Report for annual networks

Submit the report to sns@slu.se by 24:00 CET, 1st of March the year after the network period.
The report should not exceed 2000 words.

Please adjust the size of the boxes to the length of your answer.

1. Title of the network:	**Biographic analysis of historical forest insect invasions and host associations**
2. Network code:	**123**

3. Main applicant:	**Maartje J Klapwijk**
Email:	**Maartje.klapwijk@slu.se**
Institution:	**Department of Ecology**

Activities

4. Place of the activities:	**Various**
Duration of the activities (start date, end date):	**From 2018 - 2024**

5. Provide a short network summary, including:

a) The purpose of the network/main problems/background

The purpose of the network was to bring together scientists to address ecological questions at the basis of species invasions. We wanted to investigate whether the distribution of tree species affects the potential for them to receive invasive species. Is there a relationship between currently known insect in Europe and Eastern United States herbivore and the host tree distribution are invasions, was the main question posed.

b) A description of the main activities of the network

At the beginning of the project, we started by collecting the European data necessary to answer the above question. The dataset was created and we discussed analyses and work on the planned manuscripts mostly over ZOOM during 2020-2023. In February 2023, we had the first network workshop in the Netherlands where we finalized the analyses for our first manuscript and concluded the work on the first manuscript. Parallel to that the dataset was used for a second manuscript, with the aim to identify the principal drivers of native insect associations with native European trees and then test how well these relationships can predict novel associations between native insects and non-native tree hosts. In October 2023, a second workshop was held in Prague, there the aim was to work on the analyses to incorporate the Eastern United States data in the analyses framework. That work addresses the question whether there are differences between the patterns in invasion for non-native insect herbivore species in the Eastern United States and Europe with regard to the host tree distribution area and the native insect – tree associations. The workshop resulted in analyses and a framework for the writing of the third manuscript. Then that work was presented by the applicant at the interagency forum for invasive species, Annapolis MD, organized by the USDA Forestry Service in Annapolis, 2024. In connection to the meeting we held a fourth workshop in Washington DC were we discussed the comments that followed the presentation of the results of US and EU comparisons and discussed a fourth manuscript.

c) Did the network develop and deliver as planned? If not, please explain why

The scientific aims of the network have been met. We have been able to answer the research questions we set out in the application and will have four manuscripts resulting from the collaboration. However, the Nordic partners were forced to leave the network due to many different personal circumstances that made their active contribution impossible. Also, we would have liked to see more involved from PhD students and the postdocs but

how the project developed made expanding the network a larger challenge than envisioned. Hence the SNS aim to increase collaboration in the Nordic networks have not been met. As the financing of the network was for the largest part meant to facilitate workshops, the work within the network was delayed due to COVID-19. The first workshop was meant to be held in 2020 but in the end took place in 2023. However, despite all this we successfully worked toward the aim of the network and produced a relevant and necessary scientific addition to the understanding of biogeographic patterns in species invasions.

Outcomes

6. Published outputs achieved as a consequence of the network (peer-reviewed articles, other publications)

Angela M. Mech, Andrew M. Liebhold, Jiří Trombik, Christer Björkman, Kamal J. K. Gandhi, Päivi Lyytikäinen-Saarenmaa, Deepa S. Pureswaran, Jiří Synek, Maartje J. Klapwijk (to be submitted) Does the Island Biogeography Theory apply to community assembly patterns of non-native forest insects?

Gougherty, Andrew; Klapwijk, Maartje; Liebhold, Andrew; Mech, Angela; Trombik, Jiří; Fei, Songlin (revision for Ecology and Evolution) Enemy release and herbivore accumulation: Identifying the generalizable controls on insect associations of native and non-native trees.

Klapwijk, M.J., Andrew M. Liebhold, Jiří Trombik, Christer Björkman, Kamal J. K. Gandhi, Päivi Lyytikäinen-Saarenmaa, Deepa S. Pureswaran, Jiří Synek, Angela Mech (in prep) Asymmetry in herbivore species invasions; a comparison between Eastern North America and Europe

7. Other practical outputs of the network (workshops, conferences, scientific meetings, policy recommendations, conferences, large-scale project applications, websites or databases etc.)

Mech, A., Liebhold, A., Trombik, J., and Klapwijk, M. No tree is an island entire of itself: The search for forest invasion relationships in Europe. 2022 Joint Entomological Society of America (ESA), Entomological Society of Canada (ESC), and the Entomological Society of British Columbia (ESBC) Annual Meeting. November 2022. Vancouver, BC.

Klapwijk et al. Asymmetry in herbivorous species invasions; a comparison between Europe and Eastern North America at the interagency forum on invasive species, organized by the USDA Forestry Service in Annapolis (MD) from 9 January to 12 January 2024

8. How and within which areas was the network beneficial for the Nordic region (Denmark, Finland, Iceland, Norway, Sweden and the autonomous areas of the Faroe Islands, Greenland and Åland Islands)?

While the Nordic region to date has experienced relatively few such invasions, trends of climate change and globalization could intensify the threat of future damaging invasions. Our project has given increased insight in one of the ecological drivers of species invasions. We find a weak relationship between the native community and the number of non-native species but a stronger relationship for tree distribution area, which will help identify the tree species to target for risk assessment. Also, decisions about the tree species used for forestry in adaptation to climate change could be related to species-area relationship of the tree and its non-native species in North America and Europe. Increasing temperatures and connected longer growing season has rekindled the interest in the Nordic region for the use of non-native tree species in production forests. The relationship of native and non-native insect herbivore species associated with native and non-native tree species will be addressed in our fourth manuscript and the data collected within the SNS project framework has provided the opportunity to do these analyses. We believe that the results of our project have contributed to key information that will guide regional invasive species risk assessments, contributing to knowledge critical to improved forest biosecurity in the region.

Participation

9. Number of participants

Country	PhD students & Post-docs	Other researchers	Stakeholders	Communication officers	Gender			Total
					Women	Men	Other	

Denmark	0	0						
Finland	0	1						
Iceland	0	0						
Norway	0	0						
Sweden	0	2						
USA/Canada	0	4						
Czech Rep	2	0						
…								
Total	2	7						

Gender equality actions

In the beginning of the network period, you were introduced to the gender equality guidelines and asked to perform at least one action point from each step during your network period. Fill in the following evaluation scheme with the actions performed and the outcome. It is new for SNS to introduce these gender equality guidelines to our funded networks, so SNS would really appreciate your feedback on the guidelines and how they have worked for you.

11. Evaluation scheme	
a) Outcome of completed planning step:	As our project started in 2019 these guidelines might not have applied yet.
b) Outcome of completed action step (at least one action point):	
c) How did the actions/tools work for your network:	
d) How could SNS provide more support to your network in the work toward gender equality:	
e) General feedback to the gender equality guidelines:	

Economic report

12. Received grant from SNS (SEK):
349 000

13. Costs	SNS funding	Co-financing	Total
Travel and accomodation	197 967		197 967
Meeting costs			
Communication			
Other costs Workshop costs	151 010	43 070	194 080
Total SUM (SEK)	348 977	43 047	392 047

14. Allocation of SNS funding		
Country	**Partner organization**	**% of total**
Denmark		
Finland		
Sweden	**140 000**	**40%**
Norway		
Iceland		
Czech	**39 800**	**11%**
USA	**170 000**	**50%**
…		
Total SUM	**349 000**	

15. Economic result (deficit or surplus)
43 070

16. Optional: Comments to the economic reporting
The development of the project and the ways the collaboration developed over the duration of the project is very much deviating from the original plans. All salary is now included in-kind and this would be too much to calculate how much this would be as many people have worked on manuscripts that are and will be produced. Also, dissemination of the results outside the scientific outlet will in due course require in-kind salary provision.

17. Provide a popular science piece for dissemination in SNS' various channels (maximum 700 words) ***with emphasis on application of results and benefits for the Nordic society.***
Please see separate document for instructions

I hereby declare that the above statements are true to the best of my knowledge
(Please adjust the number of signature boxes to the number of applicants)

Signature of the main applicant		
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Signature	**Organization**	**Date**
Maartje Klapwijk		
Printed name		

Signature of the department head at the department of the main applicant		
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Signature	Organization	Date
Christer Björkman		
Printed name		

Second applicant's signature, place and date		
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Signature	Organization	Date
Päivi Lyytikaïnen-Saarenma		
Printed name		

Signature page

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