

Final report

Network: **Nordic Cone and Seed Insects (NCSI)**

Network No: **N 2009-5**

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Aims and summary of activity in 2009

The aims of the networking were 1) to coordinate research among Nordic countries and Estonia in developing a monitoring tool for a major cone pest, spruce cone worm, *Dioryctria abietella* and 2) to exchange ideas and new research results on cone insects damaging seeds of coniferous trees. In addition, the intention was to identify subjects for common investigation as Nordic co-operation or on a broader European/international level.

In 2009 there were total of 11 active members in the network, scientists involved with on-going or recent research within the topic: Finland 3, Sweden 3, Norway 2, Denmark 2 and Estonia 1. Two meetings were held as planned, one in Sweden and the other in Norway. Pheromone monitoring of spruce cone worm, was carried out according to plans in 2009 in seed orchards of the participating countries.

Prior the SNS funding the research on cone and seed insects was scattered and the activity has created a true collaborative team of colleagues. The network activity in 2009 (as follow-up on earlier network in 2007 co-ordinated by Hans Peter Ravn, Denmark) continued the collaboration both in pheromone monitoring of *Dioryctria abietella* as well the discussions on the future tests of potential insecticides. Those are needed in the Norway spruce seed orchards to protect valuable seed crops from insect pests. The pheromone monitoring emphasized in the network aim for targeted applications of insecticides with respect to pest population levels and optimized timing. As Sweden had advanced in their test of pheromone for spruce seed worm, *Cydia strobilella*, the members of the network were all invited to join an international series of experiments in 2010. In 2009 the participants agreed on writing manuscripts together on results of the pesticide experiments as well as on preliminary results from pheromone testing. New questions were raised on the life cycle of the spruce cone worm.

Status of the expected concrete results of the activity

1) We aimed to submit our **review paper** on cone and seed pests in the Nordic countries (including Estonia). The paper was started in 2007 (the first year of SNS funding) and the first draft was finished in 2008. It was critically investigated by the members of our network. After that we collected more literature and the review expanded. We worked as small writing teams at the meeting held in Norway. The new draft is too long and needs more revising and editing before it can be submitted to any journal. The slowness of the

writing process in 2009 is partly explained by maternal leave of the coordinator Tiina Ylioja. The value of the review is to provide knowledge on the cone and seed insects in our area for the scientists and researchers that are or will work with seed and cone production. At present the literature is difficult to find, contain misunderstandings and is written in local languages. In addition, the review paper will set a basis for more practical guides to be published in national languages. The writing and editing continues in 2010.

2) Firstly, we aimed to continue our **coordinated testing of pheromone monitoring system of *Dioryctria abietella*** for future IPM use in five countries. This was conducted according to plans in 2009 and data from each country was presented at the meeting held in Hamar, Norway. In the meeting we agreed to write up a short report on the results so far concerning the length of the flight period and timing of the flight of *Dioryctria abietella* in relation to accumulation of temperature degrees. The results will be represented at the IUFRO World Congress in August 2010 as a joint talk in the special session titled “Managing cone and seed insects to preserve the regeneration of future forests”. As such the pheromone monitoring will continue in the following years combined with measures of annual cone crop and damaged cones by cone worm. This aims to define pest population thresholds for potential control measures in Norway spruce seed orchards.

Secondly, we aimed for common effort to screen potential pheromones for spruce seed worm, *Cydia strobilella*. In 2009, however, at that phase it was not yet optimal to test monitoring of *C. strobilella* in multiple countries. A functioning pheromone was found in tests carried out in Sweden in 2009. As a result of our networking activity the new pheromone will be tested in 2010 simultaneously in Sweden, Finland, Denmark and Estonia in addition to China, France, Hungary, Romania and Canada (project led by Glenn Svensson, University of Lund).

The realized meetings and their topics

1) Meeting in Uppsala, Sweden, hosted by Olle Rosenberg, Skogforsk, February 25th, 2009.

Participants (8):

Eira-Maija Savonen, Metla, Finland

Tiina Ylioja, Metla, Finland

Eevamaria Harala, Metla, Finland

Paal Krokene, Skog og Landskap, Norway

Hans Peter Ravn, Skov & Landskab, Denmark

Kaljo Voolma, Estonian University of Life Sciences, Estonia

Göran Nordlander, SLU, Sweden

Olle Rosenberg, Skogforsk, Sweden

- Result from pheromone monitoring of *Dioryctria abietella* in 2008 were presented.

- The design for the pheromone monitoring of *Dioryctria abietella* in 2009 was decided and it was agreed that the pheromones were delivered from Sweden and the traps were ordered by Finland.
- The pheromone testing for *Cydia strobilella* was decided to be postponed.
- The knowledge gaps in the draft of the review paper on Nordic cone and seed insects were discussed. It was agreed that everybody searched for more literature in their own native languages and co-ordinator compiles the next version for the next meeting at the latest.

2) Meeting in Hamar, Norway, hosted by Paal Krokene, Norsk institute for skog og landskap and Øyvind Meland Edvardsen, the Norwegian Forest Seed Center, November 4 – 5, 2009.

Participants (9):

Øyvind Meland Edvardsen, Skogfrøverket, Norway
 Paal Krokene, Skog og Landskap, Norway
 Eira-Maija Savonen, Metla, Finland
 Tiina Ylioja, Metla, Finland
 Eevamaria Harala, Metla, Finland
 Hans Peter Ravn, Skov & Landskab, Denmark
 Kaljo Voolma, Estonian University of Life Sciences, Estonia
 Olle Rosenberg, Skogforsk, Sweden
 Jan Weslien, Skogforsk, Sweden

- Results from pheromone monitoring in 2009 were presented.
- Details on pheromone monitoring for 2010 were finalized.
- All agreed that the latest version of the review manuscript needed further refining. Writing session was held as group work to take a close look at species descriptions.
- Results from insecticide trials were discussed and it was decided that Sweden, Finland and Norway will write a draft on the results based on the poster presented together at the International Congress of Entomology in 2008.
- It was discussed whether preliminary results from pheromone monitoring could already be published. A joint presentation of the topic was planned for the IUFRO World Congress in 2010.
- New results on pheromone for spruce seed worm, *Cydia strobilella*, were presented by Olle Rosenberg and he told also on future publication on the pheromone of spruce cone worm that had been tested by the network participants.
- It was agreed that SNS funding is valuable and new application will be submitted in 2010.
- A tour of the Skogfrøverket was hosted by Øyvind Meland Edvardsen

Realized costs and estimated budget – SNS funds

Total grant	15 000.00 €
Total spent	10 280.15 €
Difference	4 719.85 €

Summary of the costs:

Travel	6 043.05 €
Supplies	2 952.40 €
Meals	1 281.13 €
Other	3.57 €

1) Meeting in Sweden (4 820 € budgeted for 12 persons):

Realized travel costs: 1764.97 € (8 participants)

Lunch and coffee paid by Skogforsk

Total meeting costs: 1764.97 €

2) Meeting in Norway (6825 € budgeted for 12 persons):

Travel: 3887.08 € (includes 1403.78 € for accommodation)

Meeting organizing costs (meals): 1281.13 €

Total meeting costs: 5168.21 €

3) Costs for the pheromone monitoring (3355 € budgeted):

Trap supplies: 1305.40 € (935 € budgeted)

Pheromones: 1647.00 € (2420 € budgeted)

Field work in Estonia 391.00 € (travel to study sites)

4) Other costs: 3.57 €

Other funds from institutions of the participants:

The share of other funding in the application was estimated as 76 190 € based on 12 researchers spending 4 days of workshop plus 4 days of preparation, 110€ per hour, 7.15 hours per day.

The realized time use for the workshops are 8 persons * 1 workshop day + 2 for preparation and 9 persons * 2 workshop days + 2 for preparation and the realized cost 47190 €.

In addition to workshops one person per country used 5 working days taking care of the pheromone traps, 5 persons * 5 days * 110 € * 7.15 h = 19662.50 €

Total (other funds): 66 852.50 €

Vantaa, Finland, April 28th, 2010.

Tiina Ylioja
Coordinator