

Report for NKJ-SNS Networks

Submit the report to sns@slu.se and hansson.nkj@slu.se by 24:00 CET, 1st of March, 2020, at the latest.
The report should not exceed 1500 words (including words in the template).

Please adjust the box size according to the length of your answer.

1. Network title:	Neonectria cankers on trees – meeting changed climatic conditions and increased problems in Nordic horticulture and forest production by interdisciplinary networking
2. Network number:	NKJ-SNS-07

3. Network coordinator:	Jorunn Børve
Email:	Jorunn.borve@nibio.no
Address:	NIBIO, PO Box 115, 1431 Ås, Norway

Activities during the reporting year:

4. Place of the activity:	Meetings at Ås and Malmø/Copenhagen
Duration of the activity (start date, end date):	10.2017-32.12.2018

5. Provide a short network summary, including:

- a) A background to the network
- b) The main activities of the network

Background. Three *Neonectria* spp. are currently problematic in Nordic countries; *N. ditissima*, *N. neomacrospora*, and *N. fuckeliana*. Although all of them have been present in our region for decades, recent epidemic outbreaks seem to be related to changing climate (relatively mild winters and increased precipitation). Today, *N. ditissima* causes major problems in apple orchards, affects young beech stands, and attacks a number of other broad leaf trees; *N. neomacrospora* is killing true fir (*Abies* spp.) for bough, Christmas tree and timber production; and *N. fuckeliana* is causing top dieback of Norway spruce (*Picea abies*) Christmas trees and serious canker problems and tree death in the spruce forest production.

The long term aim of the network is to significantly increase our knowledge on the canker diseases caused by the above-mentioned pathogens in horticulture and forestry. This will be achieved through collaboration in future national, Nordic and/or EU research projects. We aim to disclose the epidemiology of canker diseases through studies on distribution, diversity, biology, and genetics of the *Neonectria* fungi, to enable proper management of the diseases they are causing. Given the importance of commodities such as forest products, pome fruit, Christmas trees, bough and other end-use products for the Nordic bioeconomy, it is crucial to reduce the negative economic impact of these diseases. Furthermore, we aim to reinforce collaboration between research communities and stakeholders across sectors.



Neonectria spp. on trees in Norway; **A** - *Neonectria ditissima* on apple (*Malus x domestica*), **B** – *N. ditissima* on mountain ash (*Sorbus aucuparia*), **C** - *N. neomacrospora* on subalpine fir (*Abies lasiocarpa*), and **D & E** - *N. fuckeliana* on Norway spruce (*Picea abies*). Red fruiting bodies containing wind borne ascospores of the fungi are pictured in A and E. Photos: Venche Talgø

The goal for the period of the network activities was to exchange and assemble knowledge about the current situation with *Neonectria* cankers in Nordic countries, publish a review paper on the subject, and identify potential research topics of mutual interest to both the forest and the horticultural sector.

Main activities were two meetings. The first one took place at NIBIO Ås (Norway) with presentations given by the network participants and invited external guests, followed by general discussions. All abstracts and as complete as possible lists of literature from each country were published prior to the meeting and handed out. The second meeting took place in Alnarp (Sweden) and Hørsholm (Denmark). This meeting was more dedicated to research discussions and updates, field visits in fruit orchards and the Arboretum as well as discussions about writing a review paper. The writing is delayed and cannot be reported yet.

6. List the outputs of the network (peer-reviewed articles, other publications, websites, policy recommendations, conferences, scientific meetings, large-scale project applications, research training etc.)

Abstract book with literature overview from each country, link: Børve, J. Talgø, V. (Eds) 2018. *Neonectria* cankers on trees Abstract book, SNS/NKJ network meeting, Ås 06.02.2018 **NIBIO BOK 4(4)** 2018 36pp. <http://hdl.handle.net/11250/2487247>

SNS web site news:

Fruitful networking about *Neonectria* canker, February 22 2019;

Enlightening about *Neonectria* canker, February 27 2018;

Neonectria canker in focus, January 31 2018.

7. How and within which areas was the network beneficial for the Nordic countries?

The network strengthened communication and knowledge exchange within horticulture and forestry and established new communication between those two disciplines. New ideas came up and will be further elaborated. The information assembled for the open access abstract book is a valuable resource for the participants but also for other stakeholders.

As an example of the established communications and connections as well as shared information, the discovery of

Neonectria neomacrospora as an established pathogen in Finland was achieved (Uimari et al., New Disease Reports (2018) 38, 3. [<http://dx.doi.org/10.5197/j.2044-0588.2018.038.003>]). In Finland, both *N. fuckeliana* and *N. neomacrospora* are under surveillance and the active Nordic network has further emphasized the value of the follow-up, characterization and management of these conifer tree pathogens. The information disclosed in the network has been important in the development of recommendations for best management practices of *Neonectria ditissima* in apple fruit and nursery tree production in Finland.

8. Provide a short popular science piece of the project (maximum 500 characters) for publication by SNS in various channels

Scientists and stakeholders gathered around a long-term goal of combating diseases caused by *Neonectria* in horticulture and forestry. The network was dedicated to knowledge exchange about differences and similarities between the approaches for eliminating canker damages within the two industries, where closely related and even the same pathogens are damaging the trees. In the *Neonectria* network, a number of formal and informal collaborations and communication channels have been established.

Participation

9. Number of participants

Country	Young researchers / PhD students	Senior researchers	Stakeholders	Others (specify)	Gender			Total
					Women	Men	Other	
Denmark	1	2	0		1	2		3
Finland	0	4	3		5	2		7
Iceland	-							-
Norway	1	6	1	1(administrative)	4	6		10
Sweden	1	2	1		3	1		4
UK		1			1			1
Northern Ireland		1				1		1
The Netherlands		1			1			1
Germany		1				1		1
...								
Total	3	18	5	1	15	12		27

Economic report

10. Received grant from SNS and NKJ (SEK):

170.000 SEK

11. Transfer of SNS funds to network partners

Country	Partner organization	Sum (SEK)
Denmark		
Finland		
Sweden		
Norway	NIBIO	170000
Iceland		
Other countries (specify)		
Total SUM		170000

12. Costs

	SNS funding	External funds ²	Total
Travel and hotel	170437 ¹	23000 (estimate)	193437
Meeting costs		16400 (estimate)	16400
Salary	Not allowed	147000 (estimate)	147000
Communication			
Other costs (specify)	1420 (printing of book) ³	15000 (hours for making the book, internal cost in NIBIO)	16420
Total SUM (SEK)	171857	201400	373257

Optional: Comments to the economic overview:

¹Travel cost and meeting cost were not possible to separate although some cost were paid separately and others on invoices for all costs for one person.

²External funds is an estimate of hours spent to plan the meetings etc.

³Costs for Review paper in application were transferred to travel and meeting costs.

All costs were paid either directly from NIBIO or paid back to participants after attending the meetings.

I hereby declare that the above statements are true to the best of my knowledge

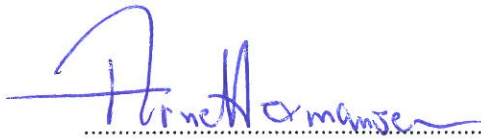
Main applicant's signature, place and date


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(Signature)

.....NIBIO.....
(Institution)

.....26/02/2020.....
(Day / Month / Year)

Signature of the head of the main applicant's research institution


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(Signature)

.....NIBIO.....
(Institution)

.....26/02/2020.....
(Day / Month / Year)

.....ARNE HERMANSØN, DIRECTOR OF DIVISION.....
(Printed name, function)


Second applicant's signature, place and date


.....
(Signature)

.....Natural Resources Institute Finland (Luke).....
(Institution)

.....25/2/2020.....
(Day / Month / Year)

Third applicant's signature, place and date


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(Signature)

.....IGN, University of Copenhagen.....
(Institution)

.....21/2/2020.....
(Day / Month / Year)