

## **Swiss Natural History Collections Network (SwissCollNet)**

Annual Report 2021

## **1. Activity report**

### **1.1. Setting up the organization of SwissCollNet by establishing the organisational bodies (Steering Board, Board of Experts, Scientific Unit) and defining the rules of procedures.**

The Steering Board of SwissCollNet has started its activities in January 2021 with 12 Steering Board members (SB). Members of the Steering Board have met for 6 virtual ordinary meetings in 2021. A representative of the Executive Board of SCNAT has assisted the Steering Board meetings and reported its activities to the Executive Board of SCNAT in 6 virtual ordinary meetings.

The Board of Experts has met for 7 virtual ordinary meetings in 2021.

1 joint meeting between the Steering Board and the Board of Experts has taken place virtually.

Furthermore, a working group for data management has been established. 9 national experts and 1 international expert have met 4 times in ordinary virtual meetings.

The Scientific Unit has organised, assisted and reported the meetings for the Steering Board, the Board of Experts and the working group for data management.

The Rules of Procedure have been established by the Steering Board SwissCollNet and have been approved by the Executive Board of SCNAT on August 27<sup>th</sup>, 2021 and have been released upon approval of the State Secretary for Education, Research and Innovation on August 30<sup>th</sup> 2021.

### **1.2. Defining the principles of Funding Procedures and the corresponding regulations.**

A working document describing the 'Principles of Funding procedures' has been prepared by the Board of Experts and the Steering Board. The document has been approved by the Executive Board of SCNAT in April 2021 to serve as foundation for the elaboration of funding regulations for SwissCollNet. The funding regulations have been elaborated by the Steering Board SwissCollNet and have been approved by the Executive Board of SCNAT on August 27<sup>th</sup>, 2021.

### **1.3. Information day**

Based on the 'Principles of funding procedures' an information day with more than 100 participants has been organized for Swiss collection-holding institutions on May 21<sup>st</sup>, 2021. In a first part, members of the Steering Board and the Board of Experts have presented the initiative SwissCollNet and informed about the content of the first call for project proposals. In a second part, the participants met in groups organized in sessions to discuss potential collaborations for the implementation of the initiative SwissCollNet. A feedback report has been written by every coordinator of the 11 sessions.

### **1.4. Recommendations on natural history collections management and quality standards**

In spring 2021, the 'Handbook on natural history collections management' has been published and sent to 360 persons mostly from collection-holding institutions in Switzerland and abroad. It is one of SwissCollNet's first measures to advance the exchange of knowledge on object and data management among Swiss Collections. It contains instructions to modernize natural history collections of preserved biological materials and geological samples developed by experts and

collections managers from across Swiss collection holding institutions. In total, 39 authors from 24 institutions have contributed to content and text of the book.

## 1.5. Digitisation recommendations and standards

With the participation of Holger Frick in the EU COST Action CA17106 "Mobilising Data, Experts and Policies in Scientific Collections – MOBILISE", SwissCollNet secures exchange and having a say on developing and implementing international standards for digitization of specimens, in order to achieve international interoperability and data exchange. The results of MOBILISE will be directly embedded into the Research Infrastructure DiSSCo - Distributed System of Scientific Collections – and will serve the community by ensuring their sustainable value and further development in the long term.

With the "Handbook on natural history collections management – A collaborative Swiss perspective", SwissCollNet has already published recommendations on object storage, collection management and monitoring as well as on databasing, digitization and data storage.

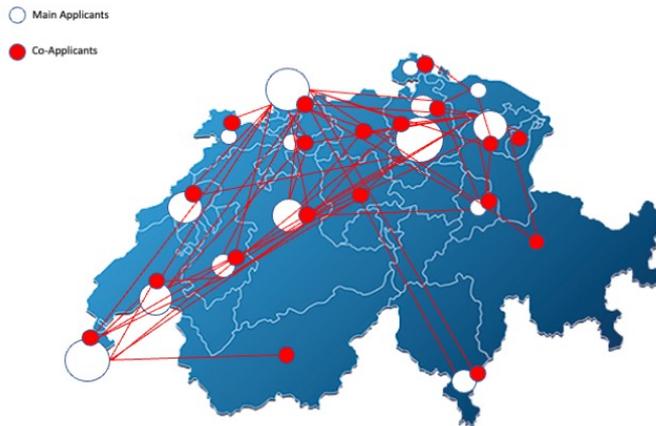
## 1.6. Call for proposals

A call for proposals description for a first call for project applications has been prepared by the Steering Board upon recommendations of the Board of Experts and based on the Funding regulations of SwissCollNet and has been published on September 16<sup>th</sup>, 2021. Applicants from public and non-profit collection-holding institutions were invited to apply for projects focusing on three strategic fields, namely:

- conditioning of collections, following defined standards, to prepare the specimens for digitisation;
- digitizing (databasing and/or imaging) specimens for their future national aggregation;
- promoting training for collection management and taxonomic expertise.

To handle project submission, evaluation and grant management, a commercial IT-tool has been adapted and prepared for project submissions, evaluations, communication with the applicants and life time management of the granted projects (payments, activity and financial reports). Templates and guidelines for project submissions and evaluation of the proposed projects have been prepared. Furthermore, a network of international experts has been built for the evaluation of the project proposals.

49 project proposals have been submitted in December 2021. The proposed projects are of high quality often proposing multiple collaborations between collection-holding institutions. Applicants are distributed across almost all cantons in which public collection-holding institutions are located, main applicants from 14 cantons, co-applicants from 18 cantons. What is striking is the high degree of networking between the institutions, which is evident from the joint project applications (Figure 1).



**Figure 1.** Distribution and proposed collaborations of the 49 applications for projects. Main-applicants (white) are working in public institutions in 14 different cantons, co-applicants (red) are located in 18 cantons of Switzerland. Joint project applications are marked with red lines (from main- to co-applicants).

In Switzerland, there are estimated to be more than 60 million natural history collection objects. Of these, objects from botany and mycology account for approximately 13.5 million (22.3%), zoology 33 million (54.5%), paleontology 12.5 million (20.7%), and geology and mineralogy 1.5 million (2.5%). Applicants indicated which disciplinary areas their project could be assigned to, and several areas could be indicated. Botany and Mycology were chosen by 29.1%, Zoology by 40.3%, Paleontology by 19.3% and Geology and Mineralogy by 11.3%, thus, the disciplinary classification of project applications reflects the number of collection objects maintained in Switzerland per discipline quite well.

### 1.7. SVNHC preparatory phase

A centralized virtual infrastructure for sharing and accessing specimen data and images of the Swiss natural history collections, referred to as the Swiss Virtual Natural History Collection (SVNHC), is a priority goal of SwissCollNet for 2024. The Swiss landscape of the natural history collections is very heterogeneous with respect to the number of collection-holding institutions, the size of their collections and their degree of digitisation (databasing as well as imaging of specimens). As such scientists of the University of Applied Sciences of the Grisons together with experts of collections and data centers (data management working group) have accomplished a preparatory study to evaluate the current situation and the requirements of the institutions in parallel with the technical solutions best adapted for the SVNHC (usability, costs, collaboration and coordination with similar data repositories, sustainability model). The study presents five possible scenarios of which the authors recommend combining two of the scenarios and keep open the possibility to add a third scenario in the future. In summary the recommendations are to coordinate vocabularies and data models among the collections and to focus on the development of already existing infrastructures, invest in their reliability, process automation, linking data between platforms, and to add functionalities where needed. In the future, an 'Enriched Dataset' Linkage Hub could be built, by adding/connecting also DNA and literature data to the infrastructure (Appendix I).

### 1.8. Survey on natural history collections

With the survey on natural history collections, SwissCollNet aims at making information on the diversity and the quality of natural history collections from public Swiss institution accessible at a meta-data level. In partnership with GBIF.ch, a survey following the structure of the Registry of Scientific Collections run by GBIF (GrSCiColl) and with the possibility to connect the collected data with Index Herbariorum has been designed using international identifiers, indicators and standards.

All collection-holding institutions were encouraged to record data of all their collections. For collections benefitting from SwissCollNet funds it was mandatory to record the data of the collections to be worked on. Recorded data information on collection units will be published on GrSCiColl in 2022 and a data synopsis of all the recorded data will be made available for curators working in Switzerland by SwissCollNet. By this, Switzerland will possess an inventory of natural history collections at the meta-data level and the registration in the publication in GrSCiColl will render the collections visible and meta-information about the collections accessible at an international level.

## **1.9. National Strategy for Natural History Collections (2025-2035)**

During the preparatory phase of SwissCollNet, members of the Board of Experts together with 26 collection-holding institutions have prepared a draft for a national strategy for natural history collections. In 2021, a working group has been put in place composed of members of the Board of Experts and the Steering Board. In a first meeting, the draft of the 'collection strategy' was presented and further steps discussed.

## **1.10. Long-term sustainability of SwissCollNet**

In the frame of the Roadmap for Research Infrastructures 2025-2028, the proposal 'SwissSpecimen: making Swiss biobanks and natural history collections accessible to science and society (formerly SwissBioCollections)' has been prepared and submitted for evaluation. The proposed infrastructure is organized around five work packages and upgrades the main missions of SwissCollNet and the Swiss Biobanking platform and is supported by the University of Geneva (host institution), Basel, Bern and Zurich, as well as by two ETHZ departments and 11 natural history museums and botanical gardens in Switzerland. A total of 45 scientists from these institutions, as well as from WSL, the University of Neuchâtel and Swiss Biobank Platform are co-applicants. The requested budget of the SwissSpecimen infrastructure will be matched with the same amount of money by the participating institutions. The infrastructure resulting from the activities of SwissCollNet (2021-2024) will fully be integrated into SwissSpecimen.

## **1.11. Training and education**

Training and education are an integral part of numerous project submissions. Taxonomic expertise as well as knowledge in collection management and databasing will be exchanged by Swiss institutions during the accomplishment of their projects.

Furthermore, the strategy 'Strategie Bildung Artenkenntnisse' has been published by InfoSpecies, the Swiss Systematics Society, HEPIA, ZHAW and sanu ag sa. Members of the Board of Experts of SwissCollNet have participated in a workshop organized by the authors of the strategy to represent SwissCollNet and the collection-holding institutions from Switzerland and give inputs for the strategy.

## **1.12. Communication**

A website has been published on the web-portal of SCNAT containing all the (regularly updated) information on SwissCollNet. In addition, the community was frequently informed and updated with newsletters. In 2021, four newsletters have been published and distributed.

## 2. Financial report

### 2.1. Expenses

During the first year of the construction phase of SwissCollNet (2021), the financial contributions of the SERI were spent to a major part to run the Scientific Unit of SwissCollNet to manage and coordinate the numerous activities described in the activity report. Furthermore, CHF 40'000.- were spent for the preparatory study of the SVNHC. In total, CHF 273'784.- were spent, resulting in a net balance of CHF 2'756'216.- (Table 1, Appendix II).

Contributions of the participants of the initiative (matching funds) consisted mainly in the participation and collaboration of the numerous experts involved either in the governance of SwissCollNet or in collaborative projects such as the collection survey or the preparatory study of the SVNHC. In total, CHF 304'243.- matching funds were invested, resulting in a net balance of CHF 3286957.- (Table 1).

Expenses SwissCollNet		Expenses Matching funds			
Scope	SwissCollNet	Scope	matching funds	in kind (h)	costs/h (Chf)
<b>SwissCollNet Management Scientific Unit</b>		<b>SwissCollNet Management Governance and Working Groups</b>			
Salaries	127'012	Steering Board	93'218	345	270
Social contributions	64'157	Board of Experts	54'900	275	200
Informatics	6'514				
Communication	176	Communication, Information day	21'600	108	200
Layout and copyrights	1'212	Expertise evaluation call1	8'100	30	270
Overhead	34'708	Formation and training	3'200	16	200
Taxes Bank account	4	Strategy 2025-2028	8'400	42	200
Collection survey	0	Collection survey	61'700	309	200
<b>Collection conditioning</b>		<b>Collection conditioning</b>			
Call for proposals	0	Call for proposals	0	0	
<b>Databasing and digitisation</b>		<b>Databasing and digitisation</b>			
Data standards	0	Data standards	30'600	153	200
Preparatory SVNHC	40'000	Preparatory SVNHC	22'525	133	170
Call for proposals	0	Call for proposals	0	0	
<b>Formation and training</b>		<b>Formation and training</b>			
Call for proposals	0	Call for proposals	0	0	
Total	273'784	Total	304'243	1'410	
SERI contributions	-3'030'000	Matching Funds	-3'591'200		
<b>Extraordinary expenditure and income</b>	<b>-2'756'216</b>	<b>Extraordinary expenditure and income</b>	<b>3'286'957</b>		

**Table 1:** Expenses of SCNAT for the SwissCollNet project in 2021 and own contributions (matching funds) by the partner institutions of SwissCollNet. Expenses are divided in the four categories, SwissCollNet Management, Collection conditioning, Databasing and digitisation and Formation and training corresponding to the categories in the "Zusatzprotokoll zur Leistungsvereinbarung 2021-2024 zwischen der Schweizerischen Eidgenossenschaft und den Akademien der Wissenschaften Schweiz.

## 2.2. Balances and cash flow

The available cash from SwissCollNet on December 31<sup>st</sup> 2021 was CHF 2'756216.- (Table 1 & 2, Appendix II). This is mainly due to the fact that a high amount of money has been budgeted to finance projects within the partner institutions (call for proposals), which will only start in 2022 after evaluation of the applications. The expenses for the management of the initiative were slightly higher than budgeted, whereas for the preparatory study of the SVNHC a lower amount than budgeted was spent.

In total, CHF 2'717'000.- have not been used for projects within the partner institutions and will be used in 2022 for this scope. Furthermore, CHF 56'000.- have not been used for the preparation of the SVNHC and the management of SwissCollNet was CHF 16'784.- more expensive than budgeted (Table 2).

### Balance of expenses SwissCollNet

Scope	SwissCollNet Expenses	SwissCollNet Budget	Balance
<b>SwissCollNet Management</b>			
<b>Scientific Unit</b>			
Salaries	127'012	208'000	80'988
Social contributions	64'157	0	-64'157
Informatics	6'514	0	-6'514
Communication	176	5'000	4'824
Layout and copyrights	1'212	0	-1'212
Overhead	34'708	0	-34'708
Taxes Bank account	4	0	-4
Collection strategy	0	2'000	2'000
Collection survey	0	2'000	2'000
<b>Total SwissCollNet Management</b>	<b>233'784</b>	<b>217'000</b>	<b>-16'784</b>
<b>Collection conditioning</b>			
Call for proposals	0	1'000'000	1'000'000
<b>Total Collection conditioning</b>	<b>0</b>	<b>1'000'000</b>	<b>1'000'000</b>
<b>Databasing and digitisation</b>			
Preparatory SVNHC	40'000	96'000	56'000
Call for proposals	0	1'147'000	1'147'000
<b>Total databasing and digitisation</b>	<b>40'000</b>	<b>1'243'000</b>	<b>1'203'000</b>
<b>Formation and training</b>			
Call for proposals	0	570'000	570'000
<b>Total Formation and training</b>	<b>0</b>	<b>570'000</b>	<b>570'000</b>
<b>Total 2021</b>	<b>273'784</b>	<b>3'030'000</b>	<b>2'756'216</b>

**Table 2:** Balance of funds in 2021. The budgeted total amount of money corresponds to the annual instalment of the SERI. Expenses of SwissCollNet are compared to the annual budget of 2021.

Contributions from the partner institutions have to make up 50% of the entire costs of SwissCollNet. For 2021, matching funds were budgeted for CHF 3'591'200. In total, CHF 304'243.- matching funds were invested in 2021, resulting in a difference of CHF 3'286'957.- compared to the budget. This is to a small amount due to the postponement of different activities such as the contributions to the collection survey from the collection institutions and work on the collection strategy and to a major part caused by the lack of contributions to the projects in the collections, as the project applications will only be evaluated at the beginning of 2022 and contributions from accepted grants will be made beginning in 2022 (Table 3). Contributions from SwissCollNet Board members for preparation and submission of the infrastructure proposal SwissSpecimen have not been counted as matching funds.

#### Balance of matching funds SwissCollNet

Scope	Expenses	Budget	Balance
<b>SwissCollNet Management Governance and Working Groups</b>			
Management and coordination (Boards)	156'218	274'000	117'782
Communication, Information day	21'600	20'000	-1'600
Formation and training	3'200	20'000	16'800
Collection strategy	8'400	48'000	39'600
Sustainability SVNHC	0	24'000	24'000
Collection survey	61'700	418'200	356'500
<b>Collection conditioning</b>			
Call for proposals	0	1'000'000	1'000'000
<b>Databasing and digitisation</b>			
Data standards	30'600	0	-30'600
Preparatory SVNHC	22'525	70'000	47'475
Call for proposals	0	1'147'000	1'147'000
<b>Formation and training</b>			
Call for proposals	0	570'000	570'000
<b>Total</b>	<b>304'243</b>	<b>3'591'200</b>	<b>3'286'957</b>

**Table 3:** Balance of matching funds in 2021. The budgeted total amount of matching funds has been estimated at the beginning of 2021. Contributions of partner institutions are compared to the initial budget.

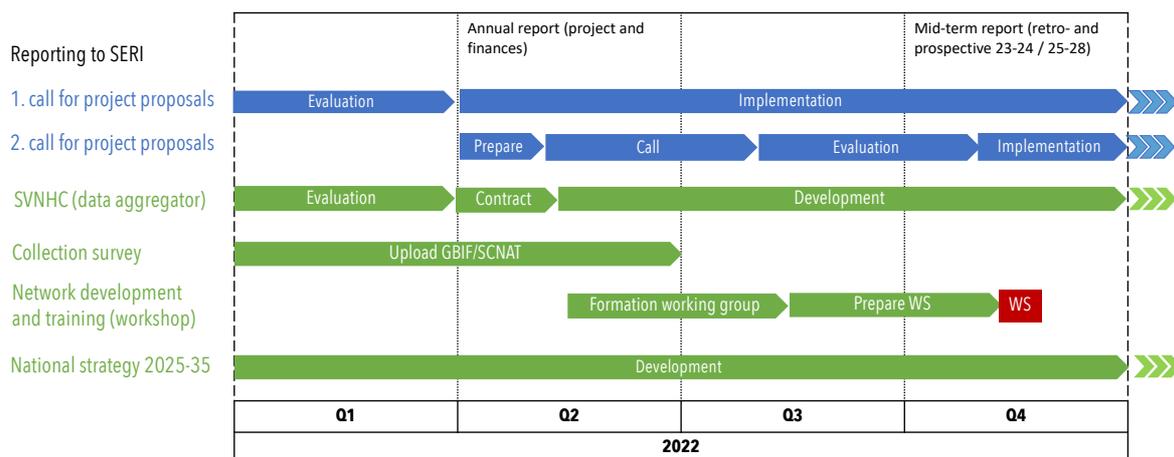
### 3. Synthesis and outlook for activities planned in 2022

In summary, the first year of SwissCollNet resulted in the formation of a firm governance with high expertise in the field of natural history collections. Fundamental work has been performed by formulating funding regulations, rules of procedure, an implementation plan and a first call for project proposals. In addition, procedures and tools for project submissions, evaluation and controlling as well as for financial administration of the project grants have been successfully established. With the preparatory study for the building of the SVNHC, needs and developmental steps have been sharpened and existing structures have been identified for collaboration and further development.

The high number of project submissions and the enormous effort for collaboration between collection-holding institutions of Switzerland is a further indicator for an excellent start and a solid establishment of the initiative SwissCollNet.

The large participation in SwissCollNet as well as the submission of the infrastructure project SwissSpecimen manifest the urgent need to modernise and digitise natural history collections and make them accessible for science and society.

In conclusion, this first year was very satisfactory with many fruitful results representing a strong basis for future activities planned in 2022 and beyond (for projects planned in 2022 see Figure 2).



**Figure 2:** Milestones and projects SwissCollNet 2022.

### 4. Overview and evaluation of the activities performed in the first 15 months of the project

- The governance of SwissCollNet has been successfully established with a Steering Board (12 members) and a Board of Experts (6 members). Working groups and single experts supplement the governance bodies punctually. The meetings are regularly frequented and contributions of the participants are of high quality.
- Procedures and tools for submission of project proposals, evaluation and life time management of supported projects have been established, a first call for projects has been published resulting in a high number of project submissions.
- In the first quarter of 2022, the first call for project proposals has been evaluated and applicants have been informed about the decisions. The thematic as well as the geographic

distribution of the granted projects are very satisfactory, as collections of diverse disciplines will be modernised and digitised in many institutions in nearly all cantons in Switzerland (Figure 3).

- On May 1, SwissCollNet will publish a second call for project proposals. This allows to complement the already accepted projects. Incoming proposals will be evaluated until the end of 2022, accepted project will start early in 2023.
- Different communication tools have been established to reach the collection community but also a larger public. With the highly frequented workshop/information day, the collection community was well primed for the preparation of their project proposals. The webpage SwissCollNet informs about the initiative and is regularly updated. Furthermore, the stakeholders of SwissCollNet are regularly informed about the initiative with the newsletter SwissCollNet and to reach a larger audience, selected information is distributed with the newsletters of SCNAT and the Swiss Academies of arts and sciences.
- First steps towards the SVNHC have been made with the preparatory study conducted by the University of Applied Sciences of the Grisons and first contacts with InfoSpecies have been established to develop a common data aggregator.
- A new matrix to register information of collections at meta-data level has been designed and distributed among the curators of collection-holding institutions. The institutions have returned information for all collections, which will be subject to projects financed by SwissCollNet. Many institutions have also returned information about their entire collections. In the near future, meta-data will be aggregated for internal use of the stakeholders and the collections will be registered in the GRSciColl.
- With the publication of the Handbook on natural history collections management and the set-up of the working group data management, the foundation has been laid for common working procedures and vocabularies to modernise and digitise natural history collections.
- Although no working group for training and education has been set up, results have and will be indirectly obtained by increasing exchanges and networking of collection-holding institutions as well as with the strong network, which will be built by the numerous collaborative projects, which will start in the near future. A collective workshop in November 2022 will underline and fortify knowledge-exchange.
- A concept for continuation and further development of SwissCollNet has been formulated in the project proposal for research infrastructures 2025-2028 'SwissSpecimen: making Swiss biobanks and natural history collections accessible to science and society'. The project will develop a common umbrella for the generation and exchange of scientific information with the highest technical and ethical standards for all Swiss collection and will enable a pooling of knowledge and expertise within a broad network in biology, geosciences and medicine. The SwissSpecimen infrastructure will bring together SwissCollNet with the Swiss Biobanking Platform (SBP). It will unite natural history collections and biobanks, but also living collections at a national level. The obtained results (governance, SVNHC, network and expertise etc.) of SwissCollNet will be the base for the natural history collection part of the project. With the realisation of SwissSpecimen, Switzerland will generate nationwide long-term sustainability of the SVNHC and the national network of natural history collections.

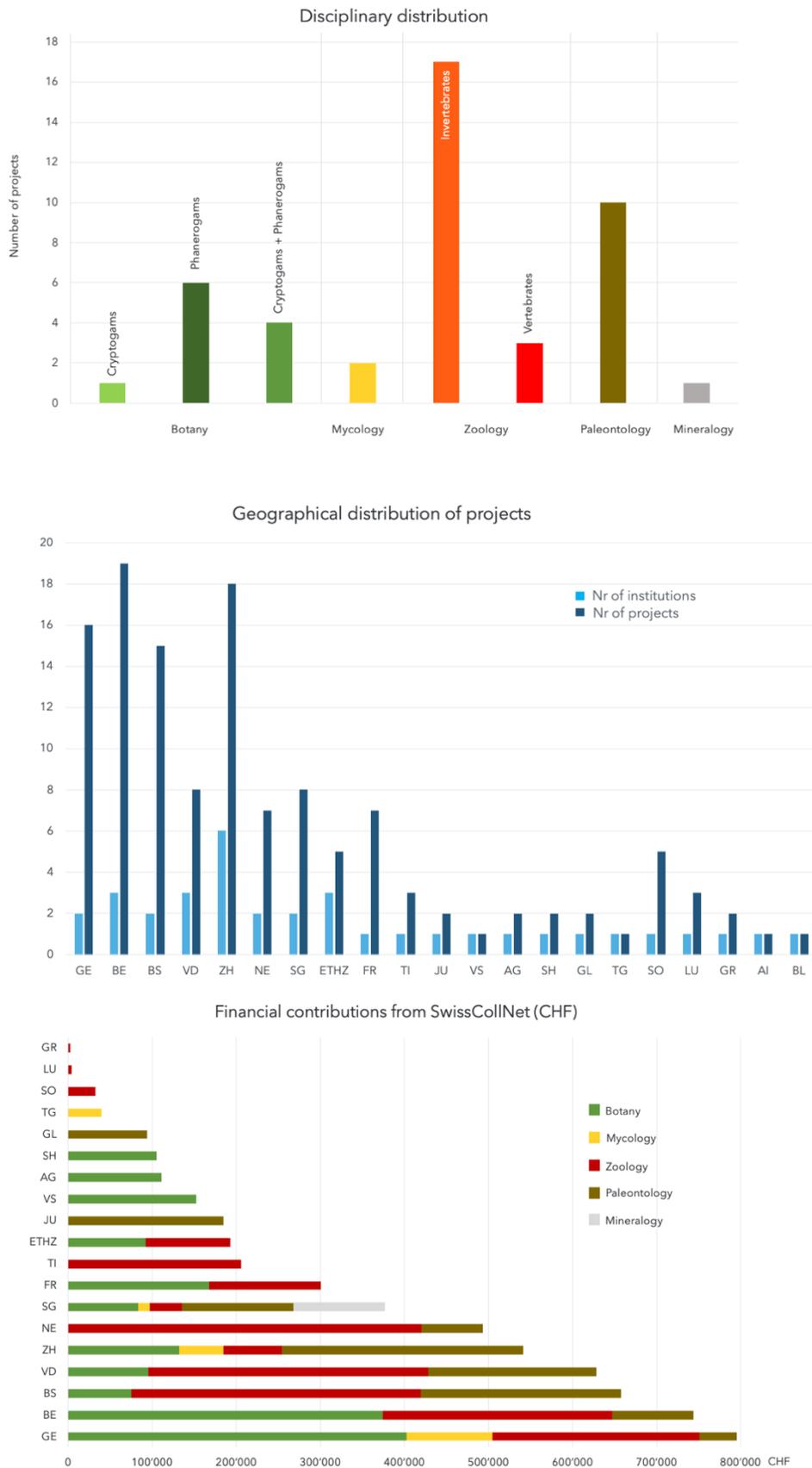


Figure 3: Disciplinary distribution of projects funded by SwissCollNet starting in May 2022, local distribution and number of institutions involved in the projects and local as well as disciplinary distribution of financial funds from SwissCollNet.

## 5. Outlook on planned activities until December 2024

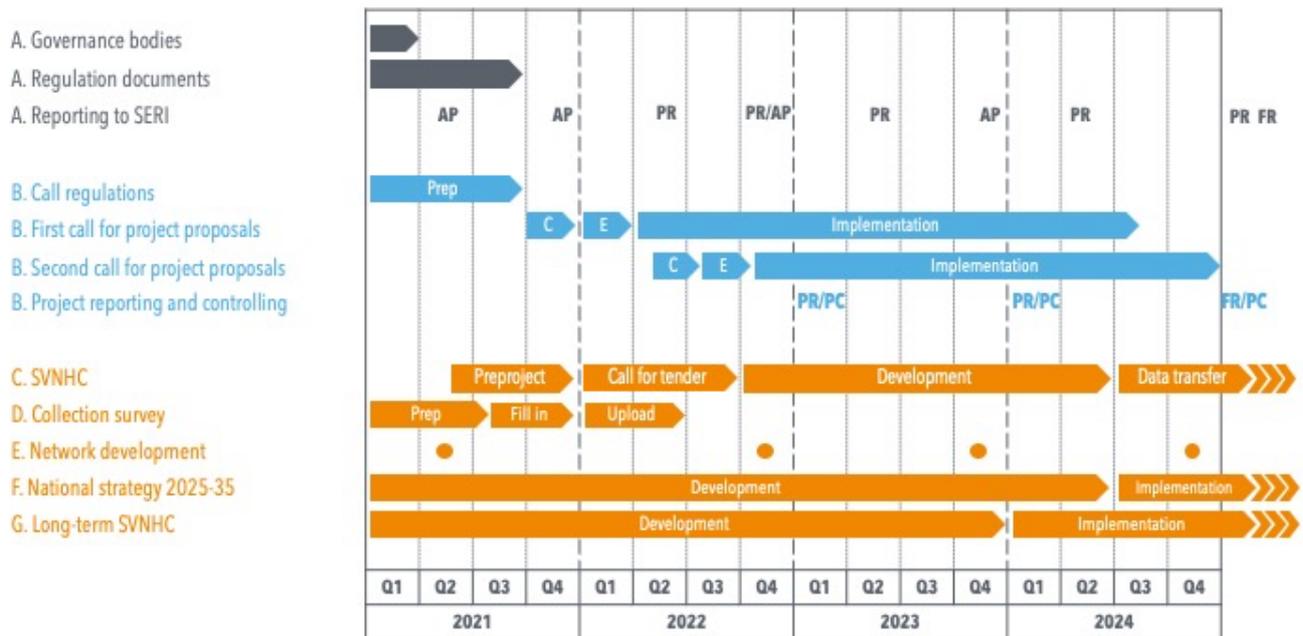
The core-activities of SwissCollNet until December 2024 will take place in the collection-holding institutions in the frame of the projects, which are subsidiarily supported by SwissCollNet. The first call for project proposals has resulted in 44 accepted and funded projects with 90 project leaders in 34 different institutions. The second call for project proposals will probably result in another 25-35 projects (Figure 3).

As for the first call, applicants have roughly estimated to invest in total around 30% of the funds into the integration of new specimens into collections and to restore collections for long-term conservation, around 60% of the funds into digitisation and 10% for training and education. The projects will contribute to increase the number and quality of modernised and databased collections.

In the first quarter of the year 2022, curators in natural history museums and herbaria have made big efforts to fill in the survey matrix for their collections. The synopsis of the gathered data results in an inventory at a meta-data level on the content (collection units and subunits), quantity, quality, number of type specimens and degree of digitisation of the collections in public institutions in Switzerland. The information will regularly be updated and is publicly available at GRSciColl. These data will be complemented with data at specimen level, resulting from the projects supported by SwissCollNet towards the end of 2024.

To make digital information about the collections and specimens publicly accessible, data stored in the collection-holding institutions all over Switzerland have to be aggregated and published. Since the data are of value for a variety of diverse users, they will be fed into distinct national and international platforms such as GBIF and GEOCASE. The national information center for species (InfoSpecies) unifies seven national data and information centers, which document taxa and their distribution in Switzerland. Observation data from these centers are aggregated and distributed via the Swiss node of GBIF to national and international data platforms. SwissCollNet will closely collaborate with InfoSpecies to connect observation data with data from natural history collections. First contacts have been established and will be further developed. This will result in the making newly acquired data from SwissCollNet accessible through the SVNHC and the use of a common data aggregator together with GBIF Suisse as shared digital infrastructure and will complement the observational data curated in the national information centers for species (InfoSpecies).

Along with applying internationally standardised vocabularies and identifiers for specimen data, the development of a common access to natural history collection data hosted in Switzerland and the collaboration with the data centers for species information to share information at species data level, a national strategy for natural history collections in Switzerland will develop and progress, creating added values for owners and consumers of this precious information. The Strategy for Swiss Natural History Collections 2025-2035 will be further developed within the SwissCollNet initiative and implemented in SwissSpecimen. With the realisation of SwissSpecimen, results achieved by SwissCollNet will be exploited in the most efficient way.



**Figure 4:** Pluriannual planning of SwissCollNet, according to the implementation plan.

## 6. Assessment of target achievements according to the pluriannual planning

According to the multiannual planning, the milestones of the first year of SwissCollNet have been fully reached. Many players are contributing an impressive amount of expertise, effort and work into SwissCollNet. The tasks to achieve in such a limited time are complex, as locally organised entities now work on a common, nationally orchestrated project. The pronounced concern to bring natural history collections to a national and digitally accessible level is displayed in the immense motivation of regional institutions to collaborate and to invest considerable personal and financial resources into the initiative SwissCollNet. The task of SCNAT of coordinating and connecting decentralised entities for joint activities with a common goal ensuing nationally and internationally imprinting results is highly appreciated by the collection-holding institutions. With modest federal financial support, an action with big effect has started. With a partial bottom-up approach, SwissCollNet guarantees to take the most urgent measures with the limited financial resources available. By competitively awarding project funds to projects that have been reviewed by international experts, SCNAT also creates transparency and guarantees the quality of SwissCollNet's results. Thus, networking and national coordination of locally directed projects can create great added value for science and society.