

Skog Alnarp



Southern Swedish Forest Research Centre

**Forest & Landscape
a great collaboration**



Annual report

2021

Freya Saidin and Filip Barzngi are two of the many students in the Forest & Landscape bachelor's program. Here they measure a birch stand.

This year the Forest & Landscape bachelor's program began as a collaboration between forestry and landscape architecture. It got off to a running start, with many more applicants than available spots. The number of scientific publications reached a all time high.

A new center specializing in fast-growing broadleaf trees will pave the way for large-scale planting of deciduous trees. And in June, Professor Magnus Löf became the new Head of department at the Southern Swedish Forest Research Centre.

Our work is in tune with our time

Since I took over the role of Head of department in June 2021, it has become even more obvious to me how many obedient workers we have. It is truly inspiring to work in an environment where everyone takes personal responsibility and comes up with new ideas.

In addition, it seems that we are up to date with new projects and activities that address issues raised in national forest debates. This is why the future looks bright for us.

However, this year has also been marked by the pandemic. I know that many agree that it will be nice to meet in person at the department again. We need to return to having fikas, happy hours and departmental retreats.

2021 has been an eventful year. We have launched the new Forest & Landscape bachelor's program with many international students.

This is positive for our department and for the forest sector in Sweden and beyond. At the same time, it brings new challenges.

The department has

increased its educational offerings substantially. We have transitioned from a focus on research and extension to now include much more teaching.

We have many new teachers and in addition, we split responsibility for the Forest & Landscape program with the Landscape Architecture department; two different academic cultures must now work together. Sometimes it has been a bit messy, but our workers have put in the effort to achieve excellent results.

Another factor in our department's smooth functioning is our administrative staff who have carried a heavy load during the covid period.

Our employees' contributions are seen in additional ways. For example, several have received big new future-oriented assignments at SLU. This is good for them and of course benefits our department.

Two happy pieces of news arrived just before Christmas. A big proposal to the Swedish Energy Agency was funded, and the department will lead

a new broadleaf center for five years called "Trees for Me."

It will deal with fast-growing deciduous trees like birch, hybrid aspen and poplar. Another large proposal was funded by the Swedish Foundation for Strategic Research – it also deals with fast-growing broadleaves!

We are also on track to develop several research programs. The body of PhD students and researchers continues to expand, as does the department's external funding and extension to the forest sector. In the broadest sense, we keep improving!



Head of department Magnus Löf.

Contact people

Head of department

Magnus Löf

Deputy Head of department

Giulia Attocchi

Education

Program leaders

Jaime Uria Diez: the Institution

Karin Hjelm: Multiple-use forestry, Forest & landscape

Giulia Attocchi: Euroforester

Annika Felton: PhD education

Euroforester coordinator

Andis Zvirgzdins

Vice Head of department for research

Michelle Cleary

Research

Silviculture

Eric Agestam

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Karin Hjelm

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Iryna Matsiakh

Donnie Peterson

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Jonas Rönnberg

Patrick Sherwood

Ecology and conservation

Jörg Brunet

Igor Drobyshev

Adam Felton

Annika Felton

Per-Ola Hedwall

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Mats Niklasson

Lisa Petersson

Jaime Uria Diez

Planning and Policy

Purabi Bose

Vilis Brukas

Ola Eriksson

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Tropical forestry/seeds

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Magnus Mossberg

Infrastructure Kent Hansson

Media/extension

Extension

Henrik Böhlenius

Media Pär Fornling

Katarina Ekegren

New assignments

In 2021, several department members took new positions

Giulia Attocchi, Euroforester director of studies

Vilis Brukas, member of the faculty board

Emma Holmström, Director of Future Forests

Magnus Löf, Head of department

Jonas Rönnberg, Director of the Forest Damage Centre

Gudmund Vollbrecht,

Coordinator of continuous cover forestry



Nyhetsbrevet

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This table shows the annual proportion of external funding at the department and number of examined PhD students.

	2017	2018	2019	2020	2021
External funding	52%	46%	46%	49%	44%
PhD	2	1	2	5	3

Growing strength

Last year, about 55 people worked at the department, some of them part time, equivalent to just over 40 full-time employees.

This is an increase of about 20 percent in three years.

Great interest in Forest & Landscape

The new Forest & Landscape program had a very good start.

Education has become a bigger part of business in Alnarp. Beyond free-standing courses and teaching in the Jägmaster program's Swedish field trip, there are now three programs:

- √ Euroforester: A two-year master's program
- √ Multiple-use Forestry: A new two-year master's program in collaboration with Linnaeus University.

- √ Forest & Landscape: A new three-year bachelor's program in collaboration with the Faculty of Landscape Architecture, Horticulture and Crop Production Science (LTV).

"Of course this requires more resources for education, but it is going well. We have a lot of obedient researchers who are interested in teaching," says Karin Hjelm, director of studies for the two new programs.

In spring of 2022, the first Multiple-use Forestry students will write their theses.

"Now we are working to get more students to find out about the program.

"Not least is it a great opportunity for graduates of the Skogsmästare program



The start of the term in Forest & Landscape

and the Sustainable Family Forestry program at Linnaeus University to continue to a master's degree.

"Since the education is distance-based, making it possible to study part time, it is a great opportunity to combine studies with employment.

"To build the knowledge required in the labor market, we have a board of advisors with overseers from IKEA, Södra, and Sveaskog, which is a very good forum," says Karin Hjelm.

When Forest & Landscape began in the fall of 2021, there weren't enough available places in the program. The program took in 35 students from 15 different countries. It is a collaboration between

landscape architecture (LTV Faculty) and forest science.

"We have a lot to learn from one another, and the collaboration is rewarding on many levels," says Karin Hjelm. The Swedish students are the biggest single group, but instruction is in English. Wageningen University in the Netherlands also participates, where it is possible to take some of the courses.

During the three years, students can choose to specialize in landscape architecture or forest science, which is particularly important when it is time to write their final thesis.

Those who want to learn more about forests can choose a suitable master's program.

At last!

Mårten Carlsson
vice chancellor
SLU 1982 - 1984



Mårten Carlsson, the former vice chancellor of SLU, is happy about the new programs. They are puzzle pieces that finally has been fit into place.

When the Forest Faculty moved to Umeå, this led to demand from the forest industry for research relevant to southern Sweden.

It became a tug-of-war between several different places.

"I drew the line and established the new forest research centre in Alnarp. A strong argument for me was that it could lead to a fruitful collaboration with landscape architects."

A first step was Alnarp's landscape laboratory.

"The result was very successful. More projects followed, but rather slowly. It is great that they have now taken a giant step forward in the collaboration, exactly as we hoped for over 30 years ago when the Forest Faculty came to Alnarp. I think this will be really good," says Mårten Carlsson.

Introductory course

Interest is strong in the new introductory course on forest management and ecology, "Adaption of forestry methods for varying goals."

It is a quarter-time distance course with two meetings in the forest.

"We have 30 spots and a very long waiting list of people who have registered interest.

"Among the participants are many forest owners who want to learn more," says course leader Eric Agestam.

Jägmaster- students learn about southern Swedish forestry on the Swedish field trip. Due to coronavirus, the 2021 field trip was suspended, thus the number of participants is planned to double in 2022.

Euroforester a growing network

The international Euroforester network continues to grow.

Just over 30 students from 12 different countries took part in the autumn course.

"We had slightly fewer students from the countries around the Baltic Sea which is traditionally our biggest base for recruitment. On the other hand, we got several students from far away," says director of studies Giulia Attocchi.

"Unfortunately, coronavirus prevented some from coming here. That was also a challenge for instruction, as we usually rely a lot on field trips. We managed it well, but really look forward to returning to normal."

Euroforester is a well-established two-year master's program.

"In the future, Euroforester will become a good option for students wanting deeper studies following the Forest & Landscape bachelor's program. It will be an excellent combination."

It all began via a collaboration with IKEA who financed stipends for students from eastern Europe. Since then, the geographical scope has widened, and new financing has come from Stora Enso, Skogssällskapet and SCA.

"Many former students now hold key positions in the forest sector around Europe."

They form a lively and growing network of well over 700 former

students.

Every three years they meet for an alumni conference and this year it will be held for the first time in Sweden. It will be an anniversary conference of the program that began in 2001.

"It will be a lot of fun. We are expecting around 200 alumni to return to Alnarp," says Giulia Attocchi.

Giulia
Attocchi



Research

Working environment praised by PhDs



Martin Goude

After a record number of doctoral defences in 2020, the department only had one in 2021. It is Martin Goude who defended his dissertation on new models to measure and calculate forest growth.

On average, three hree PhD per year are examined, and now many more are in the pipeline. At the end of the year there were 17 PhD students and two licentiate students, a new record.

In SLU's annual employee survey, the department distinguished itself with very high marks for its work environment.

"Of course, it feels good to get positive feedback. On my part, I find that of all possible administrative jobs at the department, working with doctoral students is the most fun," says Annika Felton who is responsible for PhD education. These students are on the pathway toward their defences.:

Karin Amsten

Grazing and fire – key processes for tree and flowering plant succession.

Mikolaj Lula

Regeneration and management of young Scots pine stands.

Delphine Lavivière

Thinning as a tool for biodiversity.

Mostarin Ara

Precommercial thinning.

Khaled Youssef

Heterobasidion root infections on Scots pine – a cryptic threat to sustainable forest management.

Laura Juvany Canovas

The puzzle of forestry and ungu-

The start of a broadleaf centre

Just before Christmas a record research project was funded.

The Swedish Energy Agency supports a centre of competence for fast-growing broadleaves.

It is an investment of 112 million crowns over five years, with a possibility for a further five years' extension. The project is called Trees for Me.

"We see new possibilities for broadleaves. Every year

400 million trees are planted [in Sweden], nearly all spruce or pine. Within ten years, I believe a tenth can be broadleaves. We focus on aspen, hybrid aspen, poplar and not least improved birch.

It has fantastic potential. Within 20-30 years we can have birch with 50% better growth and higher quality.

"Large-scale planting of broadleaves is new for forestry and we need extensive new knowledge," says

professor Urban Nilsson.

The research will be a collaboration with Luleå Technical College, Skogforsk, Umeå and Uppsala Universities.

Fifty organizations and companies are co-financing the research project.

"We have never had so broad a commitment to a research project. We feel massive support for possibilities with fast-growing broadleaves," says Urban Nilsson.

late interactions – a missing piece is in the understory.

Noelia Lopez-Garcia

Forest *Phytophthora* – ecology, diversity and management.

Axelina Jonsson

Forest regeneration models for planted, direct seeded and natural regenerated stands.

Ida Nordström

Rapid and portable tools for early detection of invasive alien tree pests and pathogens.

Amanda Segtowich

Silviculture of Scots pine and thinning strategies.

Joan Diaz Calafat

Deciphering the interactions between trees and climate on forest ecosystem processes.

Tatiana Klisho

Climatic controls of forest fire activity in Europe.

Andis Zvirgzdins

Establishment and management of planted birch.

Keeli Curtis

Instrumentation of the Swedish Forest Policy with a focus on advisory services.

Nora Pohl

Managing stand structure to restore mixed oak-dominated forests for conservation of biodiversity.

Therese Strömvall Nyberg

Etablering och skötsel av blandbarrskog.

Emily Delin

Forest growth models adapted to abiotic and biotic disturbances.

Luca Moraro

Poplar plantations on forest land – effect of genotypes and soil treatments.

Mimmi Blomqvist

Optimized stump treatment against *Heterobasidion* for sustainable future forests.



One question is how landscape-level planning is realized on private properties

More research on forest policy

This year Vilis Brukas began a new professorship in forest planning. This has led to a strengthening in the planning and policy research area.

Forest planning really includes a lot, everything from how forests are planned with help of modern technologies to how private forest owners are made to comply with overall forest policies. Research in Alnarp focuses on the latter topic.

"My research is actually more about forest policy than forest planning in the classic sense," responds Vilis Brukas. Several new people have joined the research group. PhD student Keeli Curtis will study how advice to private forest owners works, postdoc Luis Andrés Guillén Alm will look at forest planning from a landscape perspective and lecturer Purabi Bose will continue her internationally-focused research on land-use

conflicts with an interest in indigenous people.

Vilis Brukas, with roots in Lithuania, also continues research and teaching about forest policy in eastern Europe after the dissolution of the Soviet Union.

"Our research extends from policies at the national level to landscape perspectives and individual forest owners," says Brukas.

"We work interdisciplinarily. Just thinking about natural science isn't enough. Knowledge must be implemented in the system. One must also adopt social-science perspectives, see entire social-ecological systems and better understand relevant actors, their power and ways of thinking, as well as political instruments".

Nearly 100 publications

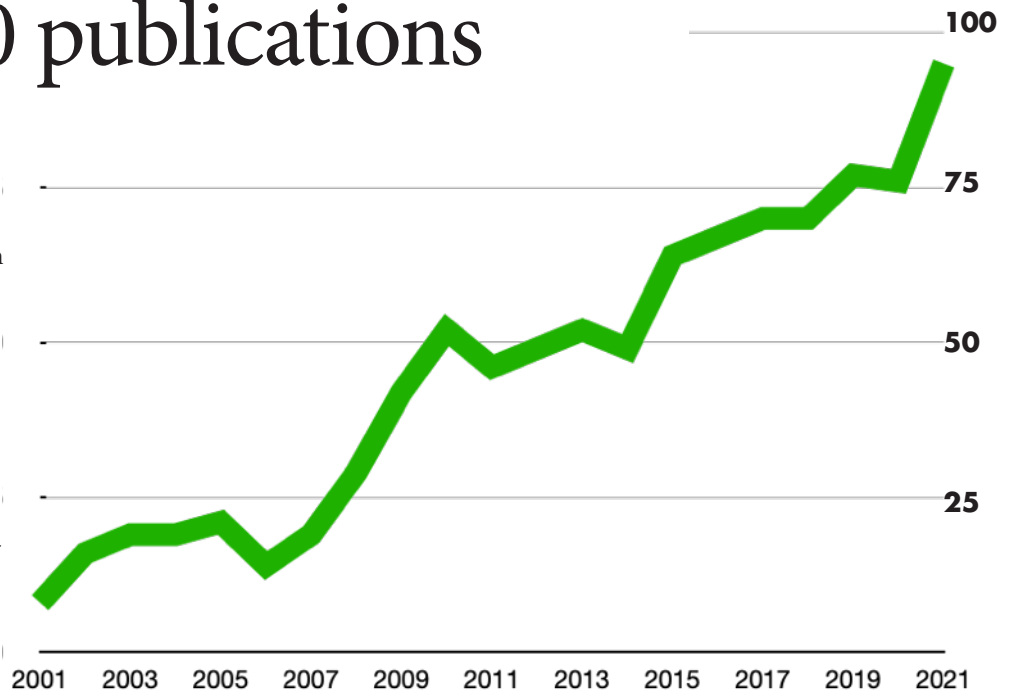
The positive trend in departmental publications continues with a new record number.

In 2021, the department's researchers contributed 95 peer-reviewed scientific articles in international journals.

Here is a list of publications and book chapters by first author. Researchers from the Southern Swedish Forest Research Centre in Alnarp are in bold type.

If the article has more than six authors, only the first and last authors are listed as well as authors from the department.

At the end is also a list of articles in the popular scientific press.



Agostinelli, M; Nguyen, D; **Witzell, J; Cleary, M.** Mycobiome of *Fraxinus excelsior* with different phenotypic susceptibility to ash dieback. FRONTIERS IN FORESTS AND GLOBAL CHANGE. 2021. 4: 580514.

Aldea, J; Bravo, F; Vazquez-Pique, J; Ruiz-Peinado, R; del Rio, M. Differences in stem radial variation between *Pinus pinaster* Ait. and *Quercus pyrenaica* Willd. may release inter-specific competition. FOREST ECOLOGY AND MANAGEMENT. 2021. 481: 118779.

Aldea, J; ...**Barbeito, I...**; **Löf, M.** Species stratification and weather conditions drive tree growth in Scots pine and Norway spruce mixed stands along Europe. FOREST ECOLOGY AND MANAGEMENT. 2021. 481: 118697.

Amato, KR; ...**Felton, AM;** ...Zeng, Y. Fermented food consumption in wild nonhuman primates and its ecological drivers. AMERICAN JOURNAL OF PHYSICAL ANTHROPOLOGY. 2021. 175 (3): 513-530.

Amsten, K; Cromsigt, JPMG; Kuijper, DPJ; Loberg, JM; Churski, M; Niklasson, M. Fire- and herbivory-driven consumer control in a savanna-like temperate wood-pasture: An experimental approach. JOURNAL OF ECOLOGY. 2021. 109 (12): 4103-4114.

Ara, M; **Barbeito, I;** Elfving, B; Johansson, **U;** **Nilsson, U.** Varying rectangular spacing yields no difference in forest growth and external wood quality in coniferous forest plantations. FOREST ECOLOGY AND MANAGEMENT. 2021. 489: 119040.

Barbeito, I; Eskelson, BNI; Carsky, G. Trade-offs across densities and mixture proportions in lodgepole pine-hybrid spruce plantations. FOREST ECOLOGY AND MANAGEMENT. 2021. 490: 119095.

Barrere, J; **Petersson, LK;** Boulanger, V; Collet, C; **Felton, AM;** **Löf, M;** Said, S. Canopy openness and exclusion of wild ungulates act synergistically to improve oak natural regeneration. FOREST ECOLOGY AND MANAGEMENT. 2021. 487: 118976.

Boakye, EA; Bergeron, Y; Girardin, MP; **Drobyshev, I.** Contrasting growth response of jack pine and trembling aspen to climate warming in Quebec mixedwoods forests of Eastern Canada since the early twentieth century. JOURNAL OF GEOPHYSICAL RESEARCH-BIOGEOSCIENCES. 2021. 126: e2020JG005873.

Brackhane, S; Reif, A; **Zin, E;** Schmitt, CB. Are natural disturbances represented in strictly protected areas in Germany? GLOBAL ECOLOGY AND CONSERVATION. 2021. 26: e01436.

Brondizio, ES; ...**Salk, CF;** ...Siani SMO. Making place-based sustainability initiatives visible in the Brazilian Amazon. CURRENT OPINION IN ENVIRONMENTAL SUSTAINABILITY. 2021. 49: 66-78.

Brunet, J; **Hedwall, PO;** Lindgren, J; Cousins, SAO. Immigration credit of temperate forest herbs in fragmented landscapes - Implications for restoration of habitat connectivity. JOURNAL OF APPLIED ECOLOGY. 2021. 58 (10): 2195-2206.

Caron, MM; ...**Brunet, J;** ...De Frenne, P. Thermal differences between juveniles and adults increased over time in European forest trees. JOURNAL OF ECOLOGY. 2021. 109 (11): 3944-3957.

Castro, J; Morales-Rueda, F; Navarro, FB; **Löf, M;** Vacchiano, G; Alcaraz-Segura, D. Precision restoration: a necessary approach to foster forest recovery in the 21st century. RESTORATION ECOLOGY. 2021. 29 (7): e13421.

Chagas, GD; **Salk, CF;** Vidal, EJ; de Souza, SEFX; Brancalion, PHS. Exploiting fruits of a threatened palm to trigger restoration of Brazil's Atlantic Forest. RESTORATION ECOLOGY. 2021. 29 (1): e13294.

Chen, WT; ...**Tigabu, M;** ...Ma, XQ. Transcriptome analysis provides insights into the root response of Chinese fir to phosphorus deficiency. BMC PLANT BIOLOGY. 2021. 21 (1): 525.

Cleary, M; **Blomquist, M;** Marchand, M; **Witzell, J.** Oomycetes in rhizosphere soil of ornamental plants from retail nurseries in Southern Sweden. FOREST PATHOLOGY. 2021. 51 (2): e12673.

Cleary, M; Morrison, DJ; van der Kamp, B. Symptom development and mortality rates caused by *Armillaria ostoyae* in juvenile mixed conifer stands in British Columbia's southern interior region. FOREST PATHOLOGY. 2021. 51 (2): e12675.

Dahlgren Lidman, F; **Holmström, E;** Lundmark T; Fahlvik, N. Management of spontaneously regenerated mixed stands of birch and Norway spruce in Sweden. SILVA FENNICA. 2021. 55 (4): 10485.

- De Pauw, K; ...**Brunet, J; Hedwall, PO**; ...De Frenne, P. Taxonomic, phylogenetic and functional diversity of understorey plants respond differently to environmental conditions in European forest edges. *JOURNAL OF ECOLOGY*. 2021. 109 (7): 2629-2648.
- de Streel, G; ...**Barbeito, I**; ...Ponette, Q. Mixing has limited impacts on the foliar nutrition of European beech and Scots pine trees across Europe. *FOREST ECOLOGY AND MANAGEMENT*. 2021. 479: 118551.
- del Rio, M; **Löf, M**; Bravo-Oviedo, A; Jactel, H. Understanding the complexity of mixed forest functioning and management: Advances and perspectives. *FOREST ECOLOGY AND MANAGEMENT*. 2021. 489: 119138.
- Depauw, L; ...**Brunet, J**; ...Verheyen, K. Evaluating structural and compositional canopy characteristics to predict the light-demand signature of the forest understorey in mixed, semi-natural temperate forests. *APPLIED VEGETATION SCIENCE*. 2021. 24: e12532.
- Downey, H; ...**Felton, A**; ...Sutherland, WJ. Training future generations to deliver evidence-based conservation and ecosystem management. *ECOLOGICAL SOLUTIONS AND EVIDENCE*. 2021. 2: e12032.
- Drobyshev, I; Niklasson, M**; Ryzhkova, N; Götmark, F; **Pinto, G; Lindblad, M**. Did forest fires maintain mixed oak forests in southern Scandinavia? A dendrochronological speculation. *FOREST ECOLOGY AND MANAGEMENT*. 2021. 482: 118853.
- Drobyshev, I; ...Pinto, G**; ...Kryshen, A. Trends and patterns in annually burned forest areas and fire weather across the European boreal zone in the 20th and early 21st centuries. *AGRICULTURAL AND FOREST METEOROLOGY*. 2021. 306: 108467.
- Elfstrand, M; ...**Cleary, M**; ...Durling, MB. Comparative analyses of the *Hymenoscyphus fraxineus* and *Hymenoscyphus albidus* genomes reveals potentially adaptive differences in secondary metabolite and transposable element repertoires. *BMC GENOMICS*. 2021. 22 (1): 503.
- Engel, M; ...**Löf, M**; ...Brazaitis, G. Simulating the effects of thinning and species mixing on stands of oak (*Quercus petraea* (Matt.) Liebl./*Quercus robur* L.) and pine (*Pinus sylvestris* L.) across Europe. *ECOLOGICAL MODELLING*. 2021. 442: 109406.
- Felton, A; Hedwall, PO; Trubins, R**; Lagerstedt, J; Felton, AM; Lindblad, M. From mixtures to monocultures: Bird assemblage responses along a production forest conifer-broadleaf gradient. *FOREST ECOLOGY AND MANAGEMENT*. 2021. 494: 119299.
- Felton, AM; ...Felton, A; Hedwall, PO; Tigabu, M**; Raubenheimer, D. Macronutrient balancing in free-ranging populations of moose. *ECOLOGY AND EVOLUTION*. 2021. 11 (16): 11223-11240.
- Gallagher, MR; Maxwell, AE; **Guillén, LA**; Everland, A; Loudermilk, EL; Skowronski, NS. Estimation of plot-level burn severity using terrestrial laser scanning. *REMOTE SENSING*. 2021. 13 (20): 4168.
- Gilani, MM; **Tigabu, M**; ...Ma, XQ. Seed germination and seedling emergence of four tree species of southern China in response to acid rain. *JOURNAL OF FORESTRY RESEARCH*. 2021. 32 (2): 471-481.
- Girdziusas, S; **Löf, M**; ...Metslaid, M. Forest regeneration management and policy in the Nordic-Baltic region since 1900. *SCANDINAVIAN JOURNAL OF FOREST RESEARCH*. 2021. 36 (7-8): 513-523.
- Guillen, LA**; Fernandez, R; Gaertner, B; Zegre, NP. Climate and landscape controls on the water balance in temperate forest ecosystems: Testing large scale controls on undisturbed catchments in the Central Appalachian mountains of the US. *WATER RESOURCES RESEARCH*. 2021. 57 (9): e2021WR029673.
- Hahn, T; Eggers, J; **Subramanian, N**; Caicoya, AT; Uhl, E; Snäll, T. Specified resilience value of alternative forest management adaptations to storms. *SCANDINAVIAN JOURNAL OF FOREST RESEARCH*. 2021. 36 (7-8): 585-597.
- Håkansson, C; **Hedwall, PO**; Strömberg, M; Axelsson, M; Bergh, J. Effects of fertilization on soil CH₄ and N₂O fluxes in young Norway spruce stands. *FOREST ECOLOGY AND MANAGEMENT*. 2021. 499: 119610.
- Hedwall, PO; Uria-Diez, J; Brunet, J**; Gustafsson, L; Axelsson, AL; Strengbom, J. Interactions between local and global drivers determine long-term trends in boreal forest understorey vegetation. *GLOBAL ECOLOGY AND BIOGEOGRAPHY*. 2021. 30 (9): 1765-1780.
- Holmström, E**; Carlström, T; **Goode, M**; Lidman, FD; **Felton, A**. Keeping mixtures of Norway spruce and birch in production forests: insights from survey data. *SCANDINAVIAN JOURNAL OF FOREST RESEARCH*. 2021. 36 (2-3): 155-163.
- Hou, XL; ...**Tigabu, M**; ...Liu, AQ. Lead contamination alters enzyme activities and microbial composition in the rhizosphere soil of the hyperaccumulator *Pogonatherum crinitum*. *ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY*. 2021. 207: 111308.
- Juerges, N; ...**Brukas, V; Felton, A; Lodin, I**; ...Sari, B. Power analysis as a tool to analyse trade-offs between ecosystem services in forest management: A case study from nine European countries. *ECOSYSTEM SERVICES*. 2021. 49: 101290.
- Krikken, F; Lehner, F; Haustein, K; **Drobyshev, I**; van Oldenborgh, GJ. Attribution of the role of climate change in the forest fires in Sweden 2018. *NATURAL HAZARDS AND EARTH SYSTEM SCIENCES*. 2021. 21 (7): 2169-2179.
- Larivière, D; Holmström, E; Brunet, J**; Weslien, J. Release of retained oaks in Norway spruce plantations. A 10-year perspective on oak vitality, spruce wood production and ground vegetation. *FOREST ECOLOGY AND MANAGEMENT*. 2021. 480: 118670.
- Leverkus, AB; ...**Löf, M**; Villar-Salvador, P. Restoring oak forests through direct seeding or planting: Protocol for a continental-scale experiment. *PLOS ONE*. 2021. 16 (11): e0259552.
- Li, X; ...**Tigabu, M**; ...Zhao, XY. Molecular and metabolic insights into anthocyanin biosynthesis for leaf color change in chokecherry (*Padus virginiana*). *INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES*. 2021. 22 (19): 10697.
- Li, X; ...**Tigabu, M**; ...Li, SW. Comparative transcriptomic analysis reveals the coordinated mechanisms of *Populus canadensis* leaves in response to cadmium stress. *ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY*. 2021. 216: 112179.
- Li, X; Zhao, MH; Xu, YJ; Li, Y; **Tigabu, M**; Zhao, XY. Genetic diversity and population differentiation of *Pinus koraiensis* in China. *HORTICULTURAE*. 2021. 7 (5): 104.
- Li, X; ...**Tigabu, M**; ...Zhao, X. Genome-wide identification of NAC transcription factor family in *Juglans mandshurica* and their expression analysis during the fruit development and ripening. *INTERNATIONAL JOURNAL OF MOLECULAR SCIENCES*. 2021. 22 (22): 12414.
- Li, Y; ...**Tigabu, M**; ...Zhao, XY. An overview of the practices and management methods for enhancing seed production in conifer plantations for commercial use. *HORTICULTURAE*. 2021. 7 (8): 252.
- Lidman, FD; **Holmström, E**; Lundmark, T; Fahlvik, N. Management of spontaneously regenerated mixed stands of birch and Norway spruce in Sweden. *SILVA FENNICA*. 2021. 55 (4): 10485.

Liljebäck, N; **Bergqvist, G**; ...Månsson, J. Learning from long time series of harvest and population data: Swedish lessons for European goose management. WILDLIFE BIOLOGY. 2021. 2021 (1): wlb.00733.

Lodin, I; Brukas, V. Ideal vs real forest management: Challenges in promoting production-oriented silvicultural ideals among small-scale forest owners in southern Sweden. LAND USE POLICY. 2021. 100: 104931.

Löf, M; Barrere, J; **Engman, M;** **Petersson, LK;** **Villalobos, A.** The influence of fencing on seedling establishment during reforestation of oak stands: a comparison of artificial and natural regeneration techniques including costs. EUROPEAN JOURNAL OF FOREST RESEARCH. 2021. 140 (4): 807-817.

Lula, M; **Trubins, R;** **Ekö, PM;** Johansson, U; **Nilsson, U.** Modelling effects of regeneration method on the growth and profitability of Scots pine stands. SCANDINAVIAN JOURNAL OF FOREST RESEARCH. 2021. 36 (4): 263-274.

Ma, QY; ...**Tigabu, M;** ...Hu, X. Gut bacterial communities of *Lymantria xylinia* and their associations with host development and diet. MICROORGANISMS. 2021. 9 (9): 1860.

Ma, YF; Zheng, WX; Guo, XB; **Tigabu, M;** Guo, FT. Effect of forest floor fuel moisture content on chemical components of PM2.5 emitted during combustion. CHEMOSPHERE. 2021. 279: 130547.

Månsson, J; Nilsson, L; **Felton, AM;** Jarnemo, A. Habitat and crop selection by red deer in two different landscape types. AGRICULTURE ECOSYSTEMS & ENVIRONMENT. 2021. 318: 107483.

Marrec, R; ...**Brunet, J;** ...Decocq, G. Multiscale drivers of carabid beetle (Coleoptera: Carabidae) assemblages in small European woodlands. GLOBAL ECOLOGY AND BIOGEOGRAPHY. 2021. 30 (1): 165-182.

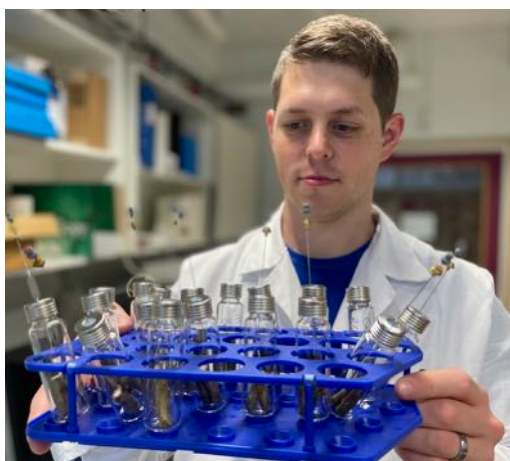
Marshall, JD; ...**Linder, S.** A carbon-budget approach shows that reduced decomposition causes the nitrogen-induced increase in soil carbon in a boreal forest. FOREST ECOLOGY AND MANAGEMENT. 2021. 502: 119750.

Matsiakh, I; Kramarets, V; **Cleary, M.** Occurrence and diversity of *Phytophthora* species in declining broadleaf forests in western Ukraine. FOREST PATHOLOGY. 2021. 51 (1): e12662.

Meeussen, C; ...**Brunet, J;** **Hedwall, PO;** ...De Frenne, P. Microclimatic edge-to-interior gradients of European deciduous forests. AGRICULTURAL AND FOREST METEOROLOGY. 2021. 311: 108699.

Meeussen, C; ...**Brunet, J;** ...De Frenne, P. Drivers of carbon stocks in forest edges across Europe. SCIENCE OF THE TOTAL ENVIRONMENT. 2021. 759: 143497.

Patrick Sherwood is one of many researchers in the growing pathology group with a laboratory at the forefront of research.



Mensah, AA; **Holmström, E;** Petersson, H; Nyström, K; Mason, EG; **Nilsson, U.** The millennium shift: Investigating the relationship between environment and growth trends of Norway spruce and Scots pine in northern Europe. FOREST ECOLOGY AND MANAGEMENT. 2021. 481: 118727.

Moreno-Fernandez, D; **Aldea, J;** Gea-Izquierdo, G; Canellas, I; Martin-Benito, D. Influence of climate and thinning on *Quercus pyrenaica* Willd. coppices growth dynamics. EUROPEAN JOURNAL OF FOREST RESEARCH. 2021. 140 (1): 187-197.

Mörtberg, U; Pang, XL; Treinys, R; **Trubins, R;** Mozgeris, G. Sustainability assessment of intensified forestry - Forest bioenergy versus forest biodiversity targeting forest birds. SUSTAINABILITY. 2021. 13 (5): 2789.

Mozgeris, G; Mörtberg, U; Pang, XLL; **Trubins, R;** Treinys, R. Future projection for forest management suggests a decrease in the availability of nesting habitats for a mature-forest-nesting raptor. FOREST ECOLOGY AND MANAGEMENT. 2021. 491: 119168.

Muffler, L; ...**Löf, M;** ...Kreyling, J. High plasticity in germination and establishment success in the dominant forest tree *Fagus sylvatica* across Europe. GLOBAL ECOLOGY AND BIOGEOGRAPHY. 2021. 30 (8): 1583-1596.

Naaf, T; ...**Brunet, J;** **Hedwall, PO;** ...Kramp, K. Sensitivity to habitat fragmentation across European landscapes in three temperate forest herbs. LANDSCAPE ECOLOGY. 2021. 36 (10): 2831-2848.

Novikov, A; Lisitsyn, V; **Tigabu, M;** Tylek, P; Chuchupal, S. Detection of Scots Pine single seed in optoelectronic system of mobile grader: Mathematical modeling. FORESTS. 2021. 12 (2): 240.

Osei, R; ...**Löf, M;** ...Ponette, Q. Tree species identity drives soil organic carbon storage more than species mixing in major two-species mixtures (pine, oak, beech) in Europe. FOREST ECOLOGY AND MANAGEMENT. 2021. 481: 118752.

Ouyang, FQ; ...**Tigabu, M;** Wang, JH. *Picea* species from humid continental and temperate marine climates perform better in monsoonal areas of middle latitudes of China. JOURNAL OF FORESTRY RESEARCH. 2021. 32 (4): 1395-1408.

OuYang, FQ; ...**Tigabu, M.** Growth and physiological responses of Norway spruce (*Picea abies* (L.) H. Karst) supplemented with monochromatic red, blue and far-red light. FORESTS. 2021. 12 (2): 164.

Padulles Cubino, J; ...**Brunet, J;** ...Chytry, M. Plant taxonomic and phylogenetic turnover increases toward climatic extremes and depends on historical factors in European beech forests. JOURNAL OF VEGETATION SCIENCE. 2021. 32 (1): e12977.

Petersson, L; Nilsson, S; **Holmström, E;** **Lindbladh, M;** **Felton, A.** Forest floor bryophyte and lichen diversity in Scots pine and Norway spruce production forests. FOREST ECOLOGY AND MANAGEMENT. 2021. 493: 119210.

Polme, S; ...**Cleary, M;** ...Tedersoo, L. FungalTraits: a user-friendly traits database of fungi and fungus-like stramenopiles. FUNGAL DIVERSITY. 2020. 105 (1): 1-16.

Potzelsberger, E; ...**Witzell, J;** ...Zlatkovic, M. Biotic threats for 23 major non-native tree species in Europe. SCIENTIFIC DATA. 2021. 8 (1): 210.

Rautiainen, H; Bergvall, UA; **Felton, AM;** **Tigabu, M;** Kjellander, P. Nutritional niche separation between native roe deer and the nonnative fallow deer-a test of interspecific competition. MAMMAL RESEARCH. 2021. 66 (3): 443-455.

Ribas-Marques, E; **Diaz-Calafat, J.** The Asian giant resin bee *Megachile sculpturalis* Smith 1853 (Hymenoptera: Apoidea: Megachilidae), a new exotic species for the bee fauna of Mallorca (Balearic Islands, Spain). JOURNAL OF APICULTURAL RESEARCH. 2021. 60 (3): 506-511.

Roos, A; Blomquist, **M**; **Ekegren, K**; **Rönnberg, J**; ...Tunberg, M. The digitalisation of the Nordic bioeconomy and its effect on gender equality. SCANDINAVIAN JOURNAL OF FOREST RESEARCH, 2021. 36 (7-8): 639-654.

Ruiz-Peinado, R; ...**Löf, M**; **Aldea, J**; **Barbeito, I**; ...Del Rio, M. Mixing effects on Scots pine (*Pinus sylvestris* L.) and Norway spruce (*Picea abies* (L.) Karst.) productivity along a climatic gradient across Europe. FOREST ECOLOGY AND MANAGEMENT. 2021. 482: 118834.

Sabatini, FM; ...**Brunet, J**; ...Bruehlheide, H. sPlotOpen - An environmentally balanced, open-access, global dataset of vegetation plots. GLOBAL ECOLOGY AND BIOGEOGRAPHY. 2021. 30 (9): 1740-1764.

Sanczuk, P; ...**Brunet, J**; **Hedwall, PO**; ...De Frenne, P. Small scale environmental variation modulates plant defence syndromes of understorey plants in deciduous forests of Europe. GLOBAL ECOLOGY AND BIOGEOGRAPHY. 2021. 30 (1): 205-219.

Skovsgaard, JP; Johansson, U; **Holmström, E**; Tune, RM; Ols, C; **Attocchi, G.** Effects of thinning practice, high pruning and slash management on crop tree and stand growth in young even-aged stands of planted silver birch (*Betula pendula* Roth). FORESTS. 2021. 12 (2): 225.

Spitzer, R; ...**Felton, AM**; **Juvany, L**; ...Cromsigt, JPGM. Small shrubs with large importance? Smaller deer may increase the moose-forestry conflict through feeding competition over *Vaccinium* shrubs in the field layer. FOREST ECOLOGY AND MANAGEMENT. 2021. 480: 118768.

Tallian, A; ...**Bergqvist, G**; Kindberg, J. The return of large carnivores: Using hunter observation data to understand the role of predators on ungulate populations. GLOBAL ECOLOGY AND CONSERVATION. 2021. 27: e01587.

Tarvainen, L; ...**Linder, S**; ...Marshall, JD. Limited vertical CO2 transport in stems of mature boreal *Pinus sylvestris* trees. TREE PHYSIOLOGY. 2021. 41 (1): 63-75.

Tian, XL; ...**Linder, S**; Makela, A. Disaggregating the effects of nitrogen addition on gross primary production in a boreal Scots pine forest. AGRICULTURAL AND FOREST METEOROLOGY. 2021. 301: 108337.

Tuffery, L; ...**Lopez-Garcia, N**; ...Lefevre, F. Adaptive measures for mountain Mediterranean forest ecosystem services under climate and land cover change in the Mont-Ventoux regional nature park, France. REGIONAL ENVIRONMENTAL CHANGE. 2021. 21 (1): 12.

Van Sundert, K; **Linder, S**; Marshall, JD; Nordin, A; Vicca, S. Increased tree growth following long-term optimised fertiliser application indirectly alters soil properties in a boreal forest. EUROPEAN JOURNAL OF FOREST RESEARCH. 2021. 140 (1): 241-254.

Vanneste, T; Van Den Berge, S; **Brunet, J**; **Hedwall, PO**; Verheyen, K; De Frenne, P. Temperature effects on forest understorey plants in hedgerows: a combined warming and transplant experiment. ANNALS OF BOTANY. 2021. 128 (3): 315- 327.

Wang, F; ...**Tigabu, M**; Zhao, XY. Transcriptome sequencing and gene expression profiling of *Pinus sibirica* under different cold stresses. BREEDING SCIENCE. 2021. 71 (5): 550-563.

Wang, Z; ...**Drobyshev, I.** 352 years long fire history of a Siberian boreal forest and its primary driving factor. GLOBAL AND PLANETARY CHANGE. 2021. 207: 103653.

Zaluma, A; **Sherwood, P**; Bruna, L; **Skola, U**; Gaitnieks, T; **Rönnberg, J.** Control of *Heterobasidion* in Norway spruce stands: The impact of stump cover on efficacy of urea and *Phlebiopsis gigantea* and implications for forest management. FORESTS. 2021. 12 (6): 679.

Zhang, H; Heal, KT; Zhu, XD; **Tigabu, M**; Xue, YA; Zhou, CF. Tolerance and detoxification mechanisms to cadmium stress by hyperaccumulator *Erigeron annuus* include molecule synthesis in root exudate. ECOTOXICOLOGY AND ENVIRONMENTAL SAFETY. 2021. 219: 112359.

Zhang, H; ...**Tigabu, M**; ...Zhao, XY. Genetic stability of *Larix olgensis* provenances planted in different sites in northeast China. FOREST ECOLOGY AND MANAGEMENT. 2021. 485: 118988.

Zhang, Y; ...**Tigabu, M**; Ma, XQ. Linkage of aggregate formation, aggregate-associated C distribution, and microorganisms in two different-textured ultisols: A short-term incubation experiment. GEODERMA. 2021. 394: 114979.

Popular science

Publications in popular science outlets in 2021 with authors from the Southern Swedish Forest Research Centre.

Brunet, J. Trolleholms skogar under 300 år. Skogshistoriska Sällskapets Årsskrift 2021: 82-93.

Brunet, J. Trolleholms skogar under 300 år – skogsbrukets utveckling på ett skånskt gods. 2021. Working report no 55. 81 pp. Inst. f. sydsvensk skogsvetenskap, SLU. ISBN (pdf) 978-91-576-9839-1, (printed) 978-91-576-9838-4.

Böhlenius, H.; **Petersson, L.**; **Cleary, M.**; ...Persson, P-O. Snabbväxande trädslag för energi och andra ändamål - Sammanställning av dagens kunskapsläge och framtidens utmaningar. 2021. ER 2021:19. 80 pp. Energimyndigheten. ISBN (pdf) 978-91-7993-015-8.

Lindbladh, M. En nykomling i skogen. Så erövrade granen Sverige. 2021. 200 pp. Hirschfeld förlag. ISBN (printed) 978-91-576-9842-1.

Kiss, B; **Salk, C.** Mobile research labs to explore nature-based solutions in Japanese cities. Utsunomiya University Center for the Multicultural Public Sphere Annual Report. 2021. 13: 145-154.

Skovsgaard, JP; Graversgaard, HC. Skovdyrkning med små trærarter: Tyrkisk hassel – 2. Skoven. 2021 (2): 64-69.

Violeta Kokos keeps track of the department's administration



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