FINAL NARRATIVE REPORT

Guidelines on how to complete this report are included in italics.

Use the information included in your BIFA Full Proposal (reproduced in Annex 1 of your BIFA contract) as a baseline from which to complete this report.

Remember that this report will be made available on your project page on the GBIF website and therefore should not include any contact information, unless you have permission from all mentioned in the report that their contact information can be published.

Contents

Project information

Main contact person and role:	**Chang, Chin Sung, Coordinator**
Institution/network/agency affiliation:	Department of Forest Science, Seoul National University
BIFA Project ID:	**BIFA4_015**
Project title:	Data mining of historical herbarium specimens from the Korean peninsula (Phase II): Major old collections from North Korea
Start date and end date of the reporting period:	May 1, 2019 - April 30, 2020
Country in which the activities take place:	Republic of Korea

Executive summary

Please provide a brief summary of your project's objective(s), its implementation and achievements. You should also describe the context and the approach taken for the final evaluation of your project, and also the key best practices and lessons learnt identified. Remember to include any additional objectives that were defined during the implementation of the project and explain why they were added to the project's initial objectives. In the event of unexpected challenges which have prevented you to reach a planned project objective, please provide explanations and indicate if and how you plan to reach these objectives post project.

(Max. 350 words.)

The great majority of vascular plant species data in South Korea which is currently available as occurrence records in the GBIF, has not been georeferenced (< 1%) and been classified as the orphaned dataset. Also, the qualified data from North Korea are insufficiently integrated to foster query-based inquiries now.

Many Japanese herbaria constitute a large fraction of North Korean botanical collections. Our priority of the second phase is to improve data quality and fill data gaps in North Korea and to focus on enhancing the completeness of published data and on improving the overall data quality. To be able to use this dataset for a process of validation and data cleaning, including a retrospective georeferencing process, are performed now. The current work and scope of this project integrated the BRAHMS software to allow queries of foreign herbaria historical records, generate specimen georeferenced data, and photo images. We continue to provide additional data about 34,000 historical collections collected by T. Nakai, T. Uchiyama, T. Mori, and T. Ishidoya from University of Tokyo herbarium (TI), and J. Ohwi, S. Kitamura, G. Koidzumi, S. Okamoto, and T. Saito from Kyoto University herbarium (KYO), and V.L. Komarov (literature) before 1945 and about 23,000 herbaceous plant specimens at SNUA that provide access to a wealth of information on biodiversity and the spatial and temporal distribution. This project mobilized the specimens housed mainly at TI and KYO and uses the information about and primary occurrence data and collections from the literature (Flora Manshuriae, three volumes). As a result of this BIFA project, this project handled

about 100,000 occurrence records in the Korean peninsula for two years and makes them available through the GBIF web services and download files.

Our group tries to expand the role of agentry in information systems in Korea. Also, our project seeks to keep improving data quality even after this project. As a primary objective of this project, we try to use the hosting center, GBIF for biodiversity data in order to show the use of data standards and to develop tools for data discovery in eastern Asia.

Progress against expected milestones

Please indicate the status of the expected milestones as outlined in Annex 3 of the contract, at the time of final reporting.
Please provide links in the sources of verification.
In the event of unexpected delay(s), please provide detailed explanatory notes.

Expected milestones	Completed? Yes/No	Explanatory notes	Sources of verification
Gain certification at BIFA Capacity Enhancement Workshop (Mid-term report milestone)	Yes	One of our members attended the workshop last July	See the attached photos
At least one dataset has been published to GBIF.org (Mid-term report milestone)	Yes		https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54
All deliverables have been produced (Final report milestone)	Yes	T.B. Lee herbarium database(SNUA)- mainly south Korea Flora of the Korean Peninsula phase II – mainly north Korea	https://www.gbif.org/dataset/6258c1c8-b27e-4497-8079-ac084029b81b https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54
Sustainability and next steps have been documented (Final report milestone)	Yes		See the sustainability plans

Activities

Please indicate the status of the activities as outlined in the BIFA Full Proposal (section 4.4), at the time of final reporting.

The table below should be completed in the same way as in the BIFA Full Proposal, but should include information and updates on the status of each activity. Please indicate relevant source(s) of verification and provide links, or a copy of the source of verification mentioned if no links are available. Attachments should be provided in the Annex.

In the event of unexpected delay(s), please provide detailed explanatory notes and indicate new planned completion date(s).

Please include any additional activities completed during the implementation of the project that were not originally outlined in the BIFA Full Proposal.

Add rows as required.

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
Data capture	Input (23,000) of SNUA herbarium specimens.	Input (23,000) of SNUA herbarium specimens. Specimens at SNUA	*Yes (95% data cleaning completed)*	The 5% of data cleaning is going on and will be continued after this project	https://www.gbif.org/dataset/6258c1c8-b27e-4497-8079-ac084029b81b https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
Georeferencing	Data records [two datasets from TI, KYO, and a dataset from literature of Flora Mandshuriae] and SNUA records with geographic coordinates were georeferenced by Drs. Chang & Kim	literature of Flora Mandshuriae and SNUA records with geographic coordinates will be georeferenced by Drs. Chang & Kim	100% completed		https://www.gbif.org/dataset/6258c1c8-b27e-4497-8079-ac084029b81b https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54
Nomenclatural annotation	Look up the currently accepted name of any taxon using our own checklist as the authority	Look up the currently accepted name of any taxon using our own checklist as the authority	Most of the data from Komarov's collections were reviewed in terms of nomenclature and fixed.	Some misapplied and synonyms were resolved	https://www.gbif.org/dataset/6258c1c8-b27e-4497-8079-ac084029b81b https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54
Informatics	Images (ca. 1,919 specimens) from TI and KYO captured by digital camera and type images from the University of Tokyo Museum Type collections sites were manually edited.	Images (ca. 1,000 specimens) from TI and KYO captured by digital camera and type images from the University of Tokyo Museum Type collections sites will be manually edited.	Images of collections at TI and at KYO including type specimens were collected and uploaded. More than 1,000 images will be uploaded after the project.	2,000 photos of TI collections and 2,000 photos of KYO collections have been collected. Half of those were uploaded	load the URL of images into the dataset https://www.gbif.org/dataset/6258c1c8-b27e-4497-8079-ac084029b81b https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54

Activity name	Expected deliverable	Contribution to goals listed in table 4.3 of the BIFA Full Proposal	Status of activity at final reporting: Completed? Yes / No (inc. % complete)	Explanatory notes, including new planned completion date if necessary	Source(s) of verification
Information dissemination	Project data and image files were loaded in the GBIF website	Data publication, journal, and research oral presentation		Data publication will be conducted after this project	https://www.gbif.org/dataset/51fa6038-895d-4ed7-bf80-0754fa4d5f54

Deliverables

This section should summarize the project deliverables as outlined in the BIFA Full Proposal (section 4,5), at the time of final reporting. Please highlight any changes from the original plans.

If no result has been achieved on a specific point, or in the event of unexpected delay(s), please provide detailed explanatory notes and indicate new planned completion date(s).

Please include any additional deliverables completed during the implementation of the project, that were not originally outlined in the BIFA Full Proposal.

Add rows as required.

a. Data

Details of datasets published and/or pending publication as an outcome of the project. The table below should be completed in the same way as in the BIFA Full Proposal but should include information and updates on the status of each dataset. Please provide links in sources of verification.

If the dataset is not yet published, please indicate this as "not published" and provide a detailed explanation, % of digitization and expected date of publication.

Add rows as required.

Title of dataset	Data type (checklist/occurrences/sampling event) [1]	Estimated number of records (specimens)	Status of dataset: Published / not published and % of digitization and expected date of publication	Data holding institution agreed to publish its data via GBIF.org (Yes/No)	Explanatory notes	Source(s) of verification: DOI or URL
Japanese collectors (major collection during the Japanese annexation of Korea	occurrences	30,000	*Published*	TI & KYO(Yes)	Images and other data were uploaded	https://www.gbif.org/dataset/51fa6 38-895d-4ed7-bf80-0754fa4d5f54
V.L. Komarov (collections and primary occurrence data)	occurrences	7,000	Published, Oct. 31st and revised, April, 30th	not applicable	Collection sites are written as Chinese gazetteers, but some examples were translated into English	https://www.gbif.org/dataset/51fa6 38-895d-4ed7-bf80-0754fa4d5f54
SNUA data	occurrences	22,300		SNUA(Yes)		

Title of dataset	Data type (checklist/occurrences/sampling event) [1]	Estimated number of records (specimens)	Status of dataset: Published / not published and % of digitization and expected date of publication	Data holding institution agreed to publish its data via GBIF.org (Yes/No)	Explanatory notes	Source(s) of verification: DOI or URL
			Published with data cleaning		Data cleaning is going on about collectors	

Collector	TI	KYO	Literature	SNUA	Total
Nakai, T	14,514	-			
Komarov, V			7,133		
Ohwi, J/Koidzumi, G./Kitamura, S.		7,030			
Uchiyama, T./Mori, T./Ishidoya, T	5,091				
Saito, T/Okamoto, S		4,607			
Others				22,372	
Total	19,605	11637	7,133	22,372	60,747*

- ** The total number of occurrence data may not be accurate, because some data were excluded in the middle of the data cleaning process. The updated dataset will be presented even after this project*

b. Other deliverables

Describe other deliverables (e.g. publication of data papers, analysis, reports etc.) produced by the project. In the event of unexpected delay(s), please provide detailed explanatory notes and indicate if the deliverable(s) are to be produced post-project, and if so, indicate expected completion date(s).

Please provide links in the sources of verification. Attachments should be provided in the Annex.

Name and type of deliverable	Status of deliverable: Completed? Yes / No (inc. % complete)	Explanatory notes	Source(s) of verification
Data papers Major Japanese collections during the Japanese annexation of Korea from North Korea and V.L. Komarov collections in 1897 from Korea	*No (30%)*	This work will be conducted after the project. Three different language versions of Komarov gazetteers are prepared now.	See the attached excel file about the Komarov's data in three language gazetteers.
A checklist of North Korean vascular plants	No (99%)	Due to time limit, data publication is pending now. Within a month, this data will be uploaded and be published through the GBIF	See the attached pdf file

Events organized as part of the project

Please indicate the status of the events as outlined in the BIFA Full Proposal (section 4.6), at the time of final reporting.

*The table below should be completed in the same way as in the BIFA Full Proposal, but should include information and updates on the status of each event. **Please provide links to any documents or web pages documenting the event(s) in the sources of verification. Attachments should be provided in the Annex.***

In the event of unexpected delay(s), please provide detailed explanatory notes and indicate new planned completion date(s).

Please include any additional events organized as part of the project that were not originally outlined in the BIFA Full Proposal.

Add rows as required.

Event title	Organizing institution	Date held / expected dates	Number of participants	Explanatory notes	Source(s) of verification
An annual meeting of Plant Taxonomic Society of Korea	Plant Taxonomic Society of Korea	Feb 14, 2020	canceled	Cancealed due to the coronavirus 19	Only a Korean absrtract was submitted (see the attached fig)
Red List Workshop	Institute of Botany, Beijing (PE)	August 26-28, 2019	60	IUCN Red List in the Korean peninsula	See the photo
20th anniversary of Korea National Arboretum	Korea National Arboretum	May 21, 2019	300	Checklist in eastern Asia	See the attached fig

Event title	Organizing institution	Date held / expected dates	Number of participants	Explanatory notes	Source(s) of verification
2019 symposium of East Asia Biodiversity Conservation Network	Korea National Arboretum (EABCN)	Sept 24, 2019	50	Russian Far East flora checklist	See the attached fig
Global Strategy for Plant Conservation	Division of International Cooperation China Wild Plant Conservation Association (CWPCA)	Oct. 28-29, 2019	200	Eastern Asia's threatened flora using the regional or national Red List for the GSPC target 2	See the attached fig

Fig. 1. IUCN Red List Workshop in Beijng,Cchina

2019 symposium of East Asia Biodiversity Conservation Network

The symposium of this year will be held on 24 September, and the title is "Contribution to achieving GSPC targets 1, 2 and 7 in East Asia" during the international conference "Lost World" in biodiversity studies: focus on the Earth's "blank spaces" of Botanic Garden Institute, Far East Branch, Russian Academy of Science.

Seven presentations in total will be given during the symposium, and each presentation will be 20 minutes long. It is recommend using 15 minutes to present and 5 minutes for discussion or questions. Acronyms in the program are as follows: T1 (GSPC target 1), T2 (GSPC target 2), and T7 (GSPC target 7).

Time	Program	Speaker
24 Sept.	**EABCN symposium** (as a session of the international conference "Lost World" in biodiversity studies)	
13:00-13:20	Opening and group photo session	Emcee: Dr. Il-Kwon Kim
13:20-13:40	[T1] Current progresses on databasing, monitoring, and conservation of vascular plants in Taiwan	Dr. Huan-Yu Lin
13:40-14:00	[T1] Contribution to the knowledge of plant systematics development in Northeastern Asia-the Russian Far East flora checklist	Dr. Chin-Sung Chang
14:00-14:20	[T1] A survey on the vascular flora of Mongolia (4 years)	Dr. Oyuntsetseg Badai
14:20-14:40	[T2] The current situation and the conservation system in threatened species of Japanese conifers	Dr. Toshio Katsuki
14:40-15:00	Coffee break	
15:00-15:20	[T2] Current studies of rare plants in the Far Eastern region of Russia: additional criteria are needed for effective species conservation	Dr. Pavel Krestov / Dr. Elena Marchuk
15:20-15:40	[T2] IUCN Red list assessment of the Korean peninsula endemic vascular plants	Dr. Hui Kim
15:40-16:00	[T7] Red listed plants of China: status, issues and prospects	Dr. Haining Qin

Fig. 2. EABCN meeting in Vladivostok, Russia

Korea National Arboretum

2019 KNA International Symposium

Date: May 21(Tue.) – 22(Wed.) 2019
Venue: Korea National Arboretum (Pocheon-si, Gyeonggi-do)
Organizer: Korea National Arboretum

Attended by researchers from home and abroad, the International Symposium will be a meaningful venue to share related information and to discuss practical measures of recent issues.

Day 1: May 21 (Tue.)	
09:00-09:30	Opening and welcoming remarks
keynote address(10:00 – 11:00, Audiovisual Room)	
10:00-10:30	Director General Lee You-Mi(Korea National Arboretum / Korea) Examining 100 years of Arboretums in Korea through Big Data Analysis
10:30-11:00	Dr. Donald Rakow(Cornell Botanic Gardens / USA) The Future of Arboretums in 50 Years
11:00-11:20	Coffee Break
Leaders Forum (Moderator: Dr. Kim Yong-Sik)	
11:20-12:10	Dr. Chipper Wichman(USA), Dr. Paul Meyer(USA), Dr. Huw Francis(UK), Dr. Suzanne Sharrock(UK / BGCI), Dr. Kim Yong-sik(Korea / Chollipo Arboretum)
12:10-13:20	Lunch
Session I (13:20 -18:20, Audiovisual Room) **Topic: Outcomes of GSPC 2020 and Prospects for the Future (Moderator: Dr. Suzanne Sharrok)**	
13:20-13:50	Dr. Malte Delmas(National Museum of Natural History / France) Progress in implementation of the Global Strategy for Plant Conservation in France and Prospects for the Future
13:50-14:20	Dr. Victoria Wilman(South African National Biodiversity Institute / South Africa) The South African perspective on implementation of the GSPC
14:20-14:50	Dr. Ben McCarthy(Plantlife International / UK) Implementation of the Global Strategy for Plant Conservation in the UK – Progress and Challenges
14:50-15:20	Dr. Hai Ren(South China Botanical Garden, CAS / China) Progress of implementation on the Global Strategy for Plant Conservation (2011-2020) in China
15:20-15:40	Coffee Break
15:40-16:10	Dr. Lilian Swee Lian Chua(Forest Research Institute Malaysia / Malaysia) Using Tropical Plants Sustainably and Equitably - the Malaysian Experiences
16:10-16:40	Dr. Haining Qin(The Chinese Academy of Sciences / China) Red List in China (GSPC target 2)
16:40-17:10	Dr. CHANG Chin-Sung (Seoul National University / Korea) Database Taxonomy : Systematic Development of a Comprehensive Checklist in Eastern Asia as a Step towards a Completion of the GSPC target 1.
17:10-17:40	Dr. Shukherdorj BAASANMUNKH(Changwon University / Korea) Conservation Status of Rare Plants in Mongolia(GSPC target 2,16)
17:40-18:20	Discussion
18:20-20:00	Welcoming Dinner

GBIF

Agenda for World Forum on

Global Strategy for Plant Conservation

- **Session 3. IUCN Red List: assessment and application**
  Moderators: QIN Haining, Chin Sung Chang
  1F An Lan Hall

08:30-08:50	From Raw Data to Guiding Conservation: How the IUCN Red List and KBAs are compiled and used *ZHANG Jing / IUCN*
08:50-09:10	Plant red listing and conservation guiding in China: Challenges and Perspectives *QIN Haining / Institute of Botany, CAS*
09:10-09:30	Conservation and development of China endangered plants *ZHANG Zhixiang / Beijing Forestry University, Beijing China*
09:30-09:50	Assessing the Red List Index for vertebrate species in China *XU Haigen / Nanjing Institute of Environment Science, Nanjing, China*
09:50-10:20	Coffee Break
10:20-10:50	Are we doing things right to save eastern Asia's threatened flora using the regional or national Red List for the GSPC target 2? *Chin-sung Chang / Seoul National University, Korea*
10:50-11:10	The survey and conservation of orchids in Myanmar *Ye Lwin Aung & JIN Xiaohua / Forest Research Institute, Myanmar & Institute of Botany, CAS*
11:10-11:30	Progress with getting plants included on the IUCN Global Red List *Domitilla C. Raimondo / South African National Biodiversity Institute*
11:30-11:50	Questions and answers

Calendar of activities

The calendar should be completed in the same way as in the BIFA Full Proposal (section 4.7) but should also clearly indicate and include any changes (e.g. use of colour-coding to indicate expected changes and/or delays). Please provide explanations for any changes in the "Notes" column. Please provide general comments on the calendar of your activities in the 'General comments on project implementation' section.

Activity	2019								2020				Notes
	M	J	J	A	S	O	N	D	J	F	M	A	
Activity: Data input/Barcoding of SNUA specimens	x	x	x	x	x	x	x	x	x	x	x	x	
Activity: Visiting TI(University of Tokyo Herbarium) by Chang & visiting KYO (Kyoto University herbarium) by Kwon and Cho (two graduate students)			x	x									
Mandatory attendance of a project team member to the BIFA Capacity Enhancement Workshop (expenses for attending the workshop are covered by the BIFA programme)			X										
Deadline for mid-term report – 31 October 2019 Mandatory milestones attached to the mid-term report: - Gain certification at BIFA Capacity Enhancement Workshop - At least one dataset has been published to GBIF.org						X							
Activity: Georeferencing and data cleaning						x	x	x	x	x	x	x	
Activity: Information dissemination and preparation of data papers											x	x	This work is in progress

Activity	2019								2020				Notes
	M	J	J	A	S	O	N	D	J	F	M	A	
Deadline for final reporting – 30 April 2020												X	
Mandatory milestones attached to the final report:												X	
- All deliverables have been produced													
Sustainability and next steps have been documented												X	
-													

a. General comments on project implementation

(Max. 200 words)

The steps for data cleaning about each specimen deposited at TI and KYO were performed using the captured photos from these herbaria. Structural errors including typos of gazetteers, incorrect information, and identification are those that arise during the input or identification process.

Checking for irrelevant georeferencing was performed using the distribution maps for each species.

Concerning records about Komarov's collections, three different languages were applied to the gazetteers which were written in Russian. Only the information on the gymnosperms and ferns has been completed. Those were included in the data publication.

Project communications and visibility

Describe the way the results of your project have been and will continue to be communicated and shared with the project stakeholders and broader GBIF community.

Please also review the page describing your project available from http://www.gbif.org/programme/bifa and highlight any additional documents, events, news items or links that you would like to add to your page and provide links/attachments in the Annex.

(Max. 300 words)

The great majority of vascular plant species data (ca. 607,514) from South Korea which is currently available as occurrence records in GBIF, has not been georeferenced (only less than 1%). Moreover, completeness and taxonomic and geographic precision of primary occurrence data are not quite satisfactory. Given the slow rate of increase in occurrence records, the question is whether this project is similarly effective in tackling spatial information gaps in South Korea. We adopted the BRAHMS database developed by Oxford University and Kew Botanical Garden and try to expand the role of agentry in information systems in Korea.

Our project seeks to improve the information available to other countries, in turn helping them to monitor and advance progress towards all other goals. The cleaning of data records will be conducted continuously after this project. Typical activities include resolving nomenclatural variations and supporting the identification and exclusion of erroneous or irrelevant records. Targeted checklists about the KPF database (Chang et al., 2014) was published by our group, but the revised checklist will be published in the GBIF next year.

We build upon for two years of experience developed to meet the capacity needs for mobilization, discovery, and use of biodiversity data for research and policy in northeastern Asia as well as the Korean peninsula. This project matches funds and expertise with needs identified by our group to remove information barriers to better decisions relating to conservation and sustainable use of biodiversity. After the project is over, we share and keep hosting these data through the scratchpads biodiversity online. Working in this way may allow large and long term goals to be achieved in these small stages without losing sight of our vision. Data quality is a key issue for the ongoing success of digital biodiversity platforms.

We will keep conducting this similar task regarding eastern Asia to mobilize vascular plant occurrence data with other international workers including our staff members.

Monitoring, evaluation and lessons learned

Please indicate the results of the monitoring and evaluation plans, as outlined in your BIFA Full Proposal (section 4.9), at the time of final reporting.

Ideally this section should also include the following:

- *An evaluation of the project activities and their outputs/deliverables*
- *An assessment of the overall outcomes, impacts of the project and how it contributes to the overall objective of the BIFA programme*
- *Comments on the project implementation and completion, and its efficiency and effectiveness, strength and weaknesses etc.*
- *Any feedback on the project's relevance from the partners and stakeholders*
- *Indications and reasons for any changes which have been made to the project's original plans, and actions to follow-up*
- *Areas of success to build on, after the project's implementation period and best practices that could be useful for the community*
- *Main lessons from the project experience that could be applied in other contexts*
- *Conclusions from your experience during the implementation of the project and recommentations for the GBIF Secretariat or the community to reinforce the success of the project*

(Max. 400 words)

An evaluation of the project activities

The herbarium specimens in SNUA have been collected over the past 50 years from south Korea geographical areas. We try to make the data globally available and paid attention to use both the Korean and the English geographical names. A thorough input was conducted to compile digital occurrence records corresponding to ca. 2,500 taxa. As we planned, a total of 25,000 data was stored in the Brahms database. A process of validation about identification and data cleaning including a retrospective georeferencing process was conducted for several months. The collective work about historical collections and knowledge of the experts across the foreign herbaria provides access to a wealth of information on the Korean peninsula. We visited two Japanese herbaria, TI and KYO, and obtained photos about Ohwi, Kitamura, Koizumi, and Saito collections. We uploaded 1995 photos with the herbarium records.

Regarding the quality of records about Komarov's collections, Russian gazetteers were attempted to be organized in parallel with both translations in English and Chinese. Due to a limit of time, only the information on the gymnosperms and some ferns have been completed, but the rest will be continued to organize the entire Komarov data even after the project. It is important to manage carefully this dataset, promoting constant quality improvements.

The present study aims to assess the quality of the dataset and records and make us keep all appropriate documents that show a variety of data. This BIFA project experience made us publish the remainders of the SNUA dataset and other historical datasets about North Korea.

Sustainability plans

Please provide a description of how the partners involved will build on the results of this project in their future work. This could include future collaborative activities, such as plans to complete any unfinished project activities and how the future impact of the project could be monitored and/or measured.

(Max. 200 words).

An important context for our project is to solve the conflicting scientific names currently used among the four countries. A target checklist about North Korea was published by our group with the help of the Korea National Arboretum (see Fig and attached the pdf). With regards to the conversion and validation of taxonomic information, the international network with Russia, China, and Taiwan are in progress and a provisional checklist of northeastern Asia will be prepared till the end of this year.

Our project seeks to improve the information available to other countries, in turn helping them to monitor and advance progress towards all other goals. Typical activities include resolving nomenclatural variations and supporting the identification and exclusion of erroneous or irrelevant records. After the project is over, we share and keep hosting these data through the scratchpads biodiversity online. A pilot study was conducted and some type specimens were shown in our scratchpads (http://kpf.myspecies.info/specimen_observation) as an example. Working in this way may allow large and long term goals to be achieved in these small stages without losing sight of our vision. Data quality is a key issue for the ongoing success of digital biodiversity platforms.

Therefore, we are more interested in a recent issue 'fitness for use'.

Annex – Additional sources of verification

Sources of verification are for example links to relevant digital documents, news/newsletters, brochures, workshop related documents, pictures, etc.

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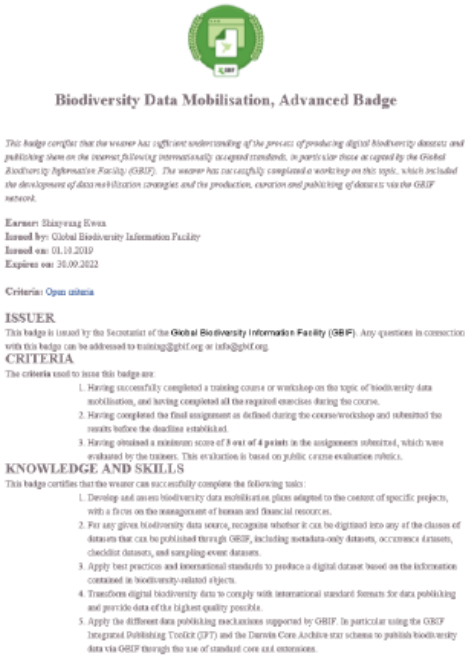

Biodiversity Data Mobilisation, Advanced Badge

This badge certifies that the wearer has sufficient understanding of the process of producing digital biodiversity datasets and publishing them on the internet following internationally accepted standards, in particular those accepted by the Global Biodiversity Information Facility (GBIF). The wearer has successfully completed a workshop on this topic, which included the development of data mobilization strategies and the production, curation and publishing of datasets via the GBIF network.

Earner: Shinyoung Kwon
Issued by: Global Biodiversity Information Facility
Issued on: 01.10.2019
Expires on: 30.09.2022

Criteria: Open criteria

ISSUER

This badge is issued by the Secretariat of the **Global Biodiversity Information Facility (GBIF)**. Any questions in connection with this badge can be addressed to training@gbif.org or info@gbif.org.

CRITERIA

The **criteria** used to issue this badge are:

1. Having successfully completed a training course or workshop on the topic of biodiversity data mobilization, and having completed all the required exercises during the course.
2. Having completed the final assignment as defined during the course/workshop and submitted the results before the deadline established.
3. Having obtained a minimum score of **5 out of 4 points** in the assignments submitted, which were evaluated by the trainers. This evaluation is based on public course evaluation rubrics.

KNOWLEDGE AND SKILLS

This badge certifies that the wearer can successfully complete the following tasks:

1. Develop and assess biodiversity data mobilization plans adapted to the context of specific projects, with a focus on the management of human and financial resources.
2. For any given biodiversity data source, recognize whether it can be digitized into any of the classes of datasets that can be published through GBIF, including metadata-only datasets, occurrence datasets, checklist datasets, and sampling-event datasets.
3. Apply best practices and international standards to produce a digital dataset based on the information contained in biodiversity-related objects.
4. Transform digital biodiversity data to comply with international standard formats for data publishing and provide data of the highest quality possible.
5. Apply the different data publishing mechanisms supported by GBIF. In particular using the GBIF Integrated Publishing Toolkit (IPT) and the Darwin Core Archive star schema to publish biodiversity data via GBIF through the use of standard core and extensions.

Fig 5. Acquired certification at BIFA Capacity Enhancement Workshop

Fig. 6. Working at TI in July, 2019

Fig. 7. Working at KYO in August, 2019

Fig. 8. Join the workshop held in Vietnam in July, 2019

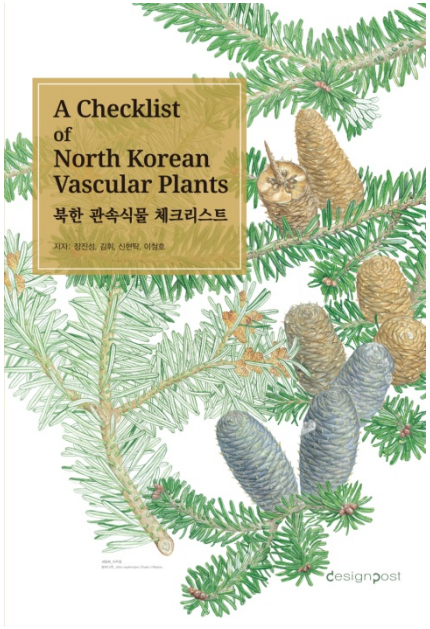

Fig. 9. New published checklist of North Korean Vascular Plants

구두 발표 (oral presentation)

생물다양성정보학에 대한 국제적 추세와 국내 현황

- GBIF와 관련된 BIFA project 활동 내용

Globa trends and domestic status of biodiversity informatics

- Our activity through the BIFA project with the GBIF

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생물다양성정보학(Biodiversity Informatics)은 자료의 관리, 발표, 발견, 탐구 및 분석과 같은 정보 해석을 위해 디지털 과학 기술을 적용한 학문으로 분류학, 생물지리, 또는 생태학 자료를 디지털 정보화하여 새로운 정보 분석을 시도하는 분야이다. 생물다양성정보학의 주요 결과물은 분포도, 지리적 분포, 분류학(종의 정이명 목록, 체크리스트), 계통수, 보전 및 관리 전략, 생태모델의 미래 예측 등이지만 근간이 되는 부분은 정이명 학명을 통한 자료 통제, 자료의 디지털화와 자료의 양이며, 자료의 이용 및 플랫폼은 이 분야의 가장 중요한 내용이 된다. 생물다양성협약(CBD)에 의해 식물보전을 위한 세계전략(GSPC)에서는 16개의 목표중 목표1의 online flora와 목표2의 적색목록에 대한 평가가 20년간 여러 국가에서 많은 발전과 결과 내용이 정리되고 있다. 학문적으로는 분류학과 생태, 지리학 그리고 보전생물학에서 보전관리와의 연계성이 강조되며, 이런 분야의 균형적인 발전이 생물다양성정보학의 근간이 된다. 생물다양성정보학은 생물정보학과는 달리 생물체를 다루며 특히 이런 생물은 이름이 모든 자료의 중심이 되며 관련 정보를 연결함에 있어 생물과 생물이 서로 연결 혹은 구분되는 지리 정보를 통해 결합, 활용된다. 통상 이런 연구는 지역이나 국가의 정이명을 통합한 checklist와 전 세계 공용으로 사용되는 Darwin core에 맞춘 database를 통해 종발생자료의 관리를 함과 동시에 online flora와 대량의 정보를 인터넷 포털을 통해 먼저 접하는 플랫폼을 구축하고 있다. 유럽과 북미대륙은 서로 다른 database (BRHAMS vs Specify)나 자료를 통제 관리하는 기구 [GBIF vs iDigBio (intergrated digitied biocollections)]가 존재하나 그 방법론은 유사하다. 현재 본 연구팀에서 진행하는 CBD의 GSPC와 관련된 동아시아 국가의 checklist와 유럽의 GBIF(Global Biodiversity Information Facility)를 통한 종발생자료의 발표에 대한 내용을 소개하고 생물다양성자료를 다루는 국내 국가기관인 산림청의 국립수목원과 환경부의 국립생물자원관, 미래창조과학부의 국립중앙과학관의 국제화에 미흡한 활동 현황과 문제점에 대해 정리하였다.

Fig 10. Abstract of oral presentation at an annual meeting of Plant Taxonomic Society of Korea