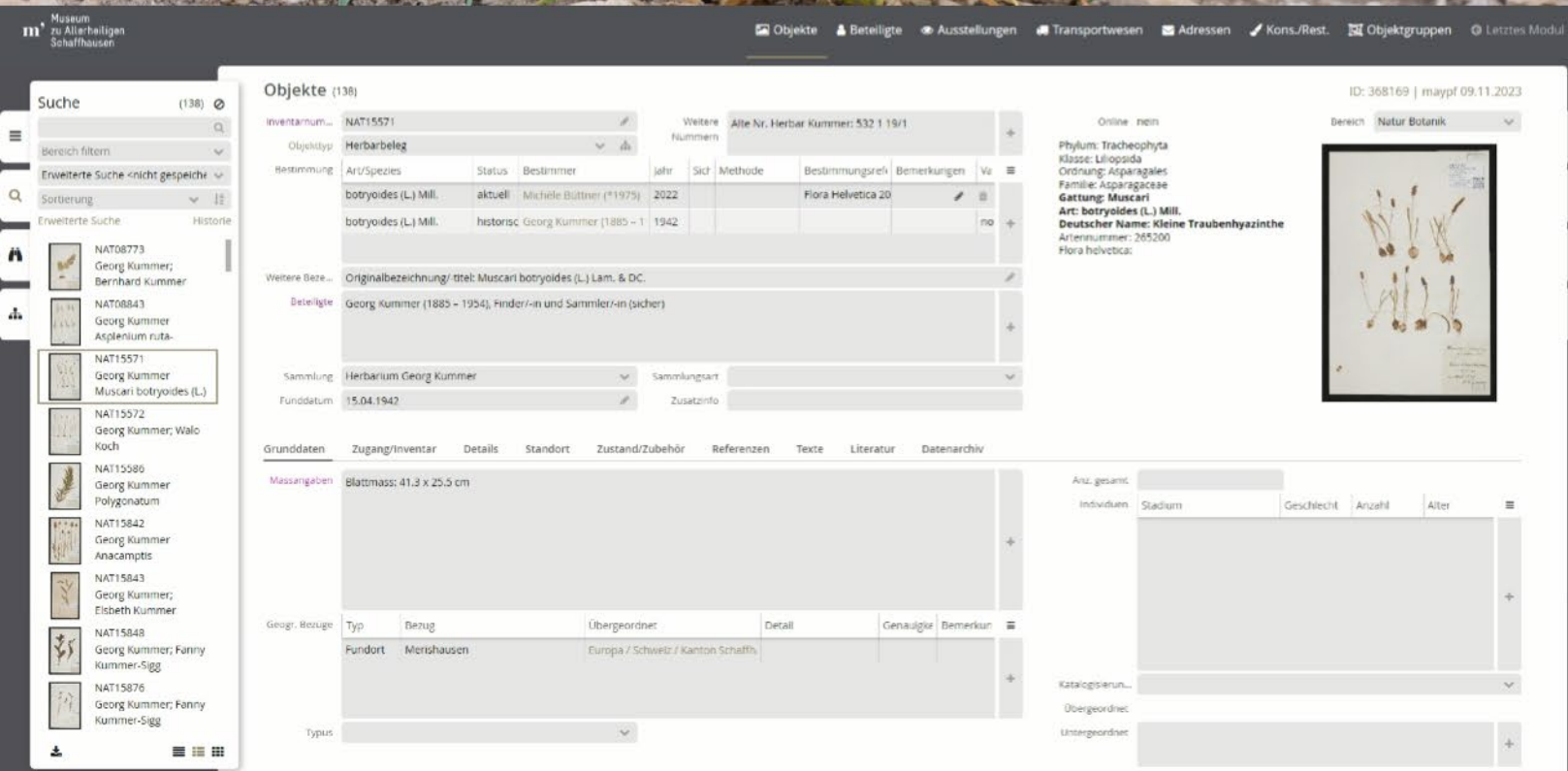
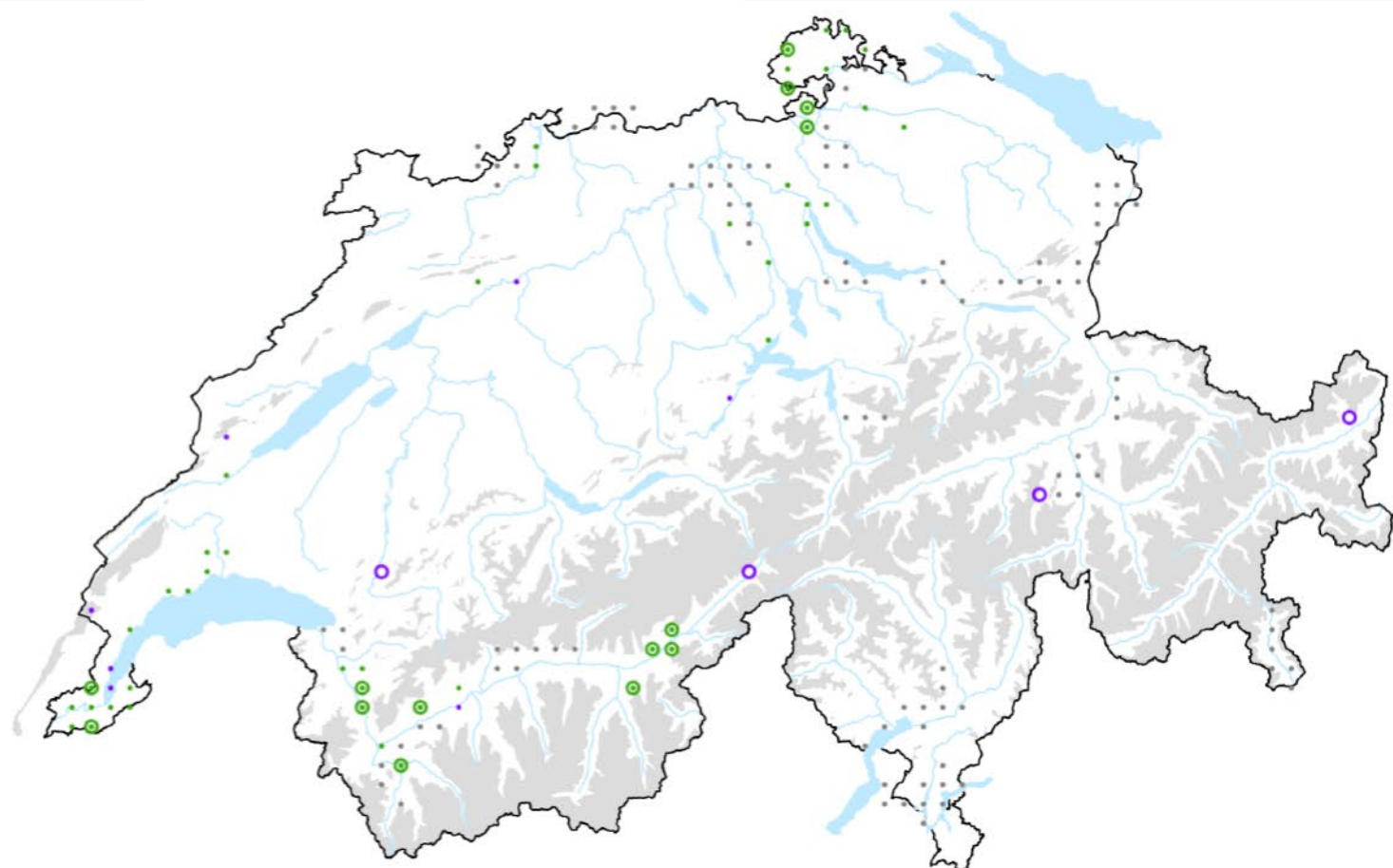




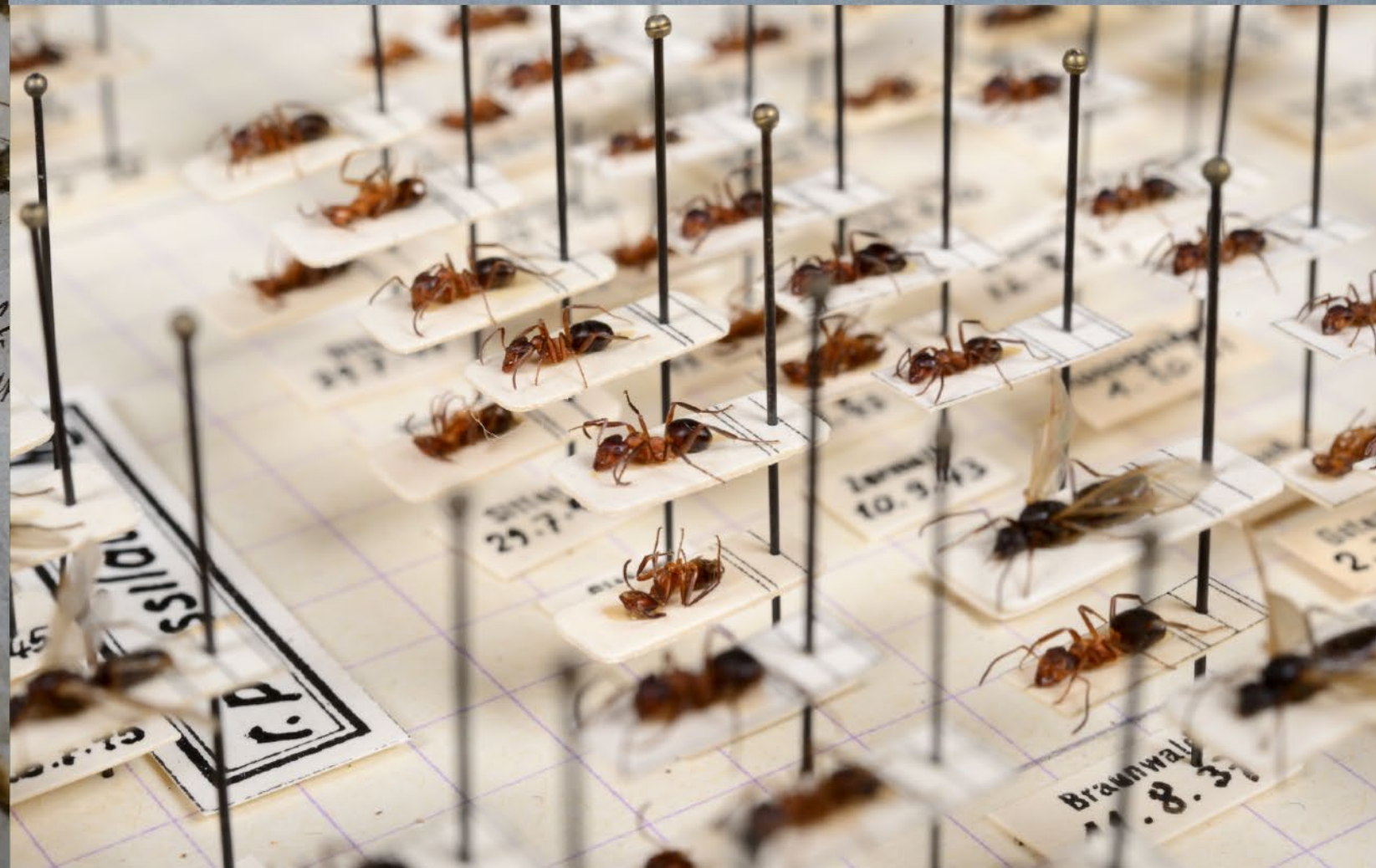
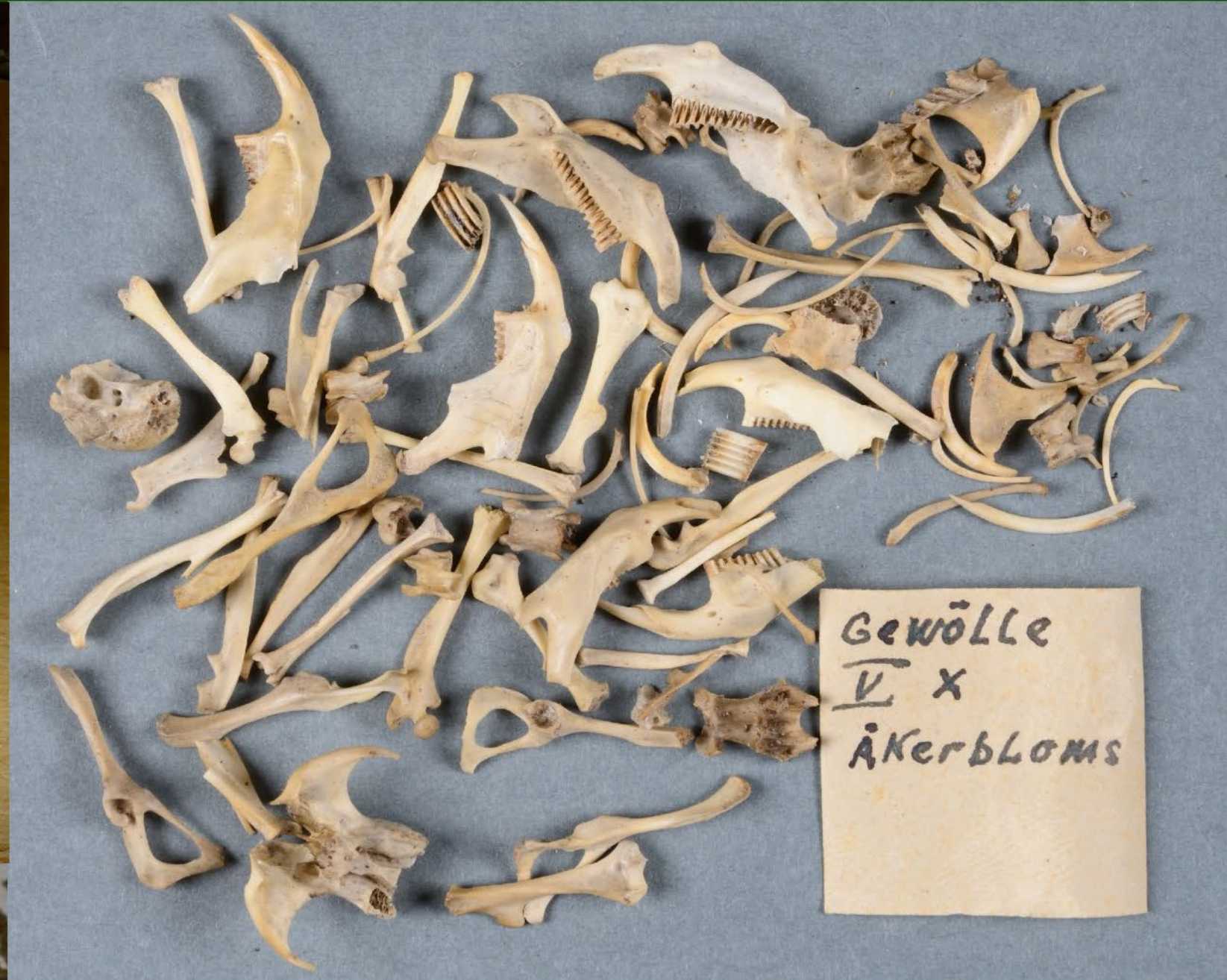
# Digitalisierung historischer Herbarien



Wie kommt die Pflanze in den  
Computer und weshalb?



Dr. Urs Weibel, Museum zu Allerheiligen Schaffhausen



Von museal zu digital  
60 Mio. naturwissen-  
schaftliche Objekte in  
Schweizer Museen,  
Botanischen Gärten,  
Universitäten

Bewahren, erschliessen  
und zugänglich machen

# Schaffhauser Sammlungen



Rund 150'000 naturwissenschaftliche Objekte im Museum zu Allerheiligen, davon je ein Drittel geologische, zoologische und botanische Objekte.



# Zwei Schaffhauser Herbarien

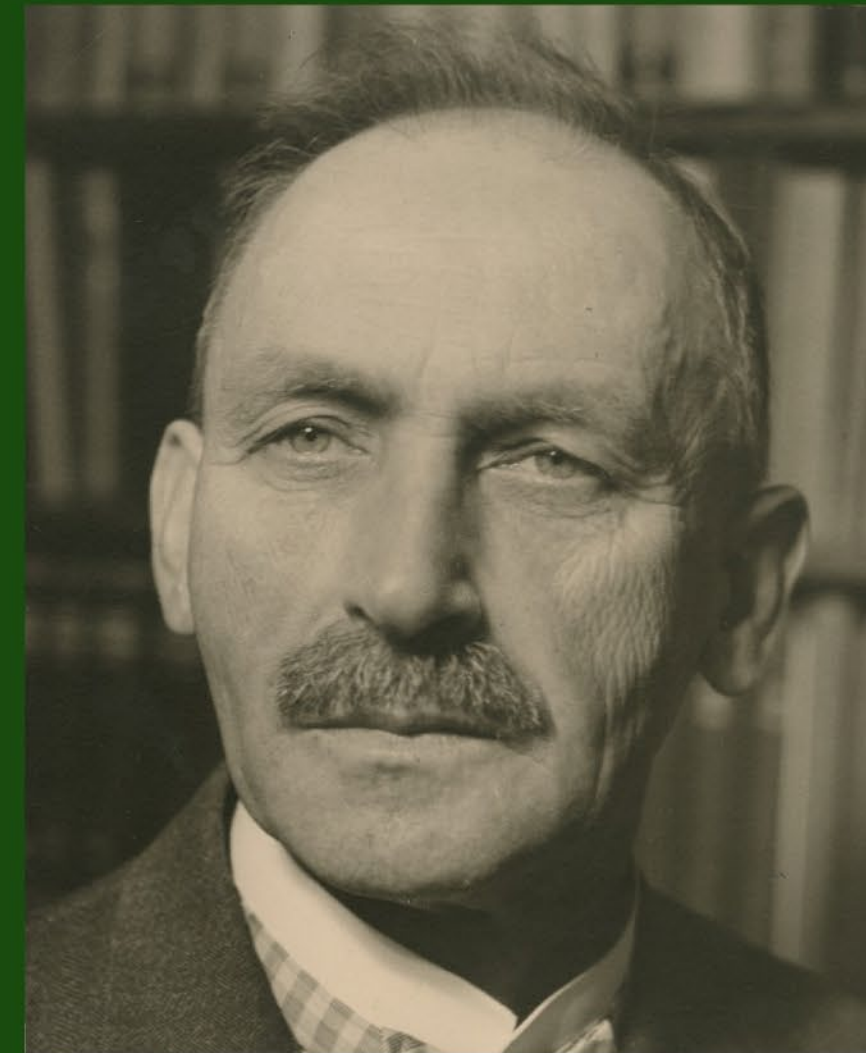
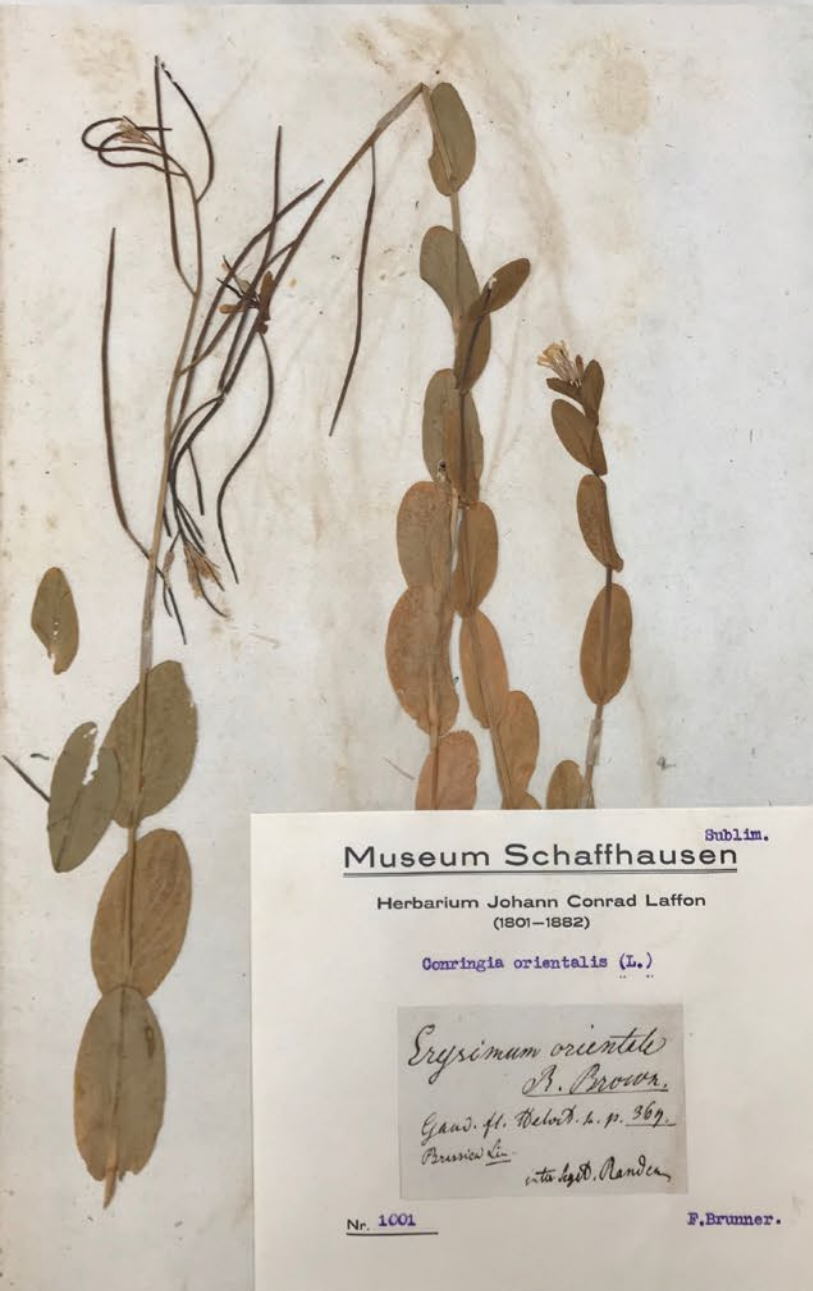


Johann Conrad Laffon

1801 – 1882

Ca. 1000 Arten  
Ca. 2000 Belege  
Schaffhausen  
Um 1830 – 1845

Gedruckte Flora

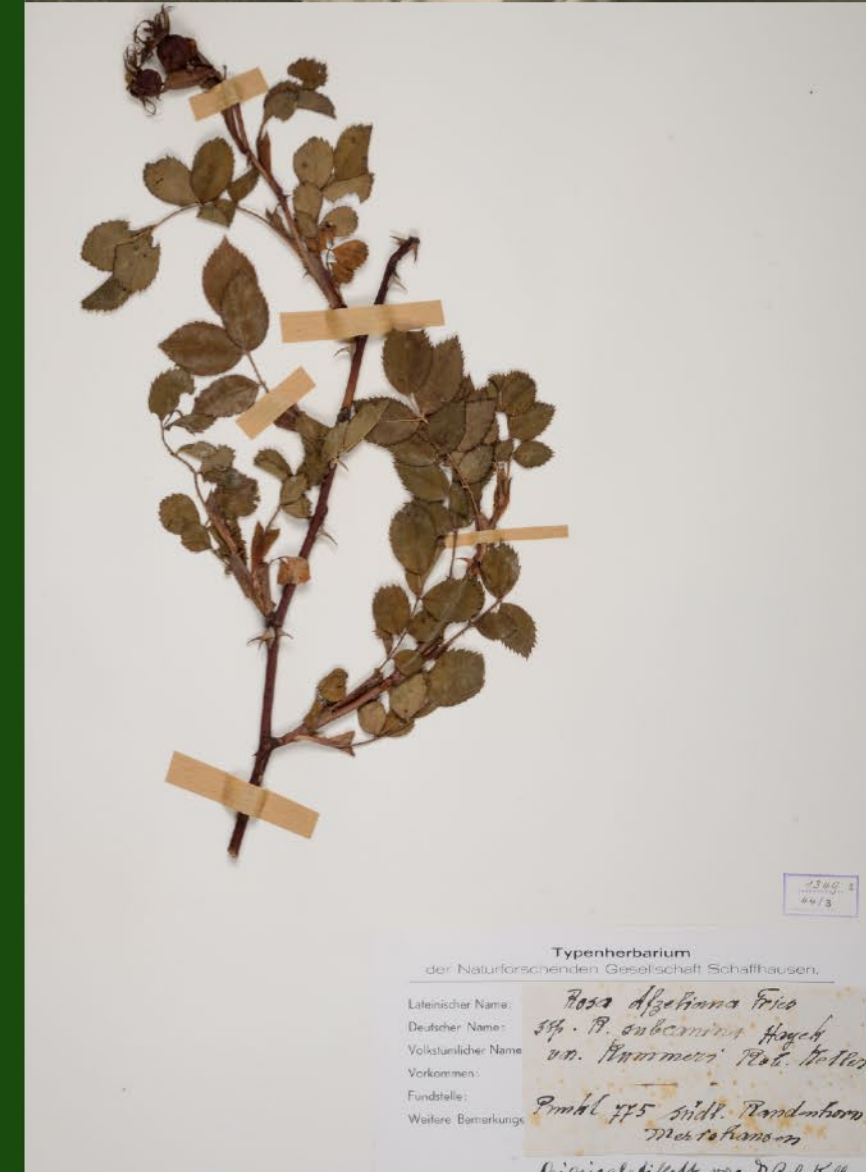


Georg Kummer

1885 – 1954

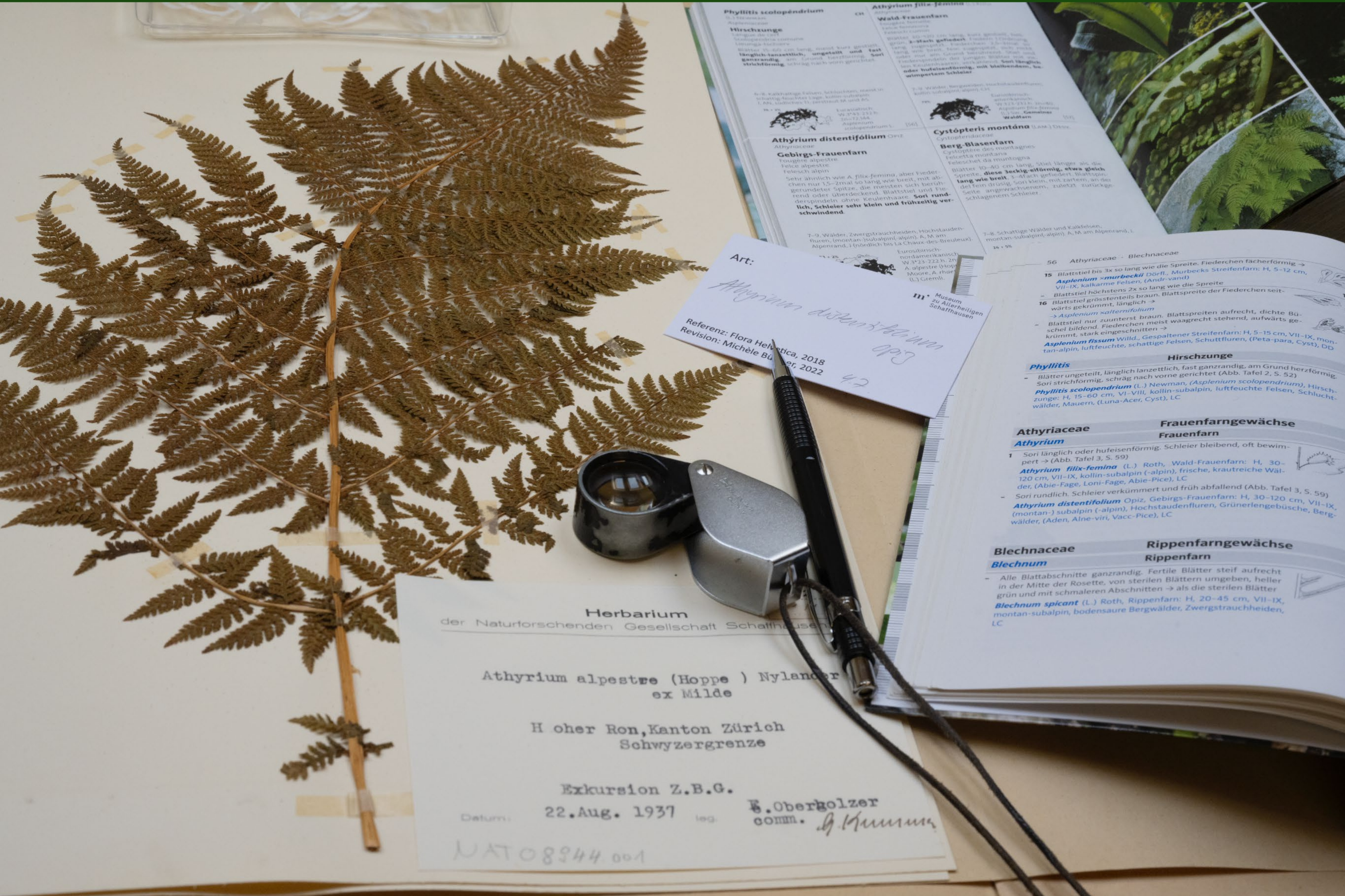
Ca. 2000 Arten  
Ca. 5000 Belege  
Schaffhausen und Schweiz  
Um 1925 – 1950

Gedruckte Flora

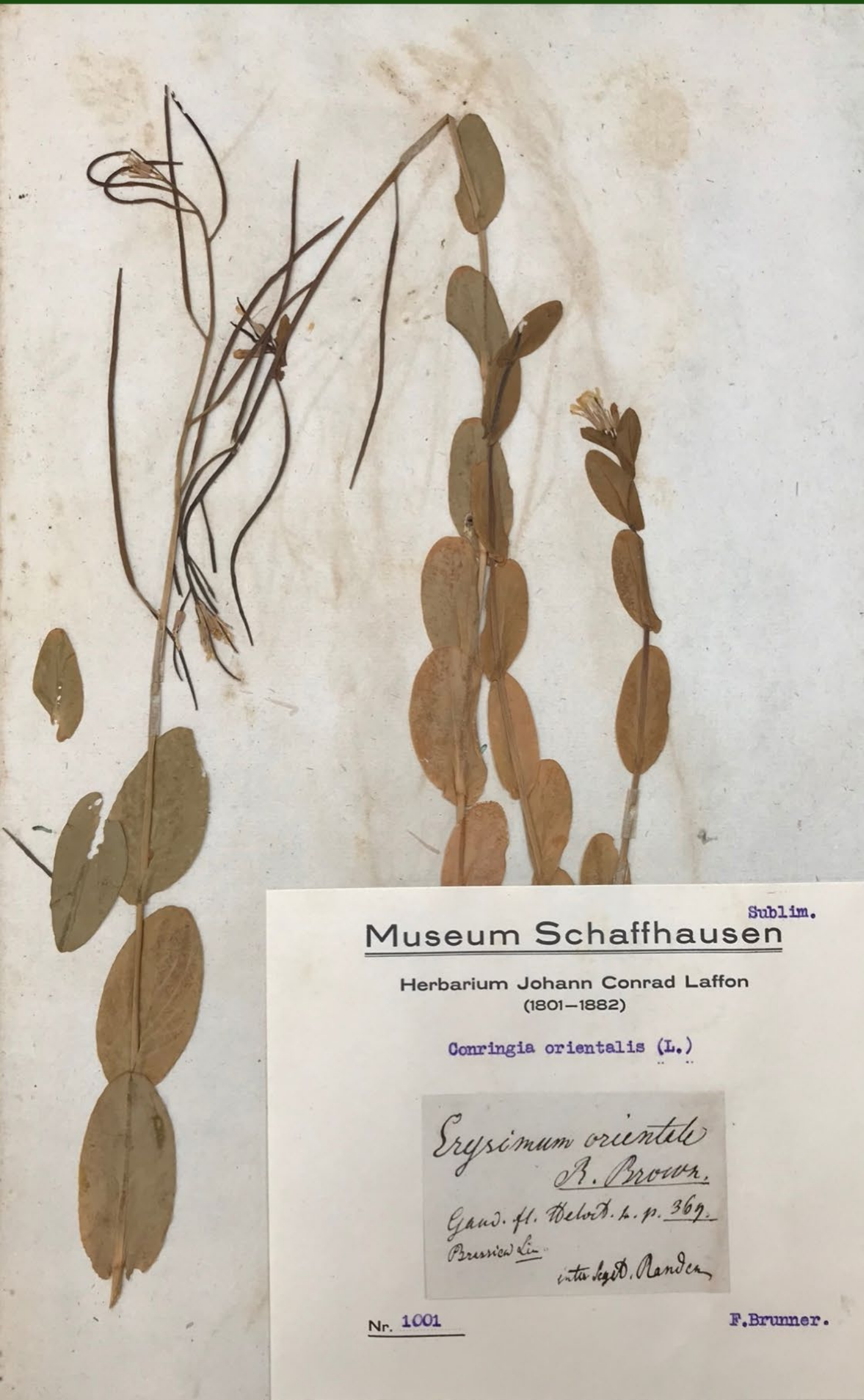


# Digitalisierung 1/6

## Revidieren



# Digitalisierung 2/6



## Montieren

# Digitalisierung 3/6

Suche (138)

Bereich filtern

Erweiterte Suche <nicht gespeichert>

Sortierung

Erweiterte Suche Historie

Melampyrum cristatum  
NAT17868.002  
Georg Kummer  
Melampyrum cristatum  
NAT17870  
Georg Kummer;  
Elsbeth Kummer  
NAT17892  
Georg Kummer  
Orobanche lutea  
NAT17893  
Georg Kummer  
Orobanche lutea  
NAT17894  
Georg Kummer  
Orobanche lutea  
NAT17895  
Georg Kummer  
Orobanche lutea  
NAT17897  
Georg Kummer  
Orobanche lutea  
NAT17898  
Georg Kummer  
Orobanche lutea

Objekte (138)

Inventarum... NAT17894 Weitere Nummern Alte Nr. Herbar Kummer: 2169 1 59

Objekttyp Herbarbeleg

Bestimmung

Art/Spezies	Statu	Bestimmer	Jahr	Sir	Methode	Bestimmung	Bemerkung	V
lutea Baumg.	aktuel	Michèle Büttner (*)	2023			Flora Helvetica		ye
lutea Baumg.	histor	Georg Kummer (1)	1943					no

Weitere Bezeichnung/-titel: Orobanche lutea Baumg.

Beteiligte Georg Kummer (1885 - 1954), Finder/-in und Sammler/-in (sicher)

Sammlung Flora des Kantons Schaffhausen Sammlungsart

Funddatum 21.06.1943 Zusatzinfo

Phylum: Tracheophyta  
Klasse: Magnoliopsida  
Ordnung: Lamiales  
Familie: Orobanchaceae  
**Gattung: Orobanche**  
**Art: lutea Baumg.**  
**Deutscher Name: Gelber Würger**  
Artennummer: 285700  
Flora helvetica:

Online nein Bereich Natur Botanil

Bild auswählen

Grunddaten Zugang/Inventar Details Standort Zustand/Zubehör Referenzen Texte Literatur Datenarchiv

Massangaben Blattmass: 41.3 x 25.5 cm

Anz. gesamt  
Individuen Stad

Geogr. Bezüge

Typ	Bezug	Übergeordnet	Detail	Genau	Bemer
Fundort	Merishausen	Europa / Schweiz / Kantc			Auf den

Typus

Muscari botryoides (L.) Lam. & DC.  
Hagen Merishausen  
914 m  
15. April 1943.  
G. Kummer.

532  
1911

## Inventarisieren

## Museum-plus



# Digitalisierung 3/6

The screenshot displays a digital museum database interface. On the left, a search sidebar shows a list of objects, with 'NAT17894 Georg Kummer Orobanche lutea' highlighted. The main area shows the 'Objekte (138)' list with columns for inventory number, object type, determination, and date. Below this is a 'Grunddaten' section with tabs for 'Zugang/Inventar', 'Details', 'Standort', 'Zustand/Zubehör', 'Referenzen', 'Texte', 'Literatur', and 'Datenarchiv'. The 'Standort' tab is active, showing 'Blattmass: 41.3 x 25.5 cm'. A 'Geogr. Bezüge' window is open, showing details for 'Fundort' (Merishausen) and 'Original-Bezeichnung' (Auf Blasen Merishausen). A 'Standortgeschichte' window is also open, showing 'Standort Art' (Präsent (Depotplatz MzA)), 'Status' (Aktuell), and 'Standort' (K.5.02.BOT.33.02). The 'Bemerkungen' field in the 'Geogr. Bezüge' window contains the text: 'Auf den Randenwiesen Emmerberg-Annabuck, Osterberg, Thüle, Berglen, Blasen, Randenhorn und Hagen Merishausen 1943 an vielen Stellen nachgewiesen'. The interface includes various navigation and editing icons at the bottom.

**Objekte (138)**

Inventarnum...	Objekttyp	Bestimmung	Weitere Nummern
NAT17894	Herbarbeleg	lutea Baumg.	Alte Nr. Herbar Kummer: 2169 1
		lutea Baumg.	

**Grunddaten** | Zugang/Inventar | Details | **Standort** | Zustand/Zubehör | Referenzen | Texte | Literatur | Datenarchiv

**Standort**

Blattmass: 41.3 x 25.5 cm

**Geogr. Bezüge**

Typ	Bezug	Übergeordnet	Detail	Genau	Bemer
Fundort	Merishausen	Europa / Schweiz / Kantc			Auf den

**Standortgeschichte**

Standort Art: Präsent (Depotplatz MzA) | Status: Aktuell

Von: 01.01.2002 | Bis: dd.MM.yyyy

Standort: K.5.02.BOT.33.02

Bemerkungen: Auf den Randenwiesen Emmerberg-Annabuck, Osterberg, Thüle, Berglen, Blasen, Randenhorn und Hagen Merishausen 1943 an vielen Stellen nachgewiesen

Erstellt am 17.01.2023

# Digitalisierung 4/6



Fotografieren

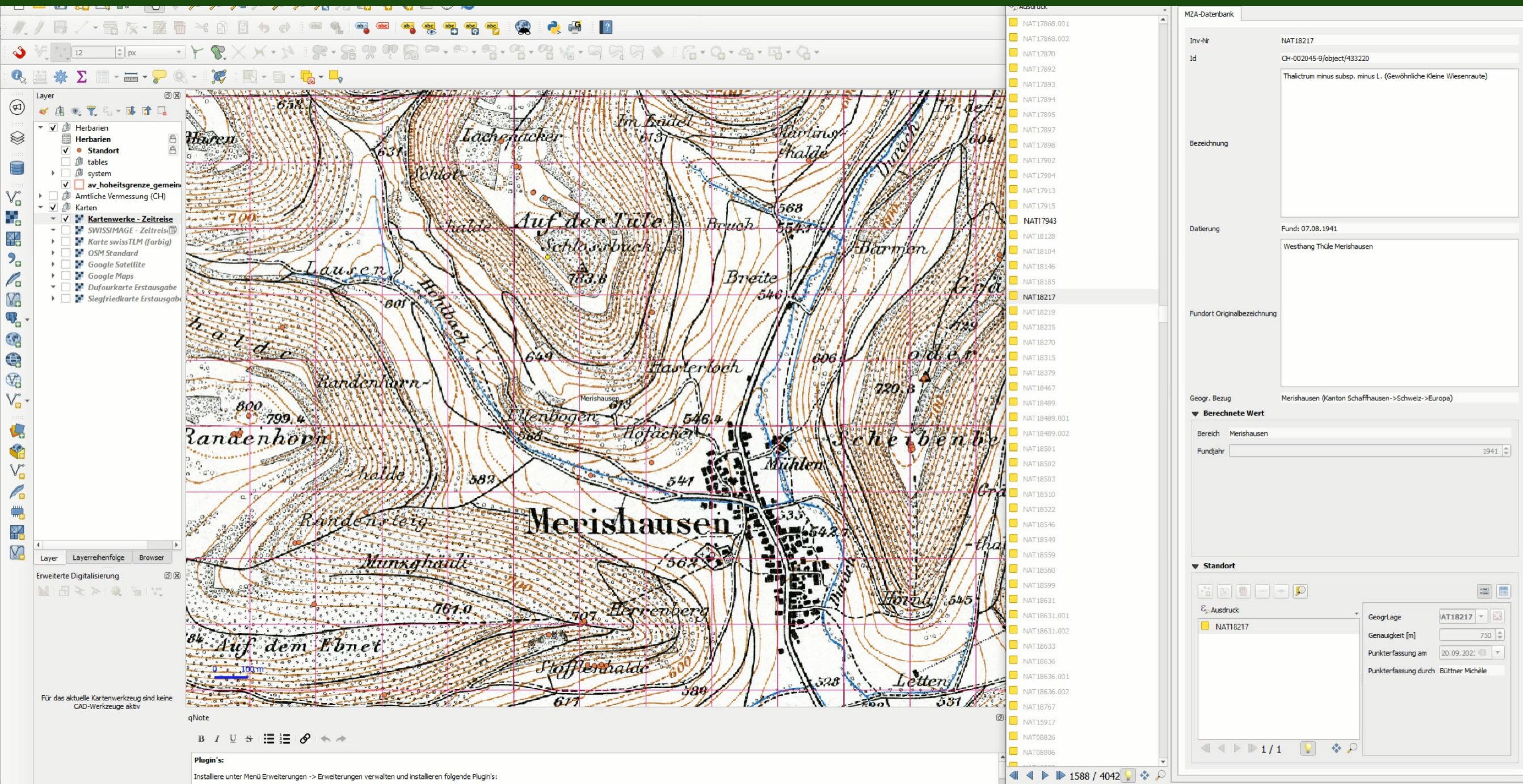
Sensishot

# Digitalisierung 4/6



# Fotografieren

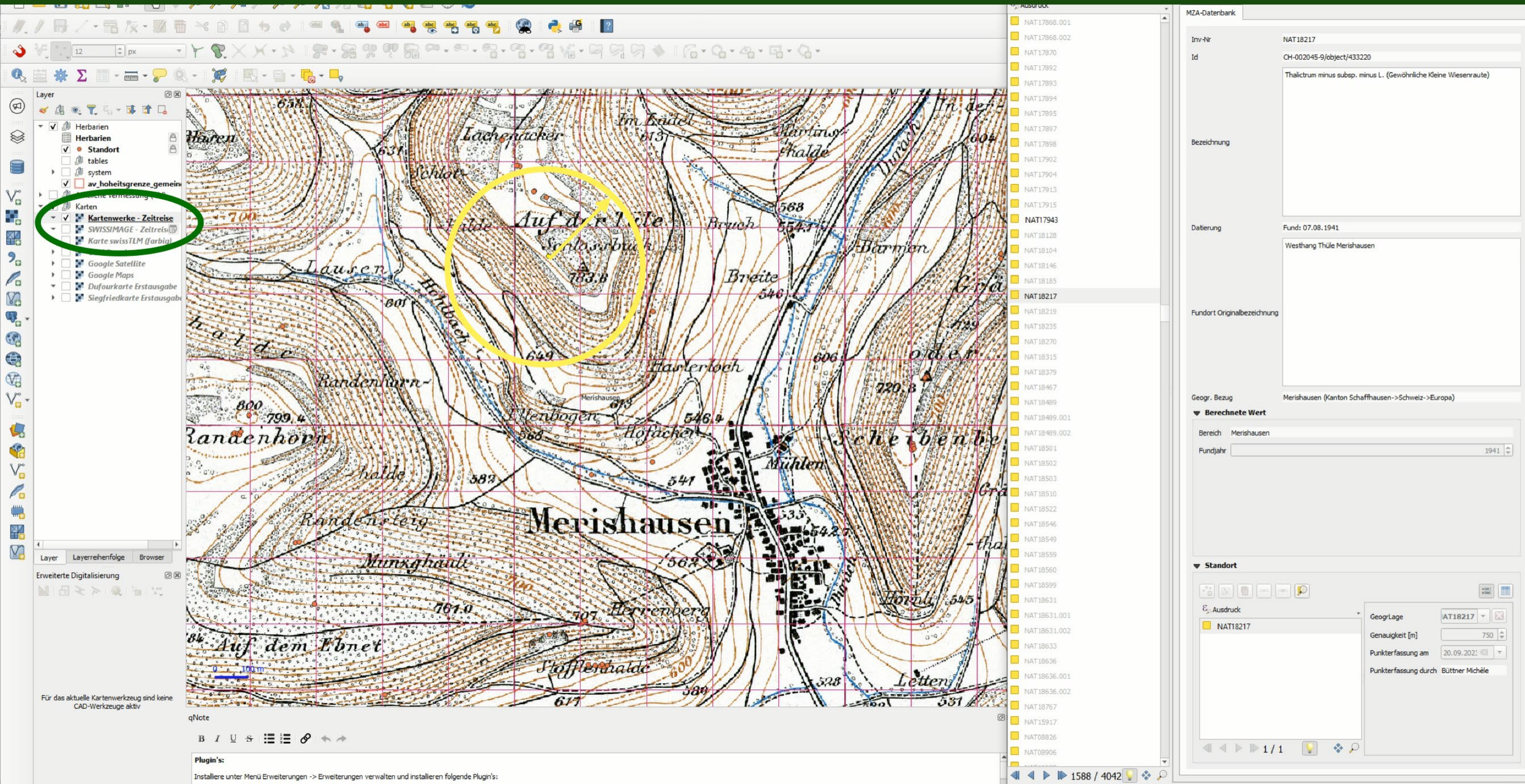
# Digitalisierung 5/6



## Geo- referenzieren

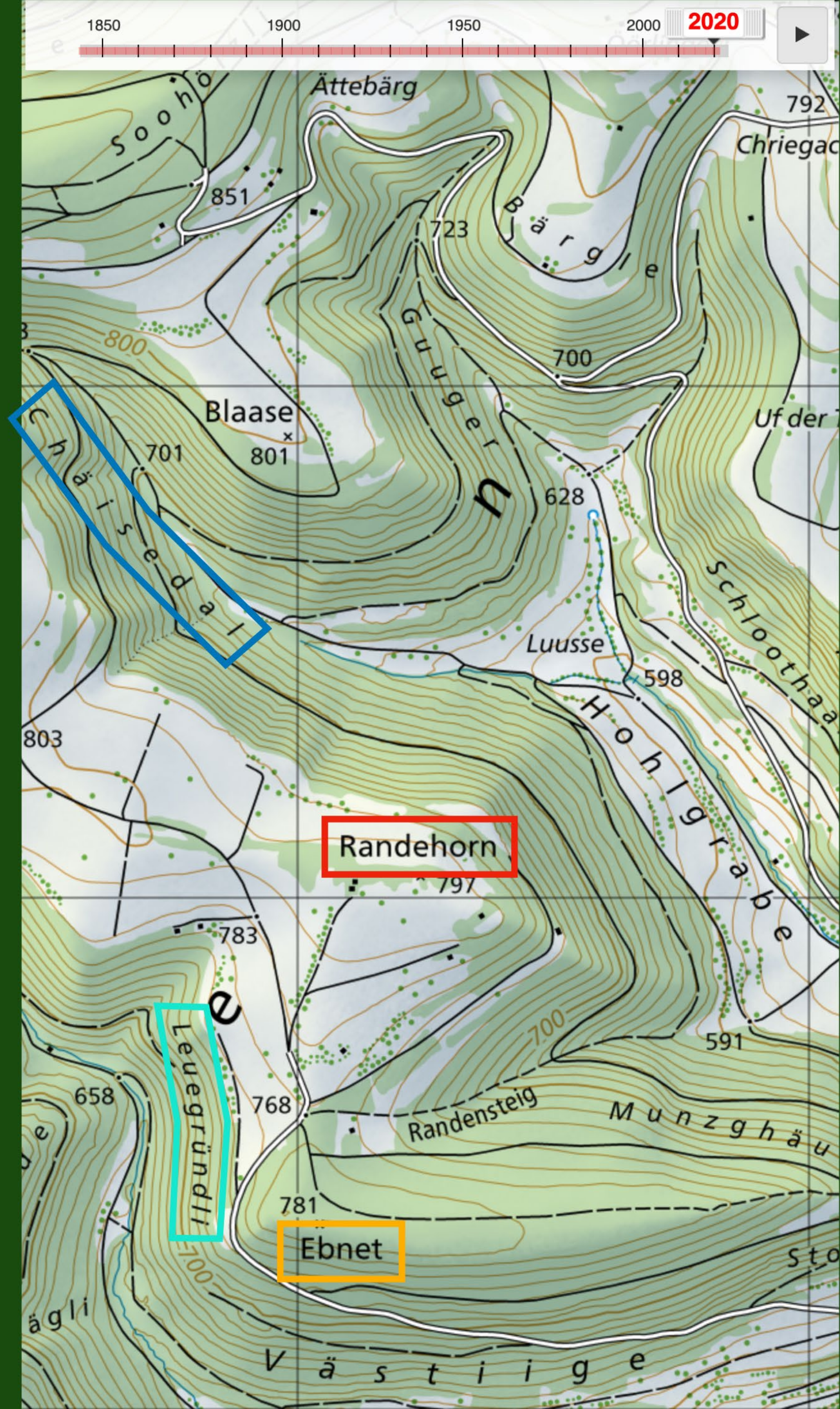
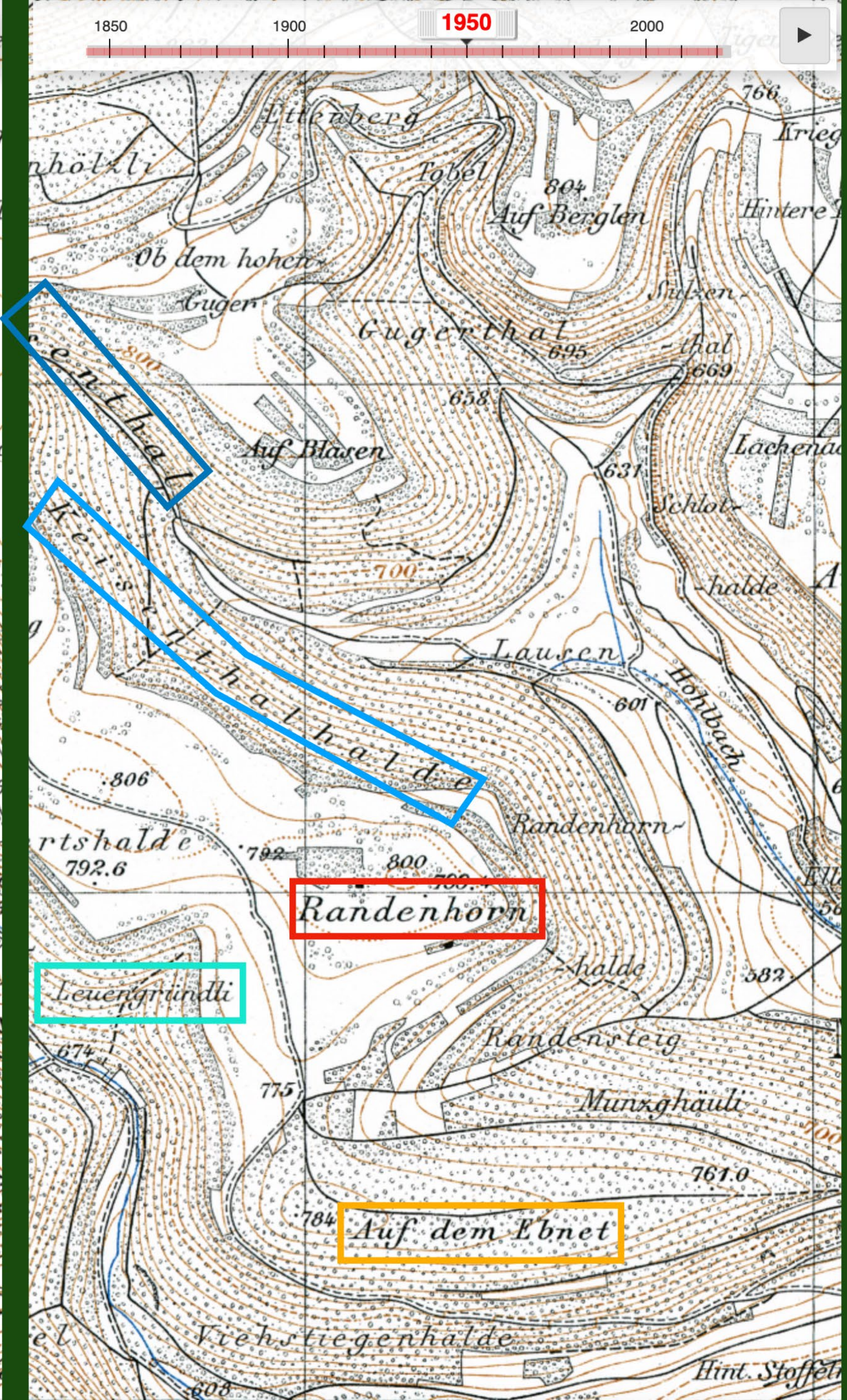
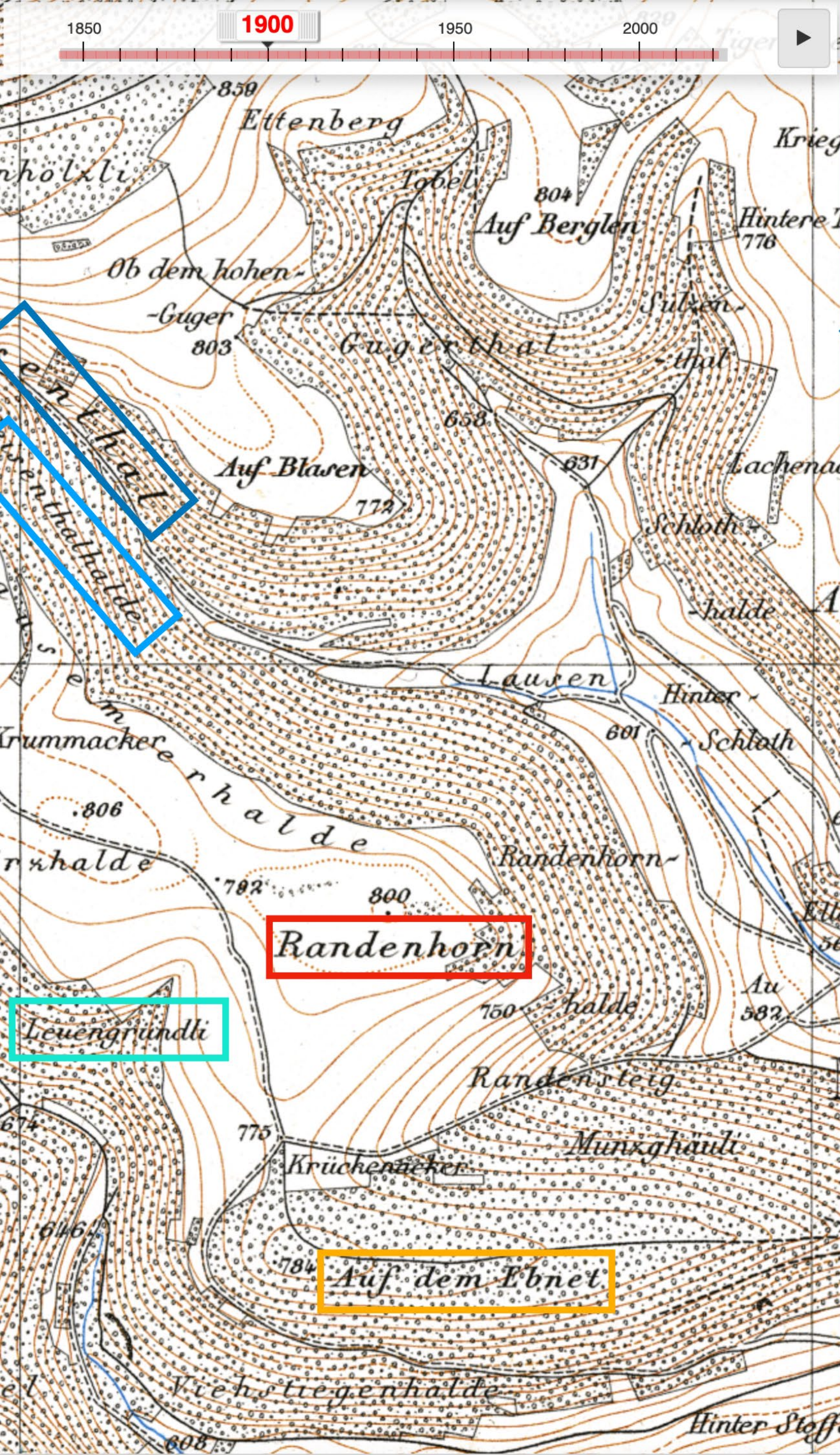
## QGIS

# Digitalisierung 5/6



Geo-  
referenzieren

Fundjahr  
Genauigkeit



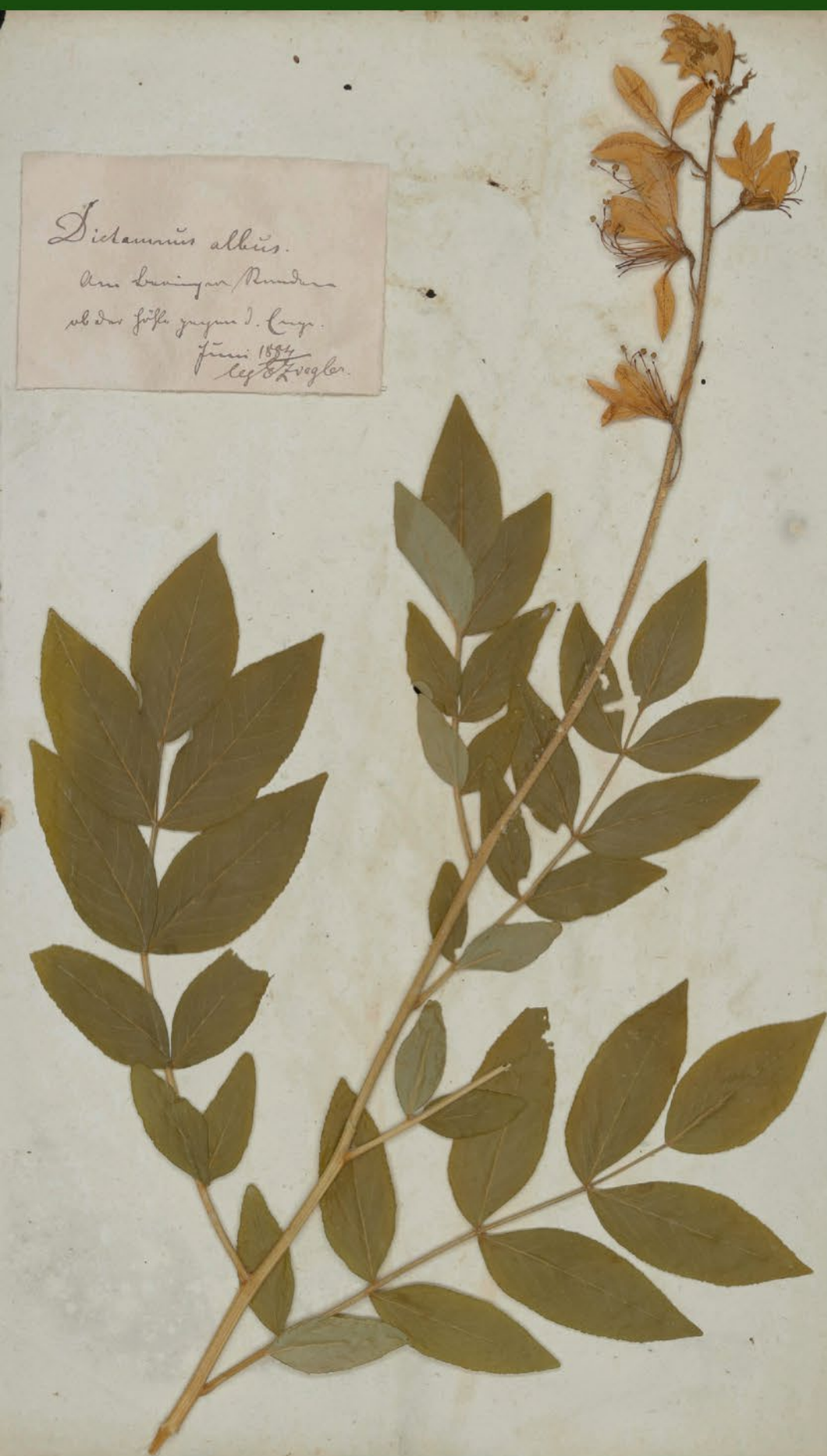
# Digitalisierung 6/6

The screenshot displays a web-based database interface for herbarium specimens. The top navigation bar includes links for 'Objekte', 'Beteiligte', 'Ausstellungen', 'Transportwesen', 'Adressen', 'Kons./Rest.', 'Objektgruppen', and 'Letztes Modul'. The main content area is titled 'Objekte (138)' and shows search filters for 'Suche (138)', 'Bereich filtern', and 'Erweiterte Suche'. The search results table lists specimens with columns for 'Inventarnum.', 'Objekttyp', 'Bestimmung', 'Status', 'Bestimmer', 'Jahr', 'Sichr.', 'Methode', 'Bestimmungsref.', 'Bemerkungen', and 'Va'. Two entries for 'botryoides (L.) Mill.' are visible, one 'aktuell' (2022) and one 'historisc' (1942). A detailed view for specimen ID 368169 is shown on the right, including taxonomic classification (Phylum: Tracheophyta, Klasse: Liliopsida, Ordnung: Asparagales, Familie: Asparagaceae, Gattung: *Muscari*, Art: *botryoides* (L.) Mill., Deutscher Name: Kleine Traubenhyazinthe) and a photograph of the dried plant specimen. Below the specimen details, there are tabs for 'Texte', 'Literatur', and 'Datenarchiv'. Two maps are overlaid on the bottom left: a detailed map of Switzerland with colored dots indicating specimen locations, and a world map with yellow dots showing the global distribution of the species.

## Datenexport

## Online InfoFlora GBIF

# Wieso muss die Pflanze in den Computer?



SwissCollNet

7000 Belege

18 Min. pro Beleg

1 Arbeitsjahr

1000 GB Daten



Alle Herbarien

50'000 Belege

7 Arbeitsjahre

7000 GB Daten



# Glücksfall Herbarium Laffon

Biological Conservation 272 (2022) 109609

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: [www.elsevier.com/locate/biocon](http://www.elsevier.com/locate/biocon)

**A 150-year-old herbarium and floristic data testify regional species decline**

Michèle Büttner <sup>a,\*</sup>, Urs Weibel <sup>a</sup>, Michael Jutzi <sup>b</sup>, Ariel Bergamini <sup>c</sup>, Rolf Holderegger <sup>c,d</sup>

<sup>a</sup> Museum zu Allerheiligen, Schaffhausen, Switzerland  
<sup>b</sup> Info Flora, Bern, Switzerland  
<sup>c</sup> WSL Swiss Federal Research Institute, Birmensdorf, Switzerland  
<sup>d</sup> ETH Zürich, Department of Environmental Systems Science, Zurich, Switzerland

**ARTICLE INFO**

**Keywords:**  
 Floristic decline  
 Habitat change  
 Herbarium specimen  
 Species extinction  
 Pioneer plants  
 Wetlands

**ABSTRACT**

Old herbarium specimens and historical floristic data give insight into regional floras for given time periods. They often cover historical time periods for which few other data are available. Herbaria thus allow the study of changes of the flora of a region across time. Using a 150-year-old regional herbarium together with a historical publication, we investigated to which extent the flora of the Swiss canton of Schaffhausen has changed, which habitats were particularly affected by local extinction, what the environmental requirements of extinct plants were and whether conclusions about the respective drivers such as land use change can be drawn. A total of 987 species were historically recorded in the study region of which 154 are currently no longer reported and are regionally extinct. This means that about one species disappeared from the region every year. Species that are currently in a high category of endangerment on the Swiss Red List have declined markedly in the canton of Schaffhausen, showing that Red Lists well portray the endangerment of species. Looking at plant strategies, the more stress-tolerant and less competitive plants have disappeared. In addition, wetland, pioneer, ruderal and mountain species as well as agricultural weeds and light-demanding species showed highest extinction rates. In contrast, forest species had a low extinction rate, and species from fertilized meadows showed no decline. Our evaluation of a regional herbarium helps to inform nature conservation about particularly endangered habitats and possible drivers of species decline.

**1. Introduction**

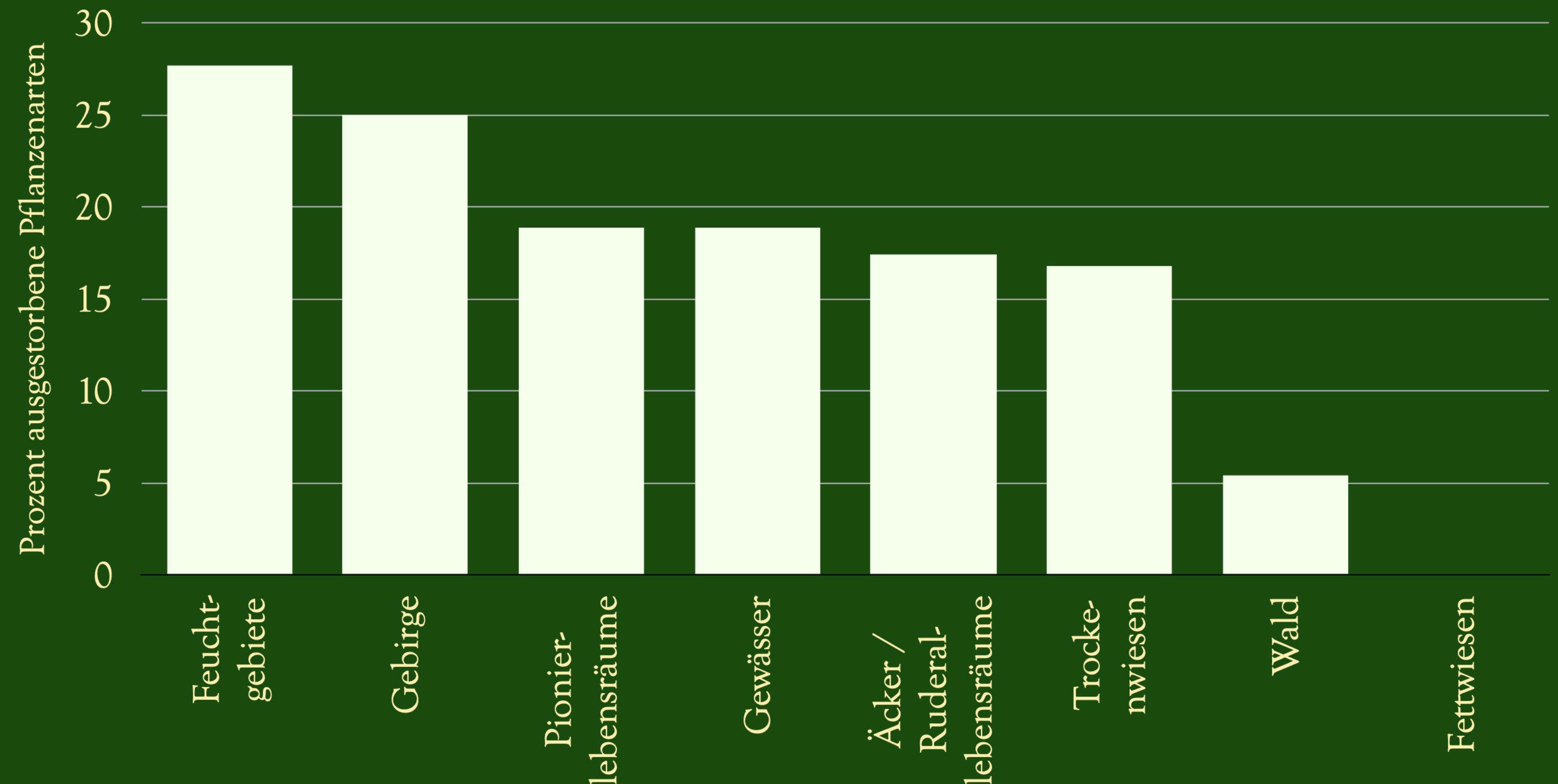
Information taken from herbaria and other biological collections has increasingly been used for a variety of purposes during recent years. There are several reviews (for example Lang et al., 2019; Lavoie, 2013; Pyke and Ehrlich, 2010; Rocchetti et al., 2020; Winker, 2004) on the use of herbaria, a fact which led Heberling et al. (2019) to suggest that we have entered a distinctly new era for the application of museum specimens. Besides traditional uses in systematics, taxonomy and biogeography and newly emerged topics such as DNA analyses, scientists utilise herbaria specimens to conduct research on climate change (e.g. changes in the distribution area of species), patterns of pollution (e.g. historical levels of pollutants) and the spread of non-native species or invasive diseases (e.g. first occurrence and subsequent spread in a country). Likewise, the use of herbarium data to address biodiversity or conservation issues has recently increased, e.g., in documenting species decline or population trends as well as in site selection for protected areas, restoration or reintroduction (Heberling et al., 2019; Lang et al., 2019; Lavoie, 2013; Shaffer et al., 1998; Thiers, 2019; Van Calster et al., 2008). According to Winker (2004) incorporating applied research and conservation issues into their portfolio allows natural history museums to meet societal challenges such as the biodiversity crisis.

With regard to such biodiversity issues, smaller herbaria (<100,000 specimens) often contain information that refers to biodiversity at the regional scale, which is neither found nor duplicated in larger herbaria (Lughadha et al., 2018; Marsico et al., 2020). Furthermore, it is exactly the regional or even the local scale where investigations of changes in biodiversity are especially useful for conservation purposes as practical measures are mostly implemented at these spatial scales (Snow, 2005). A floristic assessment across time, i.e., a comparison of the species occurring in a given region during different time periods can show whether plant species have disappeared and whether their distribution and/or abundance have changed, which gives insights to areas of occupancy and fragmentation, therefore providing information and guidance for conservation actions (Lughadha et al., 2018; Rocchetti et al., 2020). By using herbarium specimens McDonough MacKenzie et al.

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 E-mail address: [michele.buettner@stah.ch](mailto:michele.buettner@stah.ch) (M. Büttner).

<https://doi.org/10.1016/j.biocon.2022.109609>  
 Received 11 January 2022; Received in revised form 5 May 2022; Accepted 23 May 2022  
 0006-3207/© 2022 Elsevier Ltd. All rights reserved.

Von 987 wildwachsenden Pflanzenarten 154  
 ausgestorben/verschollen (16%): pro Jahr eine Art



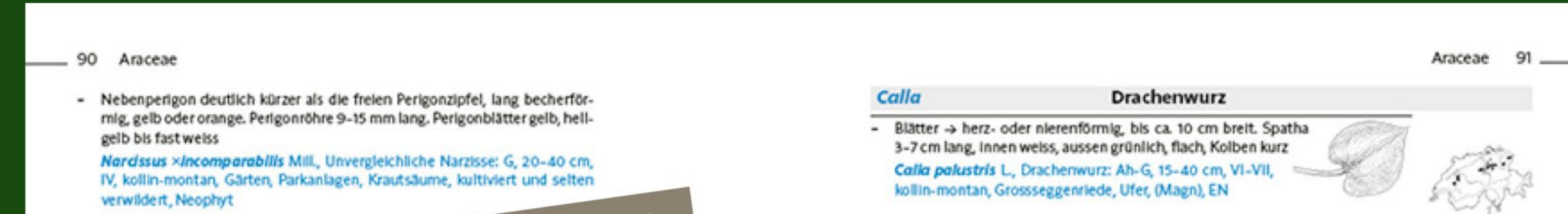
# Wieso muss die Pflanze in den Computer?

Sammlungen sind  
Archive des Lebens  
und der Zukunft

Allgemeinheit

Wissenschaft

Naturschutz



2016 > Umwelt-Vollzug > Rote Listen / Biodiversität

## > Rote Liste Gefässpflanzen

Gefährdete Arten der Schweiz

Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Bundesamt für Umwelt BAFU

info flora

