –Salt marshes with *Juncus acutus*. These rare habitats are well represented in the East part of Ararat valley in Armenia.

Table 2. Preliminary itinerary of the 13th EDGG Field Workshop in Armenia.

Day	Times (approx.)	Journey (duration of pure journey)	Dry grassland sites (preliminary)	Overnight
26 June (Wednesday)	14:00 18:00	Yerevan-Gyumri (2 h)	Meeting the group at Yerevan Botanical Garden Check-in, dinner and presentation about the study area	Gyumri
27 June (Thursday)	08:30 18:00	Gyumri – Jajur (20 min) Jajur-Shirakamut (30 min)	Morning: Jajur pass Afternoon: vicinity of Shirakamut village	Gyumri
28 June (Friday)	08:30 18:00	Gyumri-Amasia (40 min) Amasia- Aghvorik (40 min)	Morning: vicinity of Amasia town Afternoon: vicinity of Aghvorik village	Gyumri
29 June (Saturday)	08:30 18:00	Gyumri-Talin (1h 10min)	Vicinity of Talin town	Gyumri
30 June (Sunday)	08:30 18:00	Gyumri-Sevan pass (2h 10min) Sevan pass-Sevan town (25 min)	Morning: Sevan pass Afternoon: vicinity of Sevan town	Sevan
1 July (Monday)	08:30 18:00		Morning: Ardanish peninsula Afternoon: vicinity of Shorja village	Sevan
2 July (Tuesday)	08:30 18:00	Sevan-Chkalovka (20 min) Chkalovka-Selim pass (1h 30 min)	Morning: vicinity of Chkalovka village Afternoon: Selim pass	Yeghegnadzor
3 July (Wednesday)	08:30 18:00	Yeghegnadzor-Areni (20 min) Areni-Khachik (40 min)	Morning: vicinity of Areni village Afternoon: vicinity of Khachik village	Yeghegnadzor
4 July (Thursday)	08:30 18:00	Yeghegnadzor- Agarakadzor (15 min) Agarakadzor –Gnishik (20 min)	Morning: vicinity of Agarakadzor village Afternoon: vicinity of Gnishik village	Yeghegnadzor
5 July (Friday)	08:30 18:00	Yeghegnadzor- Tigranashen (2 h) Tigranashen-Ararat (40 min)	Morning: vicinity of Tigranashen village Afternoon: Vicinity of Ararat town	Yerevan
6 July (Saturday)	08:30 18:00	Yerevan-Kari lake (1h 30 min) Kari lake-Amberd castle (30 min)	Morning: vicinity of Kari lake Afternoon: vicinity of Amberd castle	Yerevan

- Vicinity of Kari lake. E4.3A2-AM – Alpine forbs meadows – alpine carpets. These habitats are very widely distributed on all volcanic massives in Armenia.
- Vicinity of Amberd castle. E2.322-AM – Sub-alpine forbs meadows. These habitats are widely distributed in Armenia in the upper mountain and sub-alpine belts.

You can find more information about habitats of Armenia in Fayvush & Aleksanyan (2016).

Important travel information

Starting point of the Field Workshop is Yerevan Botanical Garden, where we will collect the participants. Yerevan has good international airplane connections. You can easily reach Yerevan Botanical Garden from Zvartnots airport (<http://www.zvartnots.aero>) using public transport or taxi. We intend to leave from Yerevan Botanical Garden on Wednesday, 26th June, at approximately 14:00 in the afternoon and FW will be finished on Saturday, 06 July, at approximately 20:00 in the evening. We can leave you in the city centre or at the airport. Please ensure that you organise your flight journeys so that they fit with this plan. Please book accommodation yourself if you need it on the night before or after the expedition (i.e. 25/26 June or/and 06/07 July). If you do not have a suitable connection you

can contact Alla Aleksanyan (alla.alexanyan@gmail.com) for assistance.

We will provide a bunch of good floras (in Russian). Other equipment that participants should bring with them will be communicated with the participants later.

Fees and application

The fees comprise all costs of food and beverages (except for alcoholic ones), travelling and accommodation starting in Yerevan Botanical Garden on 26 June and ending on 6 July in Yerevan, as well as a printed “reader” with some basic information on the itinerary and the sites.

The fees for full participation are:

- 800 € for postdocs (senior scientists, professors etc.) who are not members of IAVS
- 600 € for postdocs (senior scientists, professors etc.) who are members of IAVS
- 700 € for young scientists (master and PhD students) as well as unemployed persons who are not member of IAVS
- 500 € for young scientists (master and PhD students) as well as unemployed persons who are member of IAVS

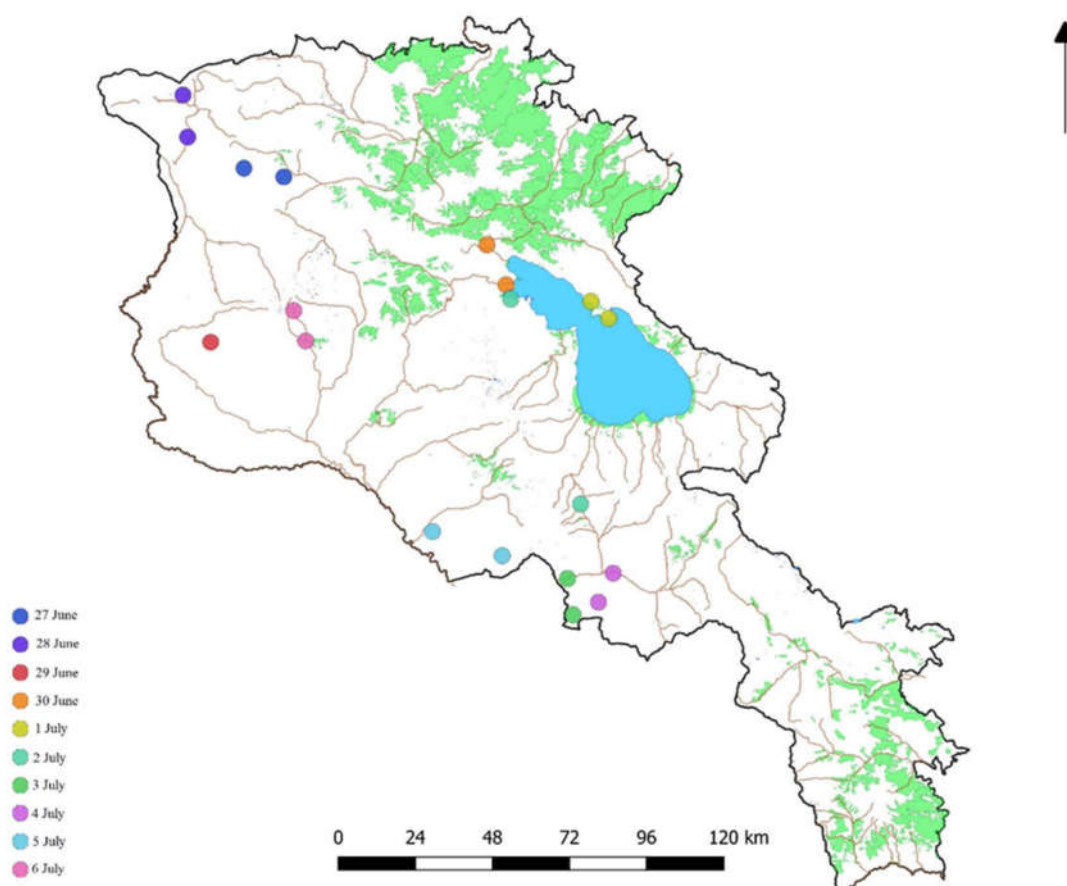


Fig. 8. Itinerary of the 13th EDGG Field Workshop in Armenia with some confirmed and potential sampling sites marked.



Fig. 9. Examples of dry grasslands in the study regions of the 13th EDGG Field Workshop. From upper left to lower right: Areni-Khachik, Aghvorik, Khachik and Ardanish. Photos: G. Fayvush.



Fig. 10. Some typical species of selected sites in Armenia (from upper left to lower right): *Asphodeline taurica*, *Gypsophila aretioides*, *Stipa lessingiana*, *Acantholimon bracteatum*. Photos: G. Fayvush.

People who participate for the whole duration can also apply for travel grants, which cover the fees partly or fully (for details see under “Travel grants” above).

Please understand that we cannot accept any other arrangements (other accommodation, travel during the day independently of the group) for logistic and group-dynamic reasons. Upon request it might be possible in some of the accommodations to offer single bed rooms if you are willing to cover the additional costs. If interested, you can get in contact with alla.alexanyan@gmail.com or gfayvush@yahoo.com.

Payment has to be made in cash on the first day of participation, with possible travel grants already subtracted. For **cancellations**, we charge the following fees:

- Until 30 April: no fees
- From 1–31 May: 50% of your regular fees
- After 31 May: 80% of your regular fees

Applications should be sent via e-mail to alla.alexanyan@gmail.com AND gfayvush@yahoo.com with all required documents and not later than 31 March 2019. The subject line of the mail should be “EDGG Field Workshop Armenia”. Please carefully read the general information given in the sections “Application” and “Travel grants” above and provide all the documents required. A maximum of 20 participants is possible, including approx. 4 organisers from Armenia. If we should receive more applications than there are available places, we will decide after the deadline according to the criteria listed above in the general part.

If you need an **invitation letter** for visa application, please get in touch with alla.alexanyan@gmail.com as early as possible.

References

Anon. 2014. *Fifth National Report of the Republic of Armenia to the Convention on Biological Diversity*. 2014. Republic of Armenia, Yerevan, AM.

- Braun-Blanquet, J. 1961. *Die inneralpine Trockenvegetation*. Fischer, Stuttgart, DE.
- Bruehlheide, H., Dengler, J., Jiménez-Alfaro, B., Purschke, O., Hennekens, S.M., Chytrý, M., Pillar, V.D., Jansen, F., Kattge, J., (...) & Zverev, A. 2019. sPlot – a new tool for global vegetation analyses. *Journal of Vegetation Science* 30. DOI: 10.1111/jvs.12710.
- Chytrý, M., Hennekens, S.M., Jiménez-Alfaro, B., Knollová, I., Dengler, J., Jansen, F., Landucci, F., Schaminée, J.H.J., Aćić, S., (...) & Yamalov, S. 2016. European Vegetation Archive (EVA): an integrated database of European vegetation plots. *Applied Vegetation Science* 19: 173–180.
- Delarze, R., Gonseth, Y., Eggenberg, S. & Vust, M. 2015. *Lebensräume der Schweiz: Ökologie – Gefährdung – Kennarten*. 3rd. ed. Ott, Bern, CH.
- Dengler, J. 2009. A flexible multi-scale approach for standardised recording of plant species richness patterns. *Ecological Indicators* 9: 1169–1178.
- Dengler, J. 2018. The beauty of xerothermic vegetation complexes in Ausserberg (Rhône valley, Switzerland). *Palaeoartctic Grasslands* 38: 34–38.
- Dengler, J., Ruprecht, E., Szabó, A., Turtureanu, D., Beldean, M., Uğurlu, E., Pedashenko, H., Dolnik, C. & Jones, A. 2009. EDGG cooperation on syntaxonomy and biodiversity of *Festuco-Brometea* communities in Transylvania (Romania): report and preliminary results. *Bulletin of the European Dry Grassland Group* 4: 13–19.
- Dengler, J., Becker, T., Ruprecht, E., Szabó, A., Becker, U., Beldean, M., Bita-Nicolae, C., Dolnik, C., Goia, I., (...) & Uğurlu, E. 2012. *Festuco-Brometea* communities of the Transylvanian Plateau (Romania) – a preliminary overview on syntaxonomy, ecology, and biodiversity. *Tuexenia* 32: 319–359.
- Dengler, J., Biurrun, I., Apostolova, I., Baumann, E., Becker, T., Berastegi, A., Boch, S., Dembicz, I., Dolnik, C., (...) & Weiser, F. 2016a: Scale-dependent plant diversity in Palaeoartctic grasslands: a comparative overview. *Bulletin of the Eurasian Dry Grassland Group* 31: 12–26.
- Dengler, J., Boch, S., Filibeck, G., Chiarucci, A., Dembicz, I., Guarino, R., Henneberg, B., Janišová, M., Marcenò, C., (...) & Biurrun, I. 2016b. Assessing plant diversity and composition in grasslands across spatial scales: the standardised EDGG sampling methodology. *Bulletin of the Eurasian Grassland Group* 32: 13–30.
- Dengler, J., Wagner, V., Dembicz, I., García-Mijangos, I., Naqinezhad, A., Boch, S., Chiarucci, A., Conradi, T., Filibeck, G., (...), Biurrun, I. 2018. GrassPlot – a database of multi-scale plant diversity in Palaeoartctic grasslands. *Phytocoenologia* 48: 331–347.
- Fayvush, G. & Aleksanyan, A. 2016. *Habitats of Armenia*. Zangak, Yerevan, AM.
- Filibeck, G., Cancellieri, L., Sperandii, M.G., Belonovskaya, E., Sobolev, N., Tsarevskaya, N., Becker, T., Berastegi, A., Bückle, C. (...) & Biurrun, I. 2018. Biodiversity patterns of dry grasslands in the Central Apennines (Italy) along a precipitation gradient: experiences from the 10th EDGG Field Workshop. *Bulletin of the Eurasian Grassland Group* 36: 25–41.
- Kuzemko, A.A., Becker, T., Didukh, Y.P., Ardelean, I.A., Becker, U., Beldean, M., Dolnik, C., Jeschke, M., Naqinezhad, A., (...) & Dengler, J. 2014. Dry grassland vegetation of Central Podolia (Ukraine) – a preliminary overview of its syntaxonomy, ecology and biodiversity. *Tuexenia* 34: 391–430.
- Kuzemko, A.A., Steinbauer, M.J., Becker, T., Didukh, Y.P., Dolnik, C., Jeschke, M., Naqinezhad, A., Uğurlu, E., Vassilev, K. & Dengler, J. 2016. Patterns and drivers of phytodiversity of steppe grasslands of Central Podolia (Ukraine). *Biodiversity and Conservation* 25: 2233–2250.
- Magnes, M., Mayrhofer, H., Kirschner, P., Stöhr, O., Schwager, P., Dengler, J. & Biurrun, I. 2018. Invitation and guide to the 11th EDGG Field Workshop. Grasslands of inneralpine dry valleys: part 1, Eastern Alps. Austria, 6–13 July 2018. *Bulletin of the Eurasian Dry Grassland Group* 36: 12–25.
- Mucina, L., Bülmann, H., Dierßen, K., Theurillat, J.-P., Raus, T., Čarni, A., Šumberová, K., Willner, W., Dengler, J., (...) & Tichý, L. 2016. Vegetation of Europe: Hierarchical floristic classification system of vascular plant, bryophyte, lichen, and algal communities. *Applied Vegetation Science* 19, Supplement 1: 3–264.
- Pedashenko, H., Apostolova, I., Boch, S., Ganeva, A., Janišová, M., Sopotlieva, D., Todorova, S., Ünal, A., Vassilev, K., (...) & Dengler, J. 2013. Dry grasslands of NW Bulgarian mountains: first insights into diversity, ecology and syntaxonomy. *Tuexenia* 33: 309–346.
- Polchaninova, N., García-Mijangos, I., Berastegi, A., Dengler, J. & Biurrun, I. 2018. New data on the spider fauna (*Araneae*) of Navarre, Spain: results from the 7th EDGG Field Workshop. *Arachnology Letters* 56: 17–23.
- Polyakova, M.A., Dembicz, I., Becker, T., Becker, U., Demina, O.N., Ermakov, N., Filibeck, G., Guarino, R., Janišová, M., (...) & Dengler, J. 2016. Scale- and taxon-dependent patterns of plant diversity in steppes of Khakassia, South Siberia (Russia). *Biodiversity and Conservation* 25: 2251–2273.
- Schaminée, J.H.J., Chytrý, M., Dengler, J., Hennekens, S.M., Janssen, J.A.M., Jiménez-Alfaro, B., Knollová, I., Landucci, F., Marcenò, C. (...) & Tichý, L. 2016. *Development of distribution maps of grassland habitats of EUNIS habitat classification*. European Environment Agency [Report EEA/NSS/16/005], Copenhagen, DK.
- Takhtajyan A.L. 1986. *Floristic regions of the world*. University of California Press, Berkeley, CA, US.
- Tamanyan K. G. & Fayvush G. M. 2009. On the problem of floristic regions of Armenia. *Flora, Vegetation and Plant Resources of Armenia* 17: 73–78.
- Turtureanu, P.D., Palpurina, S., Becker, T., Dolnik, C., Ruprecht, E., Sutcliffe, L.M.E., Szabó, A. & Dengler, J. 2014. Scale- and taxon-dependent biodiversity patterns of dry grassland vegetation in Transylvania (Romania). *Agriculture, Ecosystems & Environment* 182: 15–24.
- Wiesner, L., Baumann, E., Weiser, F., Beierkuhnlein, C., Jentsch, A. & Dengler, J. 2015. Scale-dependent species diversity in two contrasting dry grassland types of an inner alpine dry valley (Cogne, Aosta Valley, Italy). *Bulletin of the Eurasian Dry Grassland Group* 29: 10–17.
- Willner, W., Kuzemko, A., Dengler, J., Chytrý, M., Bauer, N., Becker, T., Bita-Nicolae, C., Botta-Dukát, Z., Čarni, A., (...) & Janišová, M. 2017. A higher-level classification of the Pannonian and western Pontic steppe grasslands (Central and Eastern Europe). *Applied Vegetation Science* 20: 143–158.
- Willner, W., Roleček, J., Korolyuk, A., Dengler, J., Chytrý, M., Janišová, M., Lengyel, A., Aćić, S., Becker, T., (...) & Yamalov, S. 2019. Formalized classification of the semi-dry grasslands of central and eastern Europe. *Preslia* 91: 25–49.

Jürgen Dengler (juergen.dengler@zhaw.ch)

Jamyra Gehler (jamyra.gehler@zhaw.ch)

Alla Aleksanyan (alla.alexanyan@gmail.com)

Georgi Fayvush (gfoyvush@yahoo.com)

Idoia Biurrun (idoia.biurrun@ehu.es)