FORSKNINGS- OCH UTVECKLINGSINSTITUTET

ARONIA

Aronia Research

2014

VID ÅBO AKADEMI OCH YRKESHÖGSKOLAN NOVIA

The research- and development institute Aronia was founded in 2000 in Ekenäs, a small city on the southern coast of Finland. The institute is a joint venture between Novia University of Applied Sciences and Åbo Akademi University and develops applied research and education of mutual interest for both universities. Aronia aims at linking basic institutional academic research with practical knowledge. We emphasize applied research and offer tools for natural resource management, especially in coastal regions and the archipelago.

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Contents

Where did they go?

Markus Öst, senior researcher at the Aronia coastal zone research team (ACZRT), left Aronia to pick up a lectureship at Åbo Akademi at the end of the summer 2014. Well, our loss is somebody else´s gain, and Markus is now an important node for us at Åbo Akademi University. Aronia is after all a joint venture with Åbo Akademi.

In research, moving around is just the way things are, and export and import of skills is part of the game. Just a few reflections on that. Dr. Anssi Vähätalo, senior researcher in our first set of research team players, vent to Jyväskylä University. Post-doc Johan Ekroos went to the Centre for Environmental and Climate Research at Lund University in Sweden, while his team-mate as post-doc Aleksi Lehikoinen went to the Finnish Museum of Natural History, where he now also runs his team the "Helsinki Lab of Ornithology". Andreas Brutemark went back to Sweden to do consultancy work, while our past doctoral student Anu Vehmaa works as a researcher at Helsinki University. We must be doing something right since our people get funding and positions! The gain is clearly also ours, since our network of potential co-operation is growing and expanding.

Having just said that, you will see another facet of work at the fringes of applied science as you browse our report. Funding for projects of applied nature within the EU-funding frameworks come and go with a certain rhythm. Right now, terms come to an end, and the next period is just about to start, and in between there is an abyss of nothing. Clearly, with hindsight, also our project people move around and pop up here and there, and new ventures will eventually start up. But, focusing on keeping up the good work requires for us to maintain a nucleus of people able to drive projects from embryo to full bloom – and I put this frankly to our funders.

As always, we are truly thankful to our main funders, the Town of Raseborg. Konstsamfundet and Stiftelsen för Åbo Akademi for the input into our Coastal Zone Research Team, and to Novia. For the ACZRT, there is an upcoming half-term evaluation in 2015. I´m quite confident that the work they have done will prove to be up to standards, and we can move, full steam, ahead.

Mikael Kilpi, director 2014.

Photo: Mikael Kilpi

Aronia research teams, associate researchers and applied projects

The research at Aronia is primarily run by senior researchers whom we employ for a period of time to create their own research groups. Some associate researchers also choose to work at Aronia from time to time, and we keep a desk and provide them with a place to be. Some of the staff at Novia Campus Raseborg primarily working as lecturers, also involve themselves in research. This core team provides the bulk of the scientific output we produce.

We also have number of people working in applied projects, primarily with an emphasis on questions we are interested in also in a scholarly manner. We all contribute towards better understanding and better management of the natural resources of our coasts and our seas!

Researchers, project people and teaching staff have yet another common denominator - they all work within numerous networks as experts. This means that their impact reaches beyond projects and research, into the realm of true involvement in decisions, planning and implementation.

Photo: Mikael Kilpi

Cyanobacteria and Zooplankton Interactions with Eutrophication and Climate Change

JONNA ENGSTRÖM-ÖST, ANNA-KARIN ALMÉN, ANDREAS BRUTEMARK, BETTINA GRÖNLUND, JUSTIN JOHNSON & PATRICK MOONEY

Our research combines long-term data, experiments and field work to get more information on the responses by plankton to climate change and eutrophication.

Short research highlights

In the new project, granted for 2014-2018 by the Academy of Finland, we will study consequences of warming and acidification on zooplankton fitness and population dynamics by using long-term monitoring data, and by collecting field and experimental data abroad and in the Baltic Sea. We will set up laboratory incubations with both fish larvae and zooplankton at Tvärminne Zoological Station and visit a CO2 venting area in spring 2015. **Olivier Glippa** is employed as the new post-doc in 2015, **Louise Lindroos** will start working with long-term data and **Patrick Mooney** is counting microscopy samples.

Anna-Karin Almén et al. (2014) measured vertical migration behaviour of copepods (aquatic crustaceans) and environmental variability. We showed that copepods experience highly variable environmental conditions on a daily basis. The copepods spend the day in deep water and migrate at night to the surface to feed. By measuring pH, temperature and oxygen several times during 24 hours from different depths, we found that copepods experience large variations in especially pH and temperature. The fluctuations may affect the copepods' ability to respond to climate change

Cyanobacteri-bloom in the Archipelago Sea. Photo: Mikael von Numers

Andreas Brutemark et al. (in press) published an open access paper on climate change effects on cyanobacterial growth, toxins and stress levels. The toxic alga enjoys warm water, but its stress levels increase in environments with warm water and low pH. Cyanobacteria are the oldest organisms on earth and are adaptive to changing conditions, suggesting that a warmer climate may not be such a large problem for them after all.

Justin Johnson collected data for his MSc thesis at Tvärminne Zoological Station in summer 2014. He studied ocean acidification effects on fish larval egg hatching, larval growth, respiration and survival. Together with Bettina Grönlund, Justin collected three-spined sticklebacks in the field and incubated males and females in the lab. After mating he collected the eggs from the nest and exposed them to different CO2 levels. The preliminary data show no clear differences in hatching, growth and survival, but the newly-hatched larvae respired more in low pH. Justin's MSc thesis will be finished in spring 2015.

Publication list 2014

- Scientific publications

Almén, A.-K., Vehmaa, A., Brutemark, A. & Engström-Öst, J. (2014) Coping with climate change? Copepods experience drastic variations in their physicochemical environment on diurnal basis. Journal of Experimental Marine Biology and Ecology 460: 120-128.

Brutemark, A., Engström-Öst, J. Vehmaa, A. & Gorokhova, E. (2014) Growth, toxicity and oxidative stress of a cultured cyanobacterium (Dolichospermum sp.) under different CO2/pH and temperature conditions. Phycological Research (in press)

Engström-Öst, J., Holmborn, T., Brutemark, A., Hogfors, H., Vehmaa, A. & Gorokhova, E. (2014) The effects of short-term pH decrease on the reproductive output of the copepod Acartia bifilosa – a laboratory study. Marine and Freshwater Behaviour and Physiology 47: 173-183.

Cyanobakterier och zooplankton

Ett nytt projekt som skall undersöka klimatförändring och dess konsekvenser på den marina miljön startade i september 2014 och är finaniserat av Finlands Akademi. Målsättningen är att undersöka djurplankton och deras fitness och poulationsdynamik i ett varmare klimat. Vi kommer främst att använda oss av långtidsdata, samt fält och experimentellt data för att få reda på ny infomation.

Hogfors, H., Motwani, N.H., Hajdu, S., El-Shehawy, R., Holmborn, T., Vehmaa, A., Engström-Öst, J., Brutemark, A. & Gorokhova, E. (2014) Bloom-forming cyanobacteria support copepod reproduction and development in the Baltic Sea. PLOS ONE 9: e112692.

- Thesis published

Vandelannoote, A. (2014) Effect of salinity on growth and bioactivity of the cyanobacterium Anabaena sp.. M.Sc. Thesis, Metropolia University of Applied Sciences, Universiteit Gent (Belgium). 32 pp.

Collaborators

- Dr. Ulrika Candolin, University of Helsinki, Finland (fish behaviour)
- Prof. Bart De Stasio, Lawrence University, U.S.A. (cyanobacteria-zooplankton interactions)
- Prof. Elena Gorokhova and team, Stockholm University, Sweden (oxidative stress, molecular analyses)
- Dr. Fredrik Jutfelt, University of Gothenburg, Sweden (fish larvae, ocean acidification)
- Dr. Ane T. Laugen, ARONIA & Swedish University of Agricultural Sciences, Sweden (invasion ecology)
- Dr. Sirpa Lehtinen, Finnish Environment Institute, Finland (long-term data)
- Dr. Maiju Lehtiniemi, Finnish Environment Institute, Finland (long-term data)
- Dr. Andreas Lindén, ARONIA (statistical modelling)
- Dr. Heidi Pettersson, Finnish Meteorological Institute, Finland (long-term data)
- Prof. Ulf Riebesell and team, GEOMAR - Helmholtz Centre for Ocean Research Kiel, Germany (ocean acidification)
- Dr. Sanna Suikkanen, Finnish Environment Institute, Finland (cyanobacteria ecology)

Jonna Engström-Öst racing out at sea (above) and Justin Johnson chasing Three-spined Sticklebacks. Photo: Anna-Karin Almén

Demography, movement ecology and conservation value of forest raptors

PATRIK BYHOLM

As a senior lecturer at the Novia University of Applied Sciences I alongside the teaching conduct scientific research on various aspects of forest raptor ecology. The methods used involve monitoring of demographic parameters at raptors' nests and GPS-tracking.

Highlights of the year

The long-term monitoring of nesting success and demography of goshawks (*Accipiter gentilis*) in Southern Ostrobothnia as initiated already in the 1990s continued during the year. From a longer time perspective, the summer of 2014 could at best be considered only an average year. The number of active nests and fledged chicks was clearly below the long-term average. For example, none of the nests in the core study area (the municipalities of Närpes and Kristinestad, Western Finland) produced more than three fledgling, whereas four fledglings are found in close to 50% of the nests in the best years. The most likely reason for the low reproductive success in 2014 is a result of the constantly ongoing deterioration of habitat quality, i.e. clear-cutting of old forest, lowering the carrying capacity of the forest landscape for the hawks and their prey (e.g. Byholm et al. 2007, J. Anim. Ecol.). Possibly long-lasting carryover effects from the cold and prey scarce winter 2009-2010 when the breeding population dropped with more than one third still also cast its consequences.

The summer of 2014 was at best only an average year for the monitored goshawk population; the breeding pairs were few and the broods small. Photo: Patrik Byholm.

The problem with lowered environmental quality as a result of logging is apparent also in many other species, and because of this new actions to better preserve biodiversity are needed. As a response to this need I as a part of the supervision of the PhD-project of Daniel Burgas (dissertation 24th October) at the University of Helsinki evaluated the biodiversity surrogacy effectiveness of goshawks and Ural owls (*Strix uralensis*) in the Finnish boreal forest. This work showed that the immediacies of Ural Owl nest sites and even more so goshawk nests, both typically characterized of old forest, host more biodiversity (birds and wood decaying were assessed) than control sites. This relationship persisted even over large regional sales when moving from one vegetation zone to another. Considering that in particularly the goshawk shape the composition of the bird community and mammals (Byholm et al. 2012, Ecology) both directly (predation) and indirectly (heterospecific attraction or avoidance), sparing raptor nest sites from logging activities would thus be an new alternative method to conserve biodiversity in the Finnish forest landscape.

Sparing nest sites would of course be beneficial for any bird species, not least threatened ones. One such species is the honey buzzard (*Pernis apivorus*), a tropical migrant which has showed a decreasing population trend in Finland already for decades. To better understand the exact causes of the reasons behind the observed population decline we during 2014 continued to study the reproductive biology, movement ecology (locally in Finland and on the African wintering quarters) and migration behavior of Honey buzzards using GPS-technology. While the majority of the birds spend their winter in the rain forest belt close to the Equator one adult female nicknamed 'Päivi' made it all to South Africa upgrading the unofficial Finnish distance record with several thousand kilometers (see: http://www.luomus.fi/en/satellite-honey-buzzards). While the GPS-material still awaits it more detailed analysis (a Bachelor's-thesis at Novia is in its final stage), the preliminary results of the GPS-tracking have pointed at many causes for the observed population decline, including shooting. Another reason for the population decline may also be due to observed pesticide contamination we have documented in Finnish birds.

Skogsrovfåglars demografi, rörelseekologi och naturskyddsvärde

Den noggrannare långtidsmonitoreringen av Sydösterbottniska duvhökars reproduktionsframgång och demografi fortsatte under 2014 som visade sig vara ett svagt år för duvhöken. Orsaken i detta torde långt ligga i det faktum att skogsmiljön nu har lägre bärförmåga än under tidigare decennier p.g.a. stort virkesuttag riktat speciellt mot den äldre skog som utgör duvhökens livsmiljö. Daniel Burgas visade i sin doktorsavhandling (Burgas 2014) att skydd av skogsmiljön intill bon av både duvhökar och slagugglor skulle vara till nytta också för andra taxa (tickor och fåglar) eftersom deras biodiversitet är högre invid rovfågelbon än annanstans i skogslandskapet. Utöver skydd av boplatser är artskydd viktigt att beakta också över större geografiska skalor, vilket är något som konkretiserats till sin spets hos den tropikflyttande bivråken. Vi fortsatte att studera dess rörelser under 2014 medelst GPS-spårning.

Publications 2014

* not directly affiliated to Aronia

Burgas, D. 2014: Linking raptors and biodiversity; ecological rationale and conservation relevance. PhD-thesis, University of Helsinki, PhD defense 24th October https://helda.helsinki.fi/handle/10138/136122. *

Burgas, D., Byholm, P. & Parkkima, T. 2014: Raptors as surrogates of biodiversity along a landscape gradient, Journal of Applied Ecology, 21:786-794.

Current collaborators

- Prof. Willem Bouten, University of Amsterdam, Institute for Biodiversity and Ecosystem Dynamics
- Dr. Daniel Burgas, University of Helsinki, Department of Biosciences
- Prof. Dave Goulson, University of Sussex, School of Life Sciences
- Prof. Artti Juutinen, Natural Resources Institute Finland and University of Oulu
- Dr. Vincenzo Penteriani, Estación Biológica de Doñana, C.S.I.C.
- Dr. Jari Valkama, University of Helsinki, Finnish Museum of Natural History

Quite a few of our GPS-tagged honey buzzards have been accidentally caught on photo while migrating back and forth between Finland and Africa. Here the male Mikko at Porkkala peninsula in May 2012. Photo: Erkki Hallila.

The old mixed-spruce dominated forests which constitutes the nest environment of goshawks and Ural owls are hotspots for forest biodiversity. Photo: Patrik Byholm

Non-native species, size-selective fishing, and other anthropogenic stress in marine ecosystemss

ANE TIMENES LAUGEN

How does human-induced environmental stress influence ecological and evolutionary processes?

Highlights of the year

A large part of my research in evolutionary ecology revolves around explaining spatial or temporal patterns of variation in wild populations. Being question-driven rather than system-driven, my ongoing research includes a variety of study organisms and approaches. Main highlights include

Pacific oysters in Nordic waters: resource or nuisance?
Pacific oysters have been present in Nordic waters for less than a decade, but are now well established in Scandinavia. Their presence often leads to major ecosystem changes, for instance through outcompeting native bivalves. Self-sustaining feral populations may also severely impair other shellfish farming by using the farmed shellfish as substrate for growth. At the same time the Pacific oyster may contribute positively to other ecosystem services, for instance by "cleaning up" waters suffering from excessive algal blooms, or serve as a resource for both recreational and commercial harvesting.

Together with Swedish collaborators, I combine long-term field monitoring (Fig. 1) with molecular genetic techniques and oceanographic modelling to determine pathways for dispersal and local recruitment. By using mathematical models we have tried to predict the future distribution of the species, and our results show that because of climate-related ocean warming, the species will likely increase it's range northwards. Finally, we are also trying to figure out if native predators are interested in, and capable of, using oysters as prey (Fig. 2). Near-future plans include to experimentally assess if can tolerate and adapt to lower salinities and thereby have the potential to spread into the Baltic Sea.

A Starfish working on opening a juvenile oyster. Photo: Ane Laugen

An old epifauna-covered Oyster. Photo: Ane Laugen

Can subtropical, freshwater cyanobacteria survive in the Baltic Sea?
The combination of climate-related enironmental changes and ever-increasing transport of people and goods set the stage for invasions of non-native species. A multidiciplinary team of researchers from Aronia, Swedish University of Agricultural Sciences, and University of Belgrade, set out to investigate if the highly toxic and bloomforming subtropical cyanobacterium *Cylindrospermopsis raciborskii* is likely to be able to persist in the Baltic Sea in the future. The species has been found in Polish lakes just shy of the southern Baltic Sea coast.

Evolutionär ekologi under miljöförändringar

Under mitt andra år på Aronia har jag fortsatt min forskning om evolutionära konsekvenser av fiske, hur väderförhållanden påverkar reproduktion hos fåglar, hur stillahavsostron reproducerar, överlever, och sprider sig i svenska vatten. Tillsammans med min Aronia-kollega Engström-Öst har jag även funderat på om ett subtropisk, sötvattenscyanobakterium skulle kunde överleva och trivas i en klimatförändrat Östersjö.

In a recent publication (Engström-Öst el al, in press), we predict that climate-related changes towards warmer, less salty water may create suitable habitats for this species in several places along the Baltic proper and the Bay of Finland, and we argue that plankton monitoring in the Baltic should start sampling along the shores, not only at larger depths as is the current practise. Ongoing research will reveal in more detail where we will find suitable *C. raciborski* habitats in Nordic bodies of water, both freshwater lakes and in the Baltic Sea.

Evolutionary impact assessment as a management tool to predict evolutionary costs and consequences of fishing

Industrial fishing does not only reduce the number of fish in the sea, but tend to disproportionately target larger fish. Many of the most important European fish stocks show signs of fishing-induced evolution towards earlier maturation at smaller sizes. The article "Evolutionary impact assessment: Integrating evolutionary consequences of fishing into the ecosystem-approach to fisheries management" present methods for mapping the effect these evolutionary changes have on ecosystem services, and how to estimate the subsequent socioeconomic consequences and costs (Fig. 3).

Publications 2014

* completed before Aronia-affiliation

Laugen AT, Hollander J, Obst M, Strand Å (in press). The Pacific oyster (Crassostrea gigas) invasion in Scandinavian coastal waters: impact on local ecosystem services. In: J. Canning-Clode (ed.) Biological Invasions in Changing Ecosystems. Vectors, Ecological Impacts, Management and Predictions.

Engström-Öst J, Savatijevic Rasic I, Brutemark A, Rancken R, Subakov Simić G, Laugen AT (in press). Can Cylindrospermopsis raciborskii invade the Baltic Sea? Environmental reviews.

Öberg M, Pärt T, Arlt D, Laugen AT, Low M. (2014). Decomposing the seasonal fitness decline. Oecologia 174: 139-150.

Forsgren E, Laugen AT (2014). Prognostic value of using bee and hive debris samples for the detection of American foulbrood disease in honey bee colonies. Apidologie 45: 10-20.

*Laugen AT, Engelhard GH, Whitlock R, Arlinghaus R, Dankel D, Dunlop ES, Eikeset AM, Enberg K, Jørgensen C, Matsumura S, Nusslé S, Urbach D, Baulier L, Boukal DS, Ernande B, Johnston F, Mollet F, Pardoe H, Therkildsen NO, Uusi-Heikkila S, Vainikka A, Heino M, Rijnsdorp AD, Dieckmann U (2014). Evolutionary impact assessment: Integrating evolutionary consequences of fishing into the ecosystem-approach to fisheries management. Fish and Fisheries 15: 65-96.

Current collaborators

- Jonna Engström-Öst, Aronia Coastal Zone Research Team
- Anna Gårdmark and Ann-Britt Florin, Swedish University of Agricultural Sciences, Öregrund
- Anna Lundhagen, Eva Forsgren, and Ivana Rasic, Swedish University of Agricultural Sciences, Uppsala
- Åsa Strand, Matthias Obst, and Jon Havenhand, University of Gothenburg, Sweden
- Johan Hollander, Lund University, Sweden
- Jan Jaap Poos and Adriaan Rijnsdorp, Wageningen Imares, IJmuiden, The Netherlands
- Alex Tidd and George Engelhard, Centre for Environment, Fisheries & Aquaculture Science (Cefas), UK
- Bruno Ernande, Research Institute for Exploitation of the Sea (Ifremer), France
- Fabian Mollet, Blueyou, Switzerland (www.blueyou.ch)

Work-shop based data analysis and modeling of fish data at the Institute of Applied System Analysis, IIASA. Photo: Ane Laugen

Natural resource economy

LAURI RAPELI

Through various projects, the study of democratic governance of natural resources focuses on local-level decision-making. In addition to academic research, it introduces the concept of GeoDesign into the study of natural resource governance.

1. The governance of common-pool resources

Together with Dr. Hannu Autto (University of Turku), adjunct professor Heikki Helanterä (University of Helsinki) and professor Jon Brommer (University of Turku), we are involved in an ambitious effort to combine the study of natural resource governance with evolutionary biology through the application of game theory.

The project examines whether and how individuals can successfully manage common natural resources together, such as forests, water and game. Whereas evolutionary biology has focused on family relations as a key explanatory variable in explaining animal behavior and cooperation, the social sciences have largely overlooked it as a potential explanation for human behavior. Lending the theoretical construct from evolutionary biology, this project will explore the impact close human relationships have on strategic cooperation in natural resource governance.

2. Governance by GeoDesign

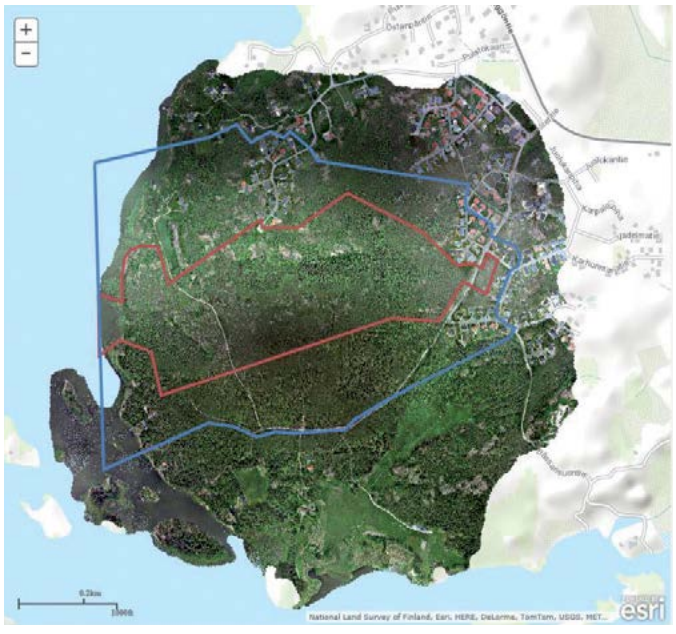
We are constantly utilizing natural resources and consequently changing the way our environment looks as we construct new buildings, roads, parks etc. Designing the environment always requires information about both the physical landscape and the surrounding community. Many people are affected by such projects: city planners, politicians, citizens and entrepreneurs. But how can all these people and information be brought together to make wise choices? Governance by GeoDesign – provides the tool needed for the integration of these elements.

The core of the idea is to offer GIS-based decision support for local governments as well as other governmental agencies in matters related to city-planning and environmental issues. A geographical information system or GIS is a powerful tool for producing visualized data from the physical world, for instance, in the form of 3-D imagery. GIS can be utilized in all kinds of decision-making in both urban and rural environments. But data has to be made understandable for decision-makers, who typically are not technical experts. Through the application of GeoDesign, we can use the data provided by GIS to mold our environment to make better decisions. GeoDesign is a method that

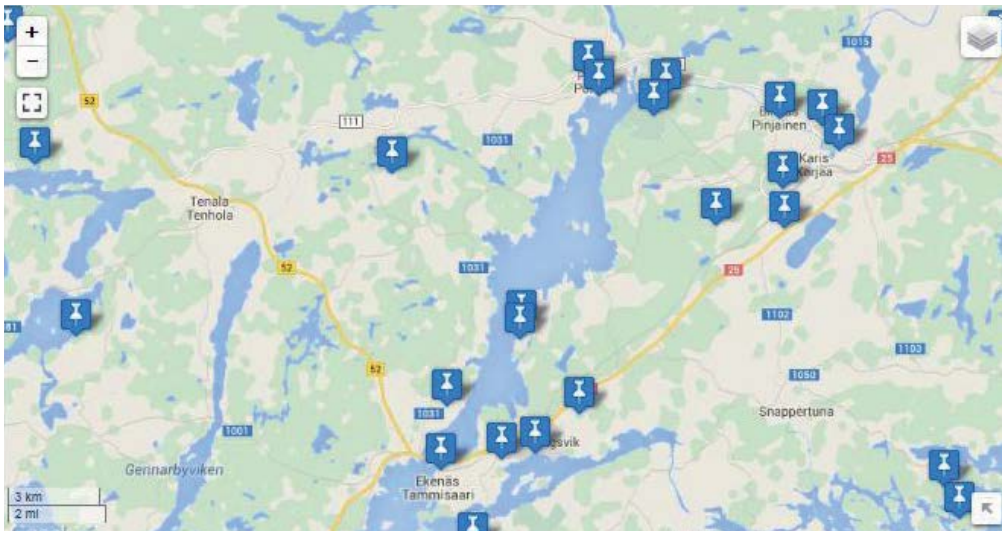
1. Gathers the necessary data needed for e.g. planning a new residential area
2. Uses sophisticated computer programs to calculate the realities for different possible scenarios
3. Brings together the officials and the politicians to look at the data and the different scenarios
4. Collects data about public opinion on the same matter
5. Gives decision-makers an arena where they meet both one another and the information they need

The emphasis is on local decision-making authorities. The empirical material is gathered by documenting several occasions where actual decision-making occurs, typically by recording the debates in municipal committees dealing with e.g. questions related to city planning.

Through the efforts of Simon Store, Raseborg city planning architect, local projects are increasingly beginning to utilize some features of the GeoDesign framework. Most notably, imagery produced by Romi Rancken and Georgy Rybakov was used in a meeting held for citizens concerning the development of the Båssastrand area. Cooperation with the villages of Tenala and Fiskars has also begun. The aim is to create village development plans with help of GIS and the GeoDesign method.



Aerial image of Båssastrand.



Visualizing city planning objects in Raseborg.

3. Public attitudes toward wind power

Together with Aronia colleagues Andreas Linden and Andreas Brutemark we have conducted a small study about people's attitudes toward building wind power plants. More specifically, we have measured both the public's general attitude toward wind power and their attitude toward it being built close to their home. Our contribution to the existing literature on the topic is that we look at how municipality-level indicators of local economy and the degree of urbanization in people's living environment affect attitudes toward wind power.

Our findings indicate that the drivers of wind power attitudes are mostly associated to people's demographic profiles rather than municipality-level predictors. What is particularly noteworthy is that we find positive attitude to rise with age. This means that younger people are typically more critical of wind power.

Collaboration

- Romi Rancken, Coastwise ltd.
- Finnish Environment Institute
- Kati Sointukangas, chair of Fiskars village committee / coordinator for the project Närdemokrati i västra Nyland (local democracy in West Uusimaa)
- The political science department at Åbo Akademi University
- Hannu Autto, The Public Choice Research Centre, University of Turku
- Heikki Helanterä, Academy research fellow, University of Helsinki
- Jon Brommer, professor, University of Turku
- City planning architect Simon Store, the town of Raseborg
- Naturresursekonomi.

Peer-reviewed journal articles

Rapeli, L. (2014): What Should the Citizen Know about Politics? Two Approaches to the Measurement of Political Knowledge. Democratic Theory, 1:1, 58–93.

Rapeli, L. (2014): Comparing Local, National and EU knowledge: The Ignorant Public Reassessed. Scandinavian Political Studies, 37:4, 428–446.

Rapeli, L. (2014): Knowledge and opinion in the immigration issue in the 2011 Finnish parliamentary elections. Nationalism and Ethnic Politics, 20:3, 309–327.

Raiskila, M., Wiren, J. & Rapeli, L. (2014): Presidenttien ja presidenttiehdokkaiden esittämien väittämien todenperäisyys puheissa ja vaaliväittelyissä. Politiikka, 56:2, 143–148.

Book chapters

Rapeli, L. (2014): Increased Ideological Confusion? Willingness to Utilize the Left-Right Dimension for Party and Self-Placements in Finland between 1994 and 2011. In Nurmi, Hannu & Tapio Raunio (eds.): Festschrift für Matti Wiberg, pp. 121-134. Fiwnnish Political Science Association: Helsinki.

Rapeli, L. (2014): Eduskunta ja kansalaismielipide [The Finnish parliament and public opinion]. In Wiberg, Matti & Tapio Raunio (eds.): Eduskuntakirja, pp. 51-65. Gaudeamus: Helsinki.

Invasion ecology and population dynamics

SATU RAMULA, MIIA JAUNI AND SHOU-LI LI (UNIVERSITY OF TURKU), SONJA HURSKAINEN (UNIVERSITY OF OULU)

We examine the life history evolution of invasive plant species and environmental factors that contribute to invasion establishment. Moreover, we aim to understand the drivers of spatial and temporal variation in plant population dynamics.

Highlights of the year

Non-native plant species benefit from disturbances but not temporal variation

Invasive species are considered to be one of the main environmental threats to biodiversity, and in contrast to many native species, invaders have been suggested to benefit from temporal environmental variation. Using published demographic data from invasive plant species, we examined demographic strategies of plant populations to cope with temporal environmental variation. We found that the populations of invasive plant species were generally buffering against temporal variation, showing little variability in the vital rates (e.g., survival) that were important to population growth rate (Li and Ramula, in press). This finding challenges the idea that invasive species would benefit from temporal environmental variability.

In another paper, we synthesised the contradictory role of disturbances, such as fire and grazing, in plant communities based on 73 published studies. We observed that the diversity and abundance of non-native plant species were considerably higher at disturbed sites than at undisturbed sites, while the diversity and abundance of native plant species did not differ between the two types of sites (Jauni et al., in press). In particular, grazing and anthropogenic disturbances resulted in a notable increase in the diversity and abundance of non-natives, indicating that disturbed habitats might act as stepping stones for plant invasions in terrestrial ecosystems. This synthesis paper was highlighted as Editor's Choice in the journal Oikos with free open-access.

In November 2014, we attended the international conference of biological invasions (Neobiota) in Turkey, where about 250 researchers and managers interested in invasion biology met during four days. Both Satu and Miia presented their most recent results to the participants.

Are dormant plants able to escape senescence?

We had pleasure to contribute to a book of the evolution of senescence. In our invited chapter, we summarised the evolution of senescence for perennial herbs exhibiting prolonged dormancy (Gremer et al., in press). In prolonged dormancy, adult plants may remain below ground for one or more years, and this fascinating phenomenon, commonly found in orchids, may enable plants to retard or even escape senescence.

Satu is recording how rapidly the invasive lupin (Lupinus polyphyllus) has occupied the study plots. Photo: Miia Jauni

Främmande arter och populationsdynamik hos växter

Projektet arbetar för att förstå ekologiska och evolutionära processer som kan leda till snabb spridning av främmande (invasiva) växtarter i naturen.

Vi har studerat om främmande växtarter kan dra nytta av temporal variation i levnadsmiljöer (Li och Ramula, i tryck). Vi har också tittat på hur störningar i levnadsmiljöer, såsom bete eller skogsbränder, påverkar artrikedom, speciellt antalet främmande växtarter (Jauni et al., i tryck). Resultaten pekar på att störda levnadsomgivningar kunde vara potentiellt viktiga för invasioner av främmande arter då de gynnar spridningen av icke-önskade invasiva växtarter.

Publications 2014

Scientific publications:

Gremer, J., Ramula, S., Pedersen, B., Crone, E., Lesica, P., Jäkäläniemi, A. & Tuomi, J. Complex life histories and senescence in plants: Avenues to escape age-related decline? in The evolution of senescence in the tree of life edited by Shefferson, R.P., Owen, R.J. and Salguero-Gómez, R., Cambridge University Press, in press.

Hyvönen, T. & Ramula, S. 2014. Crop-weed competition rather than temperature limits the population establishment of two annual C4 weeds at the edge of their northern range. Weed Research 54:245-255.

Jauni, M., Gripenberg, S. & Ramula, S. Non-native plant species benefit from disturbance: a meta-analysis. Oikos, in press.

Li, S-L. & Ramula, S. Demographic strategies of plant invaders in temporally varying environments. Population Ecology, in press.

Ramula, S. 2014. Linking vital rates to invasiveness of a perennial herb. Oecologia 174:1255-1264.

Other publications:

Hyvönen, T. & Ramula, S. 2014. Maissin rikkakasvit ovat jo matkalla Suomeen. Maaseudun Tiede in Maaseudun Tulevaisuus 2:3 (in Finnish)

Current collaborators

- Dr. Sofia Gripenberg, Oxford University, UK
- Dr. Terho Hyvönen, MTT Agrifood Research, Finland
- Dr. Jacob Johansson, Lund University, Sweden
- Prof. Niclas Jonzén, Lund University, Sweden
- Dr. Anne Jäkäläniemi, Administration of Forests, Finland
- Prof. Juha Tuomi, University of Oulu, Finland
- Prof. Anti Vasemägi, University of Turku, Finland

Non-native plant species may be able to colonise open ground more efficiently than native species after disturbances. Photo: Satu Ramula

Miia, Satu and other Neobiota conference participants visiting Kursunlu's nature reserve in Turkey. Photo: Sami Aikio

Parental care strategies, reproductive success and environmental stress in eiders

MARKUS ÖST, KIM JAATINEN, MIKAEL KILPI, KRISTINA NOREIKIENÈ & MARTIN SELTMANN

Our research combines intensive fieldwork, laboratory-based methods and theoretical modelling to study a range of basic and applies questions in evolutionary and behavioral ecology, population dynamics and conservation biology. Despite different objectives, each subproject benefits from others and from an unique twenty-years plus data set on Eiders, from Tvärminne, SW-Finland.

Highlights of the year

We have made progress in understanding why consistent individual differences in behaviour and physiology, termed animal personalities, exist. The year was kicked off by Martin Seltmann defending his PhD thesis on this topic at Åbo Akademi University (Seltmann 2014). Two chapters included in this thesis were published this year. In the first of these papers (Seltmann et al. 2014), we showed that risk-taking behaviour and stress coping styles in female eiders are related to nest-site choice. 'Daredevils' occupy nests under dense vegetation and in the centre of islands, where their clutch is better protected from egg predators but which may turn out to be a death trap for the female herself, should an eagle or mink spot the incubating female. Vice versa, 'milquetoasts' having a strong handling-induced stress response choose nests with little concealment, often close to the shoreline. In another paper (Jaatinen et al. 2014), we showed that the level of predation danger in the environment affects the relationship between reproductive investment and stress responsiveness. In times of low predation risk, females producing heavy clutches showed dampened capture-induced stress responses, whereas the opposite was true in dangerous years. The dampened stress responsiveness under low risk of predation is adaptive, since it ensures that reproduction is not inhibited when the risk of being killed by a predator is low. Consistent with this finding, we also found that the hatching success of eggs decreased with increasing stress reactivity when predation risk was low, whereas it even slightly increased with increasing stress reactivity under dangerous conditions. This latter finding is intriguing, but one possible explanation could be that female eiders hormonally speed up the rate of embryonic development in their eggs.

Female 65560 from south-western Gisselgrund and the eider team both breathe a sigh of relief after a job well done. This female was caught for the fourth time since 2008, providing valuable longitudinal data on individual behaviour and reproductive success.

The kick-off for the field season 2014 was accompanied by a savage hail storm. Things were not easy for eider ducklings either, and the year 2014 goes down in the history books as the year with the poorest duckling survival so far in this millennium.

Årets höjdpunkter!

Vi har gjort viktiga framsteg i att förstå uppkomsten av personlighet, d.v.s. stabila individuella skillnader i beteende och fysiologi, hos ejdern. Vi fann att olika personligheter väljer olika typer av boplats i skärgården (Seltmann et al. 2014). Vi har också kunnat påvisa intressanta samband mellan stressrespons, satsningen på förökning och predationsrisk i omgivningen (Jaatinen et al. 2014). Resultaten visade att ådorna dämpar sin stressrespons för att inte störa satsningen på förökning då risken att bli tagen av ett rovdjur är liten. Vi fann också att skygga ådor tog längre tid på sig att sammanslå sina kullar med andra ådors (Öst et al. in press). Det här resultatet är oväntat med tanke på att dessa fåglar borde ha hög motivation att undvika predation, men de kan också vara mer känsliga för den sociala stress som hör grupplivet till. Sara Neggazi lyckades i sin pro gradu avhandling (Neggazi 2014) påvisa en resursallokeringskonflikt mellan satsningen på immunförsvar och förökning hos ruvande ådor.

We have also investigated how personality relates to social organization in eiders (Öst et al. in press). Eider females may either fuse their broods together and form brood-rearing coalitions, or tend their young alone. Grouping serves to reduce predation on ducklings, but it also causes social stress and tension between females, a type of stress to which shy individuals may be particularly sensitive. Our results indeed suggested that female eiders may face a trade-off between avoiding conspecifics, potentially alleviating social stress, and avoiding predation. Thus, shy females, which should have a strong incentive to quickly join groups in order to reduce predation risk on both their ducklings and themselves, in fact took a longer time to form brood-rearing coalitions with other females.

Finally, MSc student Sara Neggazi successfully completed her pro gradu thesis on immunocompetence of eider females in October 2014 (Neggazi 2014). The aim of Sara's master's thesis was to study if immune function and reproduction compete for resources, and how this trade-off is resolved depending on the individual's physical state and relative reproductive value. The results showed that the antibacterial activity of eider blood plasma clearly decreased with increasing clutch size, indicating that these two traits compete for resources. Female eiders also suppressed immune function as incubation progressed, and this immunosuppression was modulated by physiological state, measured by the ratio of circulating heterophils to lymphocytes in the blood. Females in a superior physiological state had higher antibacterial activity at the beginning of the incubation and suppressed it towards the end, whereas females in a poor state had low activity throughout the incubation. In conclusion, the results suggest that reproduction and innate immunity are traded-off.

Publications 2014

Scientific publications

Jaatinen, K., Seltmann, M. W. & Öst, M. 2014. Context-dependent stress responses and their connections to fitness in a landscape of fear. Journal of Zoology 294: 147–153.

Öst, M., Seltmann, M. W. & Jaatinen, K. in press. Personality, body condition and breeding experience drive sociality in a facultatively social bird. Animal Behaviour, in press.

Seltmann, M. W. 2014: Of Milquetoasts and Daredevils – Personalities in Female Eiders. PhD thesis, Åbo Akademi, 105 pp. PhD defence 17 January 2014. https://www.doria.fi/handle/10024/94015

Seltmann, M. W., Jaatinen, K., Steele, B. B. & Öst, M. 2014. Boldness and stress responsiveness as drivers of nest-site selection in a ground-nesting bird. Ethology 120: 77–89.

Thesis published

Kurvinen, L. 2014: Linking habitat and environmental variables to changes in abundance of the Common Eider (Somateria mollissima) in the Archipelago Sea /SW-Finland). - M.Sc. - thesis, Dept. of Biology, Univ. Turku. 68pp.

Neggazi, S. 2014: Optimal resource allocation between competing life-history traits in female eider ducks Somateria mollissima. MSc Thesis, University of Helsinki, Finland, 38 pp.

This beautiful cover illustration by Photo-Wizard Heikki Eriksson appeared in the November issue of Journal of Zoology. Check it out!

Statistical Population Ecology

ANDREAS LINDÉN, LOUISE LINDROOS, SARA FRAIXEDAS (UNIVERSITY OF HELSINKI), ANDREAS OTTERBECK (UNIVERSITY OF OSLO)

Our aim is to do basic and applied research in the field of population ecology using sound statistical analysis. We use and develop methods that makes effective use of data and provides quantitative answers with as little bias as possible.

Highlights of the year

Our research interests encompass a wide range of topics within the field of population ecology, including population dynamics, spatial ecology, variation in demographic parameters, phenology, bird migration and bioacoustical applications. The activity in 2014 has focussed on avian population studies and on collaborative research projects within and outside Aronia.

Among the new publications, Timo Pakkala and co-workers pointed out that the presence of certain birds species – typical for old growth forests – indicates a high number of bird species. Sara Fraixedas published the first chapter of her PhD thesis in Journal of Avian Biology. Her main conclusions were that the numbers of wintering waterbirds and urban birds are increasing, probably due to climate change and increased winter-feeding, respectively. In contrast, wintering forest birds are decreasing. The wintering population trends also vary in accordance with migration strategy.

According to a study by Fraixedas et al. (2014), the wintering population of Snow Bunting (Plectrophenax nivalis) in Finland has experienced a decline of ca 63% over the last three decades. This is a pattern common for several short distance migrants. Photo: Andreas Lindén

The project has a new member, Louise Lindroos, who will start working on her PhD thesis in summer 2015, funded by Onni Talaan Säätiö and assigned as a student to Åbo Akademi University. Currently she is finishing her master's thesis in marine biology at the University of Helsinki. She will study how physical variables such as temperature, pH and salinity affects the population dynamics of zoo- and phytoplankton. Lindroos will apply advanced time-series modelling to long-term monitoring data, collected by the Finnish Environment Institute, Tvärminne Zoological Station and Finnish Meteorological Institute. She will collect data in Tvärminne for closer modelling of the sampling process, to explicitly separate sampling error from other sources of stochasticity. The thesis will be supervised by A. Lindén and Jonna Engström-Öst.

Andreas Otterbeck does his MSc thesis at the University of Oslo about partial migration in birds, co-supervised by A. Lindén. In addition, Otterbeck has written two papers about Sparrowhawk breeding biology, both now submitted to scientific journals. The first relates the use of prey to breeding success, while the other investigates whether reusing old nests implies a higher risk of nest predation. Related to his work, Otterbeck visited Finland twice in 2014, in May and November.

Statistical Population Ecology is involved in three collaborative projects within Aronia. Each of them have resulted in a manuscript, now submitted or ready for submission to a scientific journal. 1) Together with Satu Ramula and co-workers from Lund, we wrote a review paper about the effects of phenological change on demography. 2) A. Lindén, Lauri Rapeli and Andreas Brutemark did a study investigating hypotheses about the reasons for NIMBYism in wind power establishment. 3) A mixed group of researchers at Aronia investigated how demographic parameters of Eiders in the Gulf of Finland affects their population growth.

The project has also been visible in the scientific community. During the year, A. Lindén was the opponent of Emma Vatka's PhD dissertation (University of Oulu), gave invited talks at the Universities of Oulu and Helsinki, and an oral presentation at the International Statistical Ecology Conference (ISEC 2014) in Montpellier, France. He also taught two courses in statistics for biologists at Åbo Akademi University.

Årets höjdpunkter

Projektet fokuserar på tillämpning och utveckling av effektiva statistiska metoder för tillförlitlig estimering av ekologiskt intressanta parametrar. Forskningsintressen omfattar populationsdynamik, demografi, fenologi, fåglars flyttning och bioakustik. Året präglades av studier i fågelpopulationer och diverse samarbetsprojekt.

Projektet har en ny medlem, Louise Lindroos, som påbörjar sin doktorsavhandling inkommande sommar. Med analys av tidsserier skall hon studera hur olika miljöfaktorer påverkar populationsdynamiken hos zoo- och växtplankton i Östersjön. Projektet handleder två personer vid andra institutioner. Sara Fraixedas är doktorand vid Helsingfors universitet och jobbar med trender i fågelpopulationer. Magisterstudent Andreas Otterbeck vid Universitetet i Oslo gör sin avhandling om partiell migration.

Scientific publications 2014

Pakkala, T., Lindén, A., Tiainen, J., Tomppo, E. & Kouki, J. (2014): Indicators of forest biodiversity: which bird species predict high breeding bird assemblage diversity in boreal forests at multiple spatial scales? Annales Zoologici Fennici, 51: 457–476.

Fraixedas, S., Lehikoinen, A. & Lindén, A. (in press): Impacts of climate and land-use change on wintering bird populations in Finland. Journal of Avian Biology, DOI: 10.1111/jav.00441

Current collaborators

- Juha Tiainen, Tuomas Seimola & Jukka Rintala, LUKE; Natural Resources Institute Finland
- Mike S. Fowler, Swansea University, Department of Biosciences
- Jonas Knape, Swedish University of Agricultural Sciences, Population ecology unit
- Niclas Jonzén, Jacob Johansson & Johan Ekroos, Lund University
- Aleksi Lehikoinen, Kalle Meller & Kaisa Välimäki, University of Helsinki, Finnish museum of Natural history
- Torbjørn Ergon & Endre Knudsen, University of Oslo, Department of Biosciences, Centre for Ecological and Evolutionary Synthesis (CEES)
- Karl Inne Ugland, University of Oslo, Department of Biosciences, Marine Biology
- Brecht Verhelst, Jasper Wehrmann & Wouter Vansteelant, Batumi Raptor Count, Georgia
- Jonna Engström-Öst, Markus Öst, Satu Ramula & Lauri Rapeli, Research & Development institute Aronia, Åbo Akademi University and Novia University of Applied Sciences

It seems that the choice of prey in breeding Eurasian Sparrowhawk (Accipiter nisus) pairs affects their reproductive output. Here is MSc student Andreas Otterbeck and a Sparrowhawk nestling in a South Norwegian forest close to Oslo. Photo: Eric Roualet

Standardized long-term counting surveys on wintering birds help to understand their populations trends and fluctuations, as well as e.g. factors affecting the proportion migrating individuals in partially migratory species. Photo: Andreas Otterbeck

The White-tailed Deer project

JON BROMMER

I am an assistant professor in the University of Turku, and spend part of my work-time as an associated researcher in ARONIA. My interest is in ecological interactions and ecological genetics. As part of my ARONIA / NOVIA activities I am engaged in applied research on the management of white-tailed deer.

Highlights of the year

The white-tailed deer workgroup VS-DNA (I, Mikael Wikström and Jaana Kekkonen) continued to work on analyzing a large sample of adult white-tailed deer collected in the 2012-2013 winter in western Uusimaa. Jaana Kekkonen (University of Helsinki) has genotyped all the individuals. We found that individuals with high heterozygosity (a measure of genetic diversity) are larger in body mass than individuals of low heterozygosity. This finding shows that inbred individuals are likely hampered in gaining weight as they develop. Overall, however, there was no strong evidence for inbreeding depression. Furthermore, an individual's genetic diversity did not affect its skeletal size or its antler size. The latter was somewhat surprising since the antler size of males in many deer reflects genetic diversity.

As a whole, the genetic analyses showed patterns consistent with what we would expect given that the white-tailed deer was introduced in very low numbers in Finland in the 1930s and has since formed a completely isolated population. This year, we have also been successful in forming partnerships with institutes in Sweden, Lativia an Estonia interested in developing sustainable wildlife tourism in the Central Baltic region, aiming for funding to work on these aspects through EU Interreg Central Baltic's coming programme.

In terms of basic science, most of my work this year revolved around study of consistent behavioral variation. Consistent behaviors are termed "animal personality" and are – to some extent – analogous to human personality. Part of my work has focused on asking whether personality is associated with immune defenses or life-history traits.

White-tailed Deer. Photo: Marcus Wikman

Projekt vitsvanshjort

Tack vara lyckat sammarbetet med ungefär 70 jaktlag i Västra Nyland (Ingå, Raseborg, Hangö) kunde projekt VS-DNA (Mikael Wikström, Jaana Kekkonen, Jon Brommer) samla in ett täckande sampel av vuxna vitsvanshjortar i regionen år 2013. I år har genetiska analyser av materialet genomförts. Det visar sig att individer som har mera genetisk diversitet har större slaktvikt än de med mindre genetisk diversitet. Inavel, som minskar avkommandes genetiska diversitet, går alltså ihop med svårigheter för tillväxt. Det finns dock inte belägg för att inavel skulle vara ett allmänt fenomen hos vitsvanshjort. Mot förväntan påverkades hjortarnas hornstorlek inte av individens genetiska diversitet.

Such associations are predicted to be common according to one particular view. We did not, however, find strong evidence for such associations, neither in blue tits nor tawny owls. Another focus has been on developing methodology for critically examining some of the assumptions underlying the presumed evolutionary importance of associations of behaviors to other traits.

Publications

(* = affiliation other than Aronia)

*Helle S, Brommer JE, Pettay J, Lummaa V, Enbuske M, Jokela J. 2014: Evolutionary demography of agricultural expansion in preindustrial northern Finland. Proceedings of the Royal Society (London) B

*Brommer JE. 2014: Using average autonomy to test whether behavioral syndromes constrain evolution. Behavioral Ecology and Sociobiology 68, 691-700. DOI: 10.1007/s00265-014-1699-6
Brommer JE, Karell P, Ahola K, Karstinen T. 2014: Residual correlations, and not intrinsic properties of the individuals, determine a nest defense boldness syndrome. Behavioral Ecology 25, 802-812. doi: 10.1093/beheco/aru057

Brommer JE, Hanski IK, Kekkonen J, Väisänen RA. 2014:Size differentiation in Finnish house sparrows follows Bergmann's rule with evidence of local adaptation. Journal of Evolutionary Biology 27, 737–747. doi: 10.1111/jeb.12342

Fresneau N, Kluen E, Brommer JE. 2014: A sex-specific behavioral syndrome in a wild passerine. Behavioral Ecology 25, 359-367. doi:10.1093/beheco/aru008

Class B, Kluen E, Brommer JE. 2014:Evolutionary quantitative genetics of behavioural responses to handling in a wild passerine. Ecology & Evolution 4, 427–440. DOI - 10.1002/ece3.945

*Kluen E, Siitari H, Brommer JE. 2014: Testing for between-individual correlations of personality and physiological traits in a wild bird. Behavioral Ecology and Sociobiology 68, 205-213.

*Brommer JE.2014: Senescence: Detecting an evolutionary fingerprint in plants. Current Biology Dispatch R 267. [A3 publication]

*Gienapp P, Brommer JE. 2014: Evolutionary responses to climate change. Pages 254-273 in Quantitative genetics in Wild Populations (Charmantier A, Garant DH, Kruuk LEB, eds.). Oxford University Press [Book chapter]

*Charmantier A, Brommer JE, Nussey DH. 2014. The quantitative genetics of ageing. Pages 68-83 in Quantitative genetics in Wild Populations (Charmantier A, Garant DH, Kruuk LEB, eds.). Oxford University Press [Book chapter]

Bra mat i Västnyland

Locally produced food

ANN-LOUISE ERLUND

Local produced food (LPF) is highly demanded for many various reasons and the demand is increasing. This is the starting point for Bra mat!

Highlights 2014

Customers are interested to buy LPF and also within the public kitchens and hotel-restaurants-catering (HoReCa)–chains the interest of using LPF is increasing. There are now facts available to show the benefit of investing in LFP in public kitchens and these figures represent a good base in municipalities for decision making regarding use of LPF. To facilitate the cooperation between farmers, entrepreneurs and municipalities Local Mini Fair meetings have been arranged to discuss the logistics of LPF and to find effective solutions. For example a "theme week" was arranged when one meal made of local produced ingredients was served during one day in kindergartens, schools and residential homes. The theme week was arranged by the municipality of Raseborg/School kitchens, Farmers organizations and the project. One of the aims is to create and maintain an active dialogue between farmers and the municipalities regarding use of LPF.

To maintain the development process within the regional LPF sector Bra mat has also carried out other activities.

- Seminars have been arranged to establish Western Uusimaa as a gastronomic region and LPF also as a tourist attraction
- A study trip was arranged to Piemonte, Italy and food enterprizes in Piemonte and the Salune del Gusto Fair in Turin were visited during week 43. 30 framers and entrepreneurs from Western Uusimaa participated
- The Food Scout concept has been introduced in the region which is a concept where entrepreneurs can have their food products evaluated by professionals. Audited products can be sold within HoReCa-chain.
- A competition to find The Regional Dish and Product of the year was arranged for the first time 2014 and will be continued.
- A cooperation with the regional Tourism organization was started

The project started in September 2011 and ended at the end of 2014. The year 2014 was a comprehensive year with many activities which were successfully accomplished. Many of the processes started during the project period will be continued in new projects.

At the beginning of goat-cheese process at the Cora Formaggi. Photo: Ann-Louise Erlund

At the Panetteria Falogna in Bra, the enthusiastic baker tells of her work, and the cooperation with the Slow-food University of Gastronomic Sciences. Photo: Ann-Louise Erlund

BOSS-
From Borders to Shared Space 2014-2015

Consolidation of a RDI network in border areas

Universities of Applied Sciences develop competence, services, education, contacts and new business for companies and organizations in border areas.

The RDI network comprises seven universities of applied sciences, which will tackle development challenges of companies and organizations in Finnish border areas. The universities of applied sciences participating in the project are: Haaga-Helia UAS, Kajaani UAS, Karelia UAS, Lapland UAS, Oulu UAS, Saimaa UAS and Novia UAS. Cooperation will take place over Finnish borders into the Baltic countries, into Norway and Sweden from the Arctic border areas in the north, and from the Karelia region into Russia and the St. Petersburg metropolitan area in the southeast. In the different universities of applied sciences, measures taken will focus on the geographical areas in which they have special competence regarding the needs and activities in the area. Novia UAS defined Southwestern Finland as the border area to focus on in this project. In this area Novia UAS has two educational units: Turku and Raseborg. The main target is, among other things, to establish new contacts in Sweden and create cross-border projects.

www.borderspace.fi

Highlights of the year

2014 was the first year for the project. The project will end in December 2015. A Novia UAS BOSS-team defined the focus areas. Finding new partners across borders and planning new projects are important objectives within the BOSS project. A team of partners are working on a project plan with the topic "Entrepreneurship in the Archipelago".

The BOSS project has started a close cooperation with the Junior Chamber International Raseborg. A Business Boost event was organized, which brought together entrepreneurs, students, personnel and organizations to a business breakfast seminar with several speakers and a pitching competition for young potential entrepreneurs. It is of high importance to stimulate entrepreneurship, international activity, education, and to enable a platform for networking and discussing future business needs and trends.

Local food project - Västankvarn - en västnyländsk matkälla

ULRIKA GRÖNVIK

Västankvarn – en västnyländsk matkälla is a local food project 2013-2015. Aim is to activate, encourage and create opportunities for the local producers to increase their production within the horticultural sector in Raseborg, Inkoo and Hanko. Focal points are the importance of developing local economy and sustainable use of natural resources. We collaborate with projects Bra Mat I Västnyland, EkoNu!, Västankvarn Gård among others.

Highlights of 2014

Local food project Västankvarn-en västnyländsk matkällas second year rolls on with many activities among producers and local consumers. We have arranged several occasion to gather around local food for example in February at Restaurant Day we opened `Locavore Västankvarn´ for a day, at Fiskars Slow Food Fair we arranged for small

scale producers opportunity to attend in a shared stand, REKO-trade groups are founded and a serie of activities for children in school age were held during 2014.

Activities 2104

Visibility and networking by attending exhibitions, seminars and fairs both as exhibitor and as visitor. Presentations, involvement in local happenings and projects with students and colleagues to strengthen the contact between consumer and producers has been introduced and arranged. The demonstration field at Västankvarn has been developed and main products came from the Solanaceae-family. Tastes of the production have been shared on several occations and a small scale processing has been tested, most harvested greens have been sold on REKO-trade and to retailers. Three steering group meetings were held during 2014.

Västankvarn – en västnyländsk matkälla – året som gott

Arbetet inom projektet under 2014 fortsatt med många aktiviteter kring närmat för producenter och konsumenter. Vi har arrangerat flera tillfällen som bidragit till att föra fram de lokala producenterna och gynnat närproducerade livsmedel, till exempel arrangerades under Restaurang Dagen 16.2 Pop Up restaurangen `Locavore Västankvarn`, under Slow Food Festivalen i Fiskars möjliggjorde vi för småproducenter att delta som försäljare i evenemanget, vi har varit med och startat upp och arbetat för REKO-handel och en serie aktiviteter för elever i en lågstadieskola har arrangerats. Vi har arrangerat seminarium och studiebesök samt skrivit artiklar i tidningar som når målgruppen. Demonstrationsodlingen har utvecklats vidare och huvudgrödorna var 2014 potatisväxter.

KRAV

Classification of water- and land areas of Raseborg – a tool for management of on-site wastewater treatment and other water management measures

HEIDI EKHOLM

During project KRAV, which finished on the 30th April 2014, a GIS-based tool concerning on-site wastewater treatment was developed for the environmental authorities of Raseborg as well as for the public.

Highlights of the year

The main output of KRAV was the GIS-based management tool consisting of the zonation map and other interactive maps containing environmental information. The tool is located at the map service "Spatialen" of the municipality of Raseborg, which is accessible both from the intranet as well as from the internet (http://karta.raseborg.fi). From this material essential information, such as soil type, ecological status of recipient waters and presence of groundwater, can be obtained when planning and managing on-site wastewater treatment as well as other practices having an effect on the coastal water.

The main part of the tool is an interactive zonation map, which reflects level of sensitivity with regards to the ecology and geohydrological features of specific areas. The zone in question represents certain requirements and recommendations for on-site wastewater treatment for that zone. The zonation is a result of an applied GIS classification method developed during the project, which consists of four ecological and four geohydrological factors.
Further information about the project (in Swedish and Finnish) can be found on http://www.raseborg.fi/miljo/avlopp.

Workshops and seminars

The final seminar of KRAV was organized as part of the yearly Environmental Seminar of Novia on the 12th March 2014.

Posters and presentations

The results of the project have been presented at:

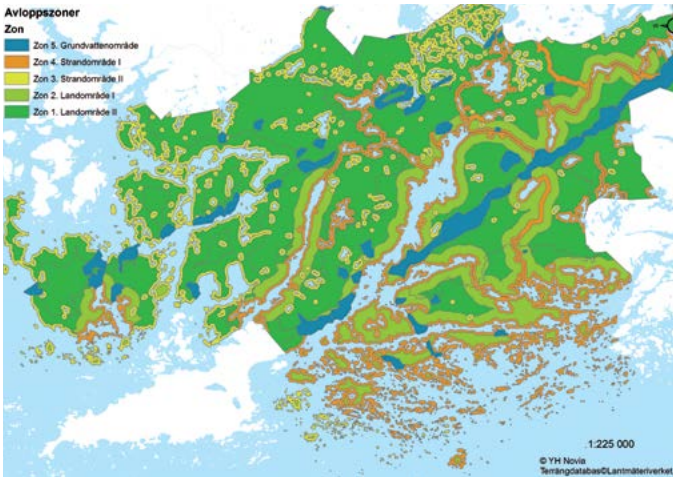
The "Jubileumsseminarium" seminar, Västra Nylands Vatten och Miljö rf by Heidi Ekholm (08.04.2014)

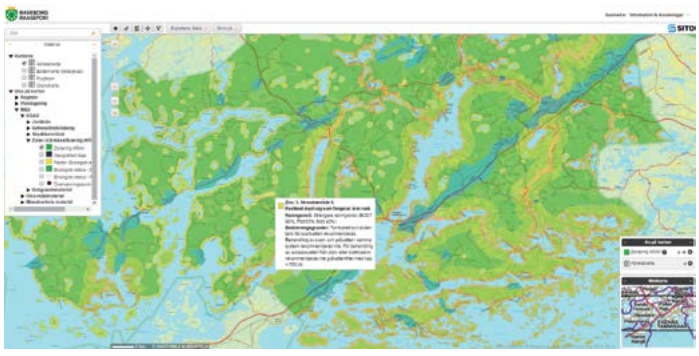
At the Employment and Economic Development Centre of Uusimaa by Heidi Ekholm (30.09.2014)

At the "Haja-asutuksen vesihuollon teempäivä" seminar, the Finnish Environment Institute by Mikaela Ahlman (28.10.2014)

Collaborators

- The Environmental Office of Raseborg
- Employment and Economic Development Centre of Uusimaa
- Metsähallitus, Natural Resources





The final zonation of Raseborg according to sensitivity and requirements for on-site wastewater treatment. Blue colour translates to the most sensitive area with the highest requirements and dark green reflects lower requirements due to lower sensitivity. (Heidi Ekholm)

Havsmanualen

HEIDI EKHOLM

Project Havsmanualen undertakes underwater mapping and brings together new and existing environmental information on coastal waters of Raseborg in order to identify practical water management measures, which could improve the ecological status of these waters. The Environmental Office of Raseborg is the project owner and Novia University of Applied Sciences implements this two-year-project, which started 1.5.2014. Havsmanualen is financed by Bergsrådinnan Sofie von Julins stiftelse.

Highlights of the year

During the beginning of the project the focus was set on monitoring shallow and coastal habitats along the coast of Raseborg. A total of, at the most, 8 people undertook field work during the period 15.7 – 30.9.2014. The monitoring was concentrated to the eastern part of the Ekenäs archipelago and to Bromarv as there is a less existing ecological information from these parts of the municipality as compared to the southern part of the Ekenäs archipelago. About one third of the monitoring was undertaken as part of the national Velmu programme (the Finnish Inventory Programme for the Underwater Marine Environment) on behalf of the Employment and Economic Development Centre of Uusimaa.

During field studies underwater aquatic plants and macroalgae were mapped, the coastal habitat type (e.g. shallow bay, flad, juvenline flad, exposed beach) was characterized, secchi depth and other environmental factors were record, as was observations on human induced pressures. For the underwater monitoring two different methods were applied. 51 shallow bays were monitored with underwater cameras, mostly GoPro, producing about 1250 videos, which later were analyzed for percentage coverage of macrophytes, type of bottom substrate and presence of fish, benthic organism and filamentous algae. The majority of the localities were monitored with dredges and aquatic binoculars and the abundance of aquatic plants, macroscopic algae and filamentous algae were determined on a 4-degree abundance scale.

Overall, information from about 200 localities were collected during the first field season. The field work will continue in the summer of 2015.

The information collected as well as existing environmental information will be summarized and analyzed with GIS (geographical information system) software. Interactive maps pinning ecological information of a locality to its spatial position will be produced. Recommendations on the use, conservation and possible restoration of particular types of coastal habitats will also be drawn up and included in the interactive maps. Localities will be classified according to their ecological value and the value class for a particular locality will be easily interpreted from the GIS map layer. All the produced maps

Floating mats of filamentous algae may restrict the recreational use of water areas. Photo: Catherine Munsterhjelm

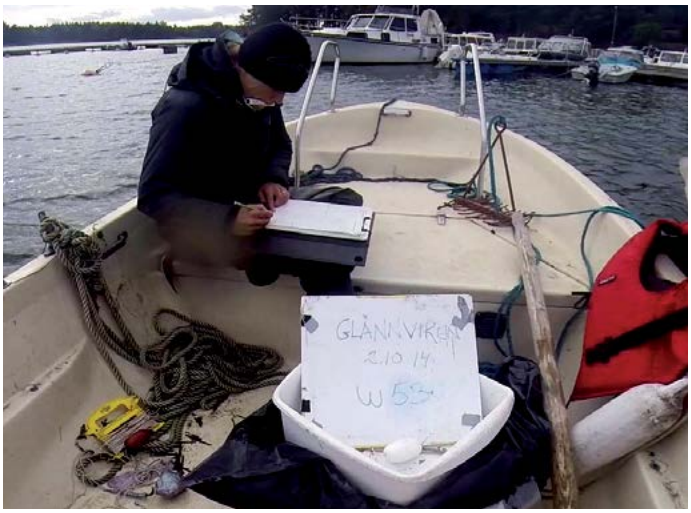
will then, at the end of the project, be incorporated into an existing map service. The map service and the map layers can then be used by owners of water- and land areas (such as, for example, recreational homeowners and farmers), by conservation organization and by both local and regional environmental authorities.

A short film directed to the public will be produced during the project. The film will show people what underwater nature looks like and it will also highlight how the way we use our land- and water areas affects the underwater habitats.

Understanding the ecology of particular underwater habitat types and how they may respond to pressures and conservation measures is a step towards using and managing our coastal water resources in a more sustainable manner.

Workshops & meetings

The steering committee of Havsmanualen consist of representatives from the Environmental Office of Raseborg, the Employment and Economic Development Centre of Uusimaa, Metsähallitus – Natural Resources, Tvärminne zoological station, Bergsrådinnan Sofie von Julins stiftelse and UAS Novia.



Field worker Pia Geyskens in action. Photo: Heidi Ekholm

Relatively big populations of Chara tomentosa were found in Långviken. Photo: Anna Granström

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Aronia Funding

Aronia

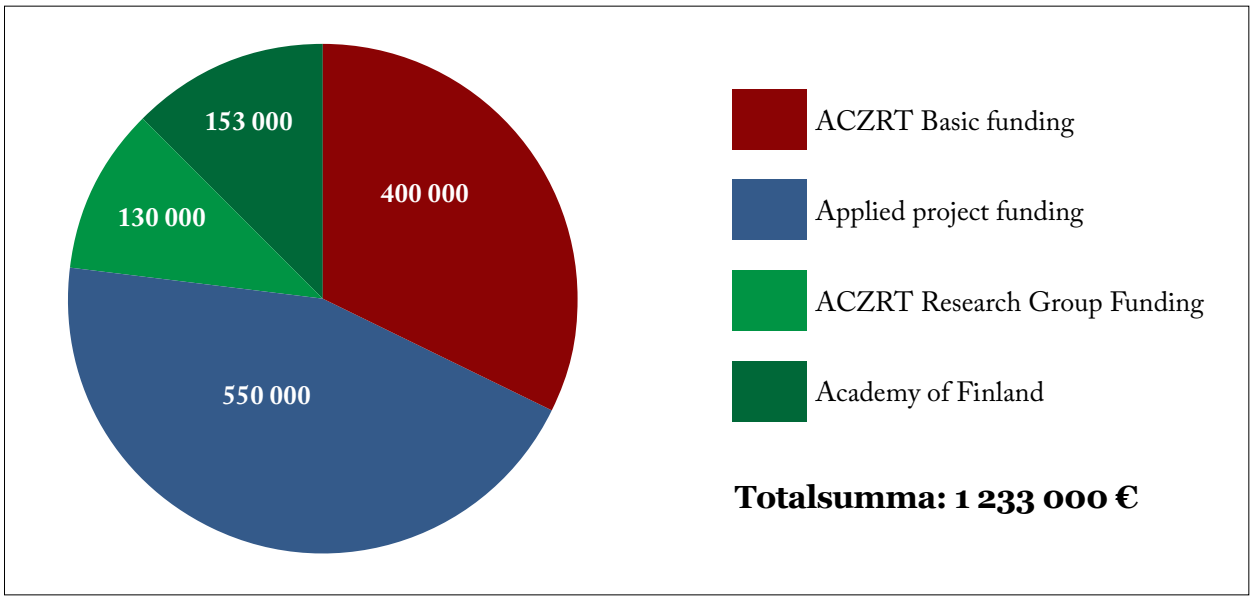
Basic Funding

- Novia University of Applied Sciences

Aronia Coastal Zone Research Team

Basic Funding

- Town of Raseborg
- Konstsamfundet
- Stiftelsen för Åbo Akademi



Aronia funding in 2014.

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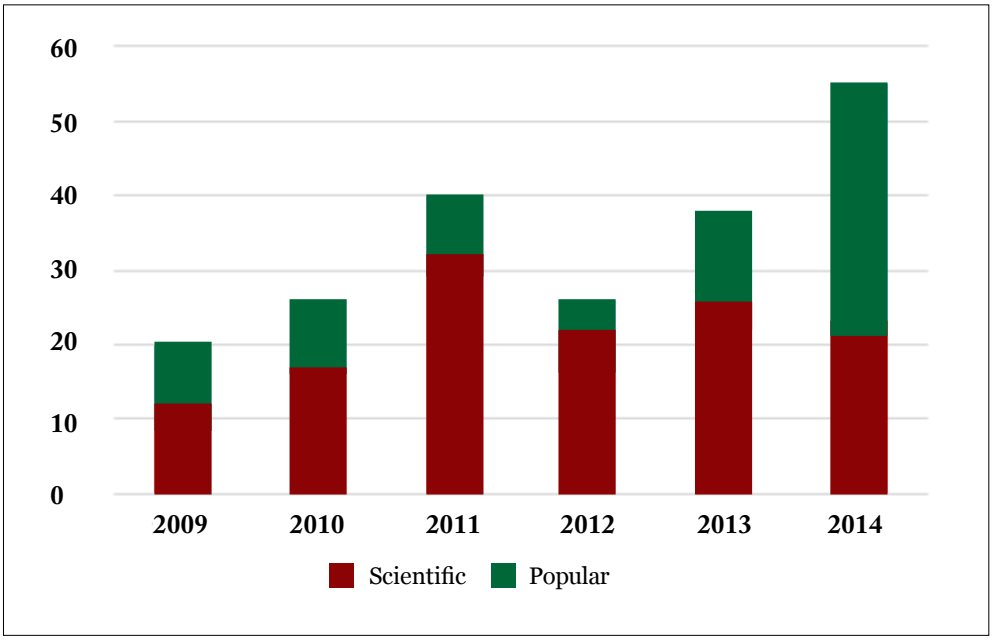
Aronia contributes on a regular basis to the regional newspaper Västra Nyland where we run a column.



Aronia publications 2008-2014.

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