

ANNUAL REPORT

Trees For Me



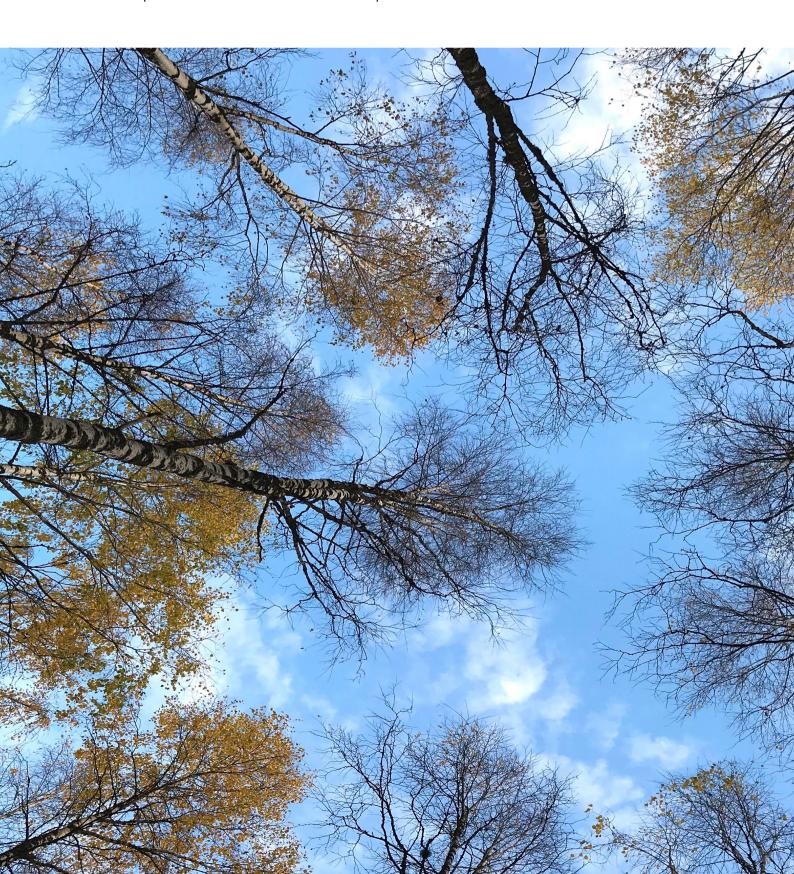
Looking back and ahead

The second year of Trees For Me has been much about starting projects. All PhD students except one are in place and are fully occupied with fieldwork, analysis of data, writing manuscripts and PhD courses. The first scientific paper by one of the centre's PhD students was published during 2023 and many more will come.

A highlight of the year was our study trip to Finland. Most of the PhD students and many supervisors could join. We learnt a lot about the Finnish experience of growing silver birch, but we also had the chance to get to know each other during many hours in the bus and during the evening events.

Our communication continues with monthly webinars with high and increasing attendance. Trees For Me hosted an excursion in Remningstorp where researchers and PhD students participated and presented on various topics related to fast-growing broadleaves.

In 2024, PhD students will continue with their projects, and we look forward to many more scientific publications. We will continue with the webinars, and we will otherwise intensify our communication efforts with stakeholders and within the centre. In addition, we have already now started to think about how to organize phase two to best make use of results from phase one and further develop the centre.



Research Programme Activities

Work package 1 - Tree breeding

The year 2023 was intensive for operational breeding of birch but birch flowering was poor and only twelve new crossings in the birch population could be done.

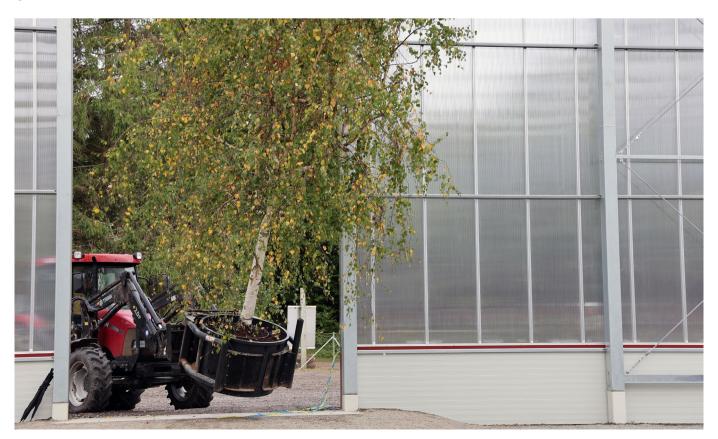
At the field station in Ekebo, a new greenhouse was built that will be used to facilitate operational breeding of birch. This greenhouse will be primarily used in research for stimulation of flowering to speed up breeding.

Three new genetic trials were planted in southern Sweden containing progenies of new crossings in the southern Swedish breeding population. The trials contain ca 6,000 seed-lings and will be an asset for selection of genotypes for future breeding. All sites were fenced to protect against browsing. Experiments with birch were established on six sites to demonstrate the effect of the breeding programme. In these demonstration sites, about 24,000 birch seedlings and 6,000 Norway spruce seedlings were planted. Parts of the experiments will be used for selection as mentioned above and for studies concerning growth and quality of different birch origin. Four sites were prepared for genetic trials in northern Sweden. In 2024, ca 14,000 seedlings will be planted. This high number of seedlings has never before been planted in the Swedish silver birch breeding programme.

A practical study of possibilities to clone birch by rooted cuttings was done. The method is completely feasible and can be implemented in the operational birch breeding program. A possible change of the breeding strategy is dependent on the economy of the birch breeding program since the method with rooted cuttings is at least three times as expensive as traditional testing via progenies which is currently used.

Giovanni Bozza (Skogforsk and SLU), who is PhD student in Work package 1 has started three of the four planned studies that are part of his PhD project. His first study on genetics of early flowering will likely be completed during 2024. Initial results show moderate heritability and high variability between full-sib birch families, i.e. families with known mother and father. Giovanni's last study will start in 2024 in the new greenhouse.

Maria del Pilar Hererra Egoavil (Uppsala University) is a PhD student working with genomic selection of silver birch. Her study, which examines the genetic structure of the birch population in Sweden, is progressing as planned. The whole genome of about 600 natural birches from Sweden was re-sequenced, and data has already been analyzed. The information from this study is crucial for implementing genomic selection to operational breeding. Not accounting for genetic structure of the natural population has been leading to biased estimation of genetic parameters and breeding values of the tested genotypes.



Work package 2 - Silviculture

In Work Package 2, several projects are working towards producing efficient biomass production systems of fast-growing broadleaves, mostly dealing with silver birch. In the project on autonomous forest regeneration, PhD student Erik Arvidsson (Luleå University of Technology) aims to develop a completely new autonomous combined site preparation and planting equipment including seedling management on vehicle. This solution is already developed for pine and spruce seedlings and there is good enough insight of the design space to adapt the AutoPlant concept and make it applicable for birch as well. The research and development of the needed subsystems has been started and so far, Erik and his supervisor have developed a method and digital tool for how to distribute mixed species seedlings taking species ratio choices into consideration. This digital precision planning tool can be used to optimize the biomass production in a regeneration area for a given species ratio. To optimize the method however, more research is needed on the local growth properties for the mixtures, as well as the vehicle properties to optimize species placement at all planting spots. Erik's work was recently presented at the 16th European-African Regional Conference of the International Society for Terrain-Vehicle Systems.

To address major knowledge gaps in terms of studies concerning regeneration methods for silver birch in Sweden, several field experiments have been implemented where the effects and interactions of clear-cut age, site preparation, seedling type, and fertilization at planting will be tested. In addition, cropping experiments where establishment and production of planted silver birch will be compared to other tree species like Norway spruce, Scots pine and larch (Russian larch in the north and hybrid larch in the south) have undergone their first measurements. The cropping experiments are established across a fertility gradient as well as a gradient in damage caused by ungulate browsing or other agents. In addition, long-term production after various precommercial thinning treatments will be studied. To date, 16 out of 50 cropping experiments have been installed and three out of four clear-cut age experiments have been started.

In her PhD project, PhD student Kinga Stolarek (Swedish University of Agricultural Sciences) is addressing some important knowledge gaps concerning artificial regeneration of silver birch. Using the clear-cut experiments described above, she is testing the performance of containerized seedlings in the field and her preliminary results already show a positive impact of site preparation (especially soil inversion) on seedling survival. In addition, she is currently investigating whether seed-associated fungi play any role in the germination of birch seed using a combination of classical and advanced molecular techniques to describe the fungal community associated with seeds from genotypically superior and wild-type birch individuals.

PhD student Babatunde (Ola) Dosumu (Swedish University of Agricultural Sciences) is developing knowledge and tools required for effective management of planted birch stands in Sweden. Site index based on dominant height is an important tool in forest growth and yield modelling, thus inventory plots were established and dominant height was measured in 23 planted birch stands across Sweden. In the summer of 2023, birch thinning trials were established on four sites in southern Sweden. With regards to climate change and carbon capture, biomass harvest was conducted on one site (Asa) in southern Sweden. Field processing of harvested trees was completed in summer 2023, while lab processing of stem, branch and foliage samples commenced in winter 2023. Biomass harvesting and analysis of data is done in a joint project between Ola Dosumu and Swastika Chakravorty (Luleå University of Technology).

Productivity expectations are not always realized as a result of unanticipated problems with pests and diseases. In her PhD project, Sezer Olivia Kaya (Swedish University of Agricultural Sciences) is investigating both current and future risks to planted birch. In 2023, she initiated several experimental trials to investigate whether Heterobasidion root rot is problematic on birch in southern Sweden. Preliminary results suggest that the frequency of infection on birch stumps is rather low, and the reason for that may be due to another dominant fungus belonging to the genus Ophiostoma that is frequently associated to birch stumps. The presence of this fungus may well deter natural germination of Heterobasidion spores on stumps after cutting, but this hypothesis is being tested now in a new series of in vitro and in vivo laboratory investigations.

Future threats on horizon for European birch include an insect pest known as bronze birch borer. This wood boring insect is native to North America and has not yet been introduced to Europe. To increase our preparedness to deal with any new biological invasion, we need better tools and methods to be able to detect new threats if they arrive to a new country. With an international team of researchers, Sezer helped to develop and field-validate an early detection tool that allows for point-of-use detection of bronze birch borer from environmental DNA (eDNA) samples. The study, was recently published in the journal Environmental DNA and has received high attention amongst the international forest pathology and entomology community and amongst plant phytosanitary agencies across the EU.



Work package 3 – Material and energy

In one of the ongoing studies, PhD student Sruthy Vattaparambil Sudharsan (Luleå University of Technology) has sampled stem discs from a second rotation poplar tree experimental site in southern Sweden. The trees were 19 years old and plots were treated with different thinning regimes, including low, medium, heavy, and unthinned. In terms of forest growth, handling, and end usage, e.g. for pulping, saw timber, and thermochemical fuel conversion, density is an important property. The density of the collected wood disc samples varied between the treatments. The trees that underwent heavy thinning showed a comparatively higher density than those that were unthinned. The trend was the same in both stem wood and bark densities. Sruthy has also collected stem discs from a thinning experiment in silver birch that will be analyzed during 2024.

A four-day experimental combustion campaign was done during November with an admixture of 20% round wood from birch to an ordinary fuel mix containing softwood sawdust and wood chips in a 50 MWth full-scale circulating fluidized bed situated in Lycksele. The combustion plant is owned and operated by Skellefteå Kraft. The birch roundwood (240 m3fub) was delivered by Sveaskog to the plant site in Lycksele. The handling and milling of the birch round wood went smoothly, and no significant difference in the operation and the combustion performance (e.g., thermal efficiency, gaseous emissions, etc.) could be determined compared to the ordinary fuel mixture used.

PhD student Swastika Chakravorty (Luleå University of Technology) is well on the way to finalize her first study on the economy of various thinning programmes in birch in monocultures and in group mixtures with Norway spruce. Preliminary results show that biomass harvest in the first thinning can be economical depending on the price of fuel wood but that individual management of different tree species in group-wise mixtures may not be economically advisable.

The PhD student Seyed Mohammad Razavi (Luleå University of Technology) could not start because of visa problems. However, stem discs for two studies in the project have been collected. The project will be finalized by a post doc and the supervisor.

Work package 4 – Societal transitions

In Work Package 4, the focus during 2023 has been on building a foundation for studying societal perspectives on fast-growing broadleaves. One project (System innovations) started in October 2022 and the second project (Forest owners and stakeholders) started in January 2023. Researchers and the PhD students Caroline Rapp (Umeå University) and Derek Garfield (Swedish University of Agricultural Sciences) have met with stakeholders (e.g. the reference group), organized a webinar for researchers and stakeholders focusing specifically on owner perspectives on fast-growing broadleaves, and attended webinars organized by Trees For Me and others (e.g. the Swedish Forest Agency/Skogsstyrelsen). They have also contributed to two webinars as part of Trees For Me webinar series, one on forest owners' tree species selection and one on the general public's acceptance of fast-growing tree species.

In addition, meetings with the external advisory board have provided an international outlook on fast-growing broadleaves. The excursions organized by Trees For Me to Finland and Remingstorp have been important opportunities for the researchers to develop a contextualized understanding of fast-growing broadleaves in Sweden. In addition, the excursions have been vital arenas for networking. The courses taken by Caroline and Derek during this year further enable the utilization of relevant social science theory and methods to examine a transition towards an increase in fast-growing broadleaves in Sweden.

Key approaches revolve around understanding system transitions, including the role of policy instruments, also utilizing psychological and geographical perspectives to understand stakeholders. The diverse activities in Trees For Me have been important when preparing for the first set of data collection in the projects. Interviews have been conducted with stakeholders exploring innovators and their business models. In addition, a large-scale survey of individual private forest owners in Sweden has been carried out to explore adoption of fast-growing broadleaves and the conditions affecting the owners' decisions.



Work package 5 – Environmental impacts

In this work package, two PhD students, Jaime Luna (Swedish University of Agricultural Sciences) and Aureo Aparecido Abreu Junior (Swedish University of Agricultural Sciences), started their studies during 2022. Jaime is working with biodiversity aspects and Aureo with climate effects due to various scenarios for increased growing of fast-growing broadleaves. In late autumn, one additional PhD student, Emil Andersson (Swedish University of Agricultural Sciences), also working with biodiversity aspects and focusing on effects on ant populations, was connected to the work package.

One major aim of the climate studies using Life Cycle Assessment is to assess alternative system designs and management strategies to be able to provide decision support on climate-optimized production and utilization chains, for upcoming large-scale implementation. To assess the overall climate impact of a forest-based production chain, a system perspective is applied where forest carbon stock changes, temporary carbon storage in wood products, value chain emissions, and avoided emissions from substitution are considered. A model framework is now developed, and preliminary results are presented, describing the effects when birch is planted instead of spruce after a final felling of spruce.

In the second PhD project, strategies to reduce the costs and optimize the benefits to forest biodiversity from the increased use of fast-growing broadleaves will be identified. The primary research questions focus on deciphering the biodiversity contribution of fast-growing broadleaved stands relative to protected forest areas and tree species replaced, as well as identifying management alternatives that may enhance the contribution of fast-growing broadleaves to Sweden's forest biodiversity. This work is mainly based on experimental research and a major work the first year has been to establish experiments, for example by placing logs of different fast-growing broadleaved tree species in various environments, for future quantification of the resulting biodiversity effects. The work in Work Package 5 has been presented and discussed on several occasions, for example at webinars and excursions organised by Trees For Me.



Goals and centre development

Overarching goal

To ensure sustainable biomass production from fast-growing broadleaves with security and flexibility of supply and quality, while reducing target conflicts, and to ensure efficient and sustainable biorefinery value chains for wood-based feedstocks and fuel assortments.

Status on the 5-10 year objectives

- Excellent interdisciplinary research program
 - o Diverse research areas are included in the centre
 - o Meetings with the External Advisory Board and reference groups.
 - o Increased interest beyond the centre partnerships
- Infrastructure for large-scale planting of fast-growing broadleaves
 - o In progress, industry involvement is crucial
- Develop "excellent leaders"
 - o PhD students are the most important asset
- Gain of critical know-how (beyond state-of-the-art) for "fast-growing broadleaves-embedded" forestry
 - o The centre involves many researchers from different disciplines as well as industry representatives
 - o Publications abour fast growing broadleaves are published in scientific journals
 - Extensive outreach activities (webinars, workshops, meetings, seminars, excursions etc.)
- Innovative solutions for sustainable forest bioenergy
 - Addressed in all WPs (various elements of value chains)
- Contribute to significant increase in the use of broadleaves forest biomass
 - o On the way, industry involvement crucial
- Identify and evaluate at least four complete value chains based on fast-growing broadleaves
 - o Done for energy conversion of birch with very good results
 - Energy conversion of poplar is ongoing
- Added funds
 - Very successful. During 2022-2023 more than 40 million SEK were granted to projects that are connected to Trees For Me
- Inclusion of new knowledge in education
 - o Through Master's theses work and in courses where Trees For Me researchers are course leaders



Key performance indicators (KPI)

See tables below with same numbering

1. People

We are now fully staffed with 27 researchers in the centre, of which 12 are PhD students. During 2023, we had four guest researchers coming to Sweden.

2. Publications

Six scientific publications were published in 2023.

3. Outreach

We have been cited in more than 20 articles in forestry magazines, have been interviewed on TV and radio, and articles/newletters widely spread through social media (e.g. LinkedIn). We have had 12 webinars and we hosted an excursion in Remningstorp well-attended by diverse stakeholders. Our website is up and running and has gotten very good reviews.

4. Education

Most researchers and PhD students are involved in teaching at different levels (Bachelors, Masters). Trees For Me researchers were course leaders on 13 courses at the bachelor- and master level corresponding to 165 higher educations credits (HEC) or 2.75 academic years. We have had five master theses that are connected to the centre.

5. Achievements

All planned experiments have been started and we foresee that they will be installed according to the experimental plans.

6. Added funding.

During 2022-2023 more than 40 million SEK granted to projects that are connected to Trees For Me

7. Meetings

During 2023, we have had more than 20 meetings with stakeholders across all Work Packages. The meetings range from large excursions (all WPs), reference group meetings (at Work Package level) and meetings with individual stakeholders (at project level) about e.g. experiments. In addition, meetings with the External Advisory Board held by each Work Package separately, has largely benefited the projects with the very high level of knowledge and experience of experts in the area.



Trees For Me in numbers

Table 1. Researchers and students involved in the centre 2023

Work package	Name	Title	Organisation
1	Mateusz Liziniewicz	Doctor, researcher	Skogforsk
1	Henrik Hallingbäck	Doctor, researcher	Skogforsk
1	Curt Almqvist	Doctor, senior resercher	Skogforsk
1	Magnus Löf	Professor	Swedish University of Agricultural Sciences
1	Thomas Kraft	Researcher and manager	Skogforsk
1	Martin Lascoux	Professor	Uppsala University
1	Pascal Milesi	Doctor, researcher	Uppsala University
1	Jon Ahlinder	Doctor, researcher	Skogforsk
1	Ulfstand Wenström	Researcher and manager	Skogforsk
1	Niina Stenvall	Doctor, researcher	LUKE
1	Giovanni Bozza	PhD student	Skogforsk
1	Maria del Pilar Herrera Egoavil	PhD student	Uppsala University
2	Michelle Cleary	Associate professor	Swedish University of Agricultural Sciences
2	Karin Hjelm	Associate professor	Swedish University of Agricultural Sciences
2	Henrik Böhlenius	Associate professor	Swedish University of Agricultural Sciences
2	Torbjörn Lindbäck	Associate professor	Luleå University of Technology
2	Håkan Lideskog	Associate professor	Luleå University of Technology
2	Magnus Karlberg	Professor	Luleå University of Technology
2	Urban Nilsson	Professor	Swedish University of Agricultural Sciences
2	Gudmund Vollbrecht	Associate professor	Swedish University of Agricultural Sciences
2	Erik Arvidsson	PhD student	Luleå University of Technology
2	Kinga Stolarek	PhD student	Swedish University of Agricultural Sciences
2	Ola (Babatunde) Dosumu	PhD student	Swedish University of Agricultural Sciences
2	Sezer Olivia Kaya	PhD student	Swedish University of Agricultural Sciences
3	Marcus Öhman	Professor	Luleå University of Technology
3	Elisabeth Wetterlund	Professor	Luleå University of Technology
3	Kentaro Umeki	Professor	Luleå University of Technology
3	Swastika Chakravorty	PhD student	Luleå University of Technology
3	Sruthy Vattaparambil Sudharsan	PhD student	Luleå University of Technology
3	Dan Bergström	Associate professor	Swedish University of Agricultural Sciences
4	Louise Eriksson	Associate professor	Umeå University
4	Vilis Brukas	Professor	Swedish University of Agricultural Sciences
4	Derek Garfield	PhD student	Swedish University of Agricultural Sciences
4	Caroline Rapp	PhD student	Umeå University
5	Per-Anders Hansson	Professor	Swedish University of Agricultural Sciences
5	Adam Felton	Senior lecturer	Swedish University of Agricultural Sciences
5	Renats Trubins	Assistant senior lecturer	Swedish University of Agricultural Sciences
5	Jaime Luna	PhD student	Swedish University of Agricultural Sciences
5	Aureo Abreu Jr	PhD student	Swedish University of Agricultural Sciences

Table 2. Scientific publications 2023

(Trees For Me researcher indicated in bold)

- Lee D., Siipilehto J., Beuker E., Fahlvik N., **Liziniewicz M.**, Hynynen J. 2023. Multivariate mixed-effects models for stand characteristics of hybrid aspen plantations in southern Finland and southern Sweden. Forest Ecology and Management. 541. https://doi.org/10.1016/j.foreco.2023.121066
- Riit T., **Cleary M.**, Adamson K., Blomquist M., Burokien D., Mar iulynien D., Oliva J., Poimala A., Redondo M.A., Strømeng G.M., et al. 2023. Oomycete Soil Diversity Associated with Betula and Alnus in Forests and Urban Settings in the Nordic-Baltic Region. Journal of Fungi. 9(9), 926.

https://doi.org/10.3390/jof9090926

- Schulte M., Jonsson R., Eggers J., Hammar T., Stendahl J., **Hansson P-A**. 2023. Demand-driven climate change mitigation and trade-offs from wood product substitution: The case of Swedish multi-family housing construction. Journal of cleaner production. 421. https://doi.org/10.1016/j.jclepro.2023.138487
- Jones G., **Liziniewicz M.**, Lindeberg J., Adamopulos S.. 2023. Non-Destructive Evaluation of Downy and Silver Birch Wood Quality and Stem Features from a Progeny Trial in Southern Sweden. Forests. 14(10). https://doi.org/10.3390/f14102031
- **Böhlenius H., Öhman M.**, Granberg F., Persson P-O. 2023. Biomass production and fuel characteristics from long rotation poplar plantations. Biomass & Bioenergy. 178. https://doi.org/10.1016/j.biombioe.2023.106940
- Peterson D. L., Pecori F., Luchi N., Migliorini D., Santini A., Kyle K. E., Rutledge C., Sallé A., **Kaya S. O.**, Ramsfield T., & **Cleary, M.** 2023. Development of novel LAMP and qPCR assays for rapid and specific identification of Bronze birch borer (Agrilus anxius). Environmental DNA.

http://doi.org/10.1002/edn3.503

Table 3a. Web articles 2023

Publication	Author	Title
Web article	Stina Johannesson	Underutilized trees can contribute to a sustainable energy transition
Web article	Stina Johannesson	Centre for fast-growing bro- adleaves is aiming for excel- lence
Web article	Stina Johannesson	Fast-growing broadleaf trees gathered the forest sector
Web article	Stina Johannesson	Trees For Me nominated for marketing award
Web article	Mats Ostelius	More improved birch in new and unique greenhouse
Web article	Stina Johannesson	Exploring the energy potential of fast-growing broadleaves
Web article	Stina Johannesson	The Nordics and Baltics joined forces for more birch
Web article	Stina Johannesson	Greenhouse of the future installed
Web article	Stina Johannesson	Forest owners' interest in fast- growing broadleaves in focus
Web article	Stina Johannesson	Potential in innovations of fast-growing broadleaves
Web article	Stina Johannesson	Tool can detect possible destructive pest for Swedish birches

Table 3b. Research seminars 2023

Seminar	Presenter	Title
Webinar	Mateusz Liziniewicz, Giovanni Bozza, Maria del Pilar Herrera Egoavil	On the road toward speed breeding of birch
Webinar	Henrik Böhlenius	Fast-growing broadleaf trees – where are we and where are we going?
Webinar	Elisabeth Wetterlund, Johannes Schmidt (BOKU)	Integrating biomass and intermit- tent renewables in energy sys- tems: a modeling perspective
Webinar	Marcus Öhman, Henrik Böhlenius	Poplar as fuel raw material - a pre-study
Workshop	Henrik Böhlenius, Jaime Luna, Joel Jensen, Sezer Olivia Kaya, Caroline Rapp, Andis Zvirgzdins, Ola Dosumu, Kinga Stolarek, Giovanni Bozza, Luca Muraro	More improved birch in new and unique greenhouse
Webinar	Isak Lodin, Louise Eriksson, Vilis Brukas	Factors behind the choice of tree species in southern Swedish family forestry
Webinar	Per-Anders Hansson	How can we quantify climate effects of fast-growing broadleaf trees?
Webinar	Mateusz Liziniewicz	Why does not the birch flower as expected?
Webinar	Kinga Stolarek	The potential of birch – from seed to containerized seedling
Webinar	Dan Bergström	Young forest and bioenergy bio- mass - potential and technology for small tree harvest
Webinar	Louise Eriksson	The general public's perspective on fast-growing tree species
Webinar	Jaime Luna	What are the biodiversity implications of fast-growing broadleaf trees?
Webinar	Urban Nilsson, Ulfstand Wennström, Karin Hjelm	Refined birch and its potential for northern Sweden
Invited speaker	Magnus Karlberg	Lessons from the challenges in forestry machinery automation
Seminar at Swedish parliament	Urban Nilsson	Forskningsdag med fokus på hur riksdagen kan möta komplexa ut- maningar med hjälp av forskning

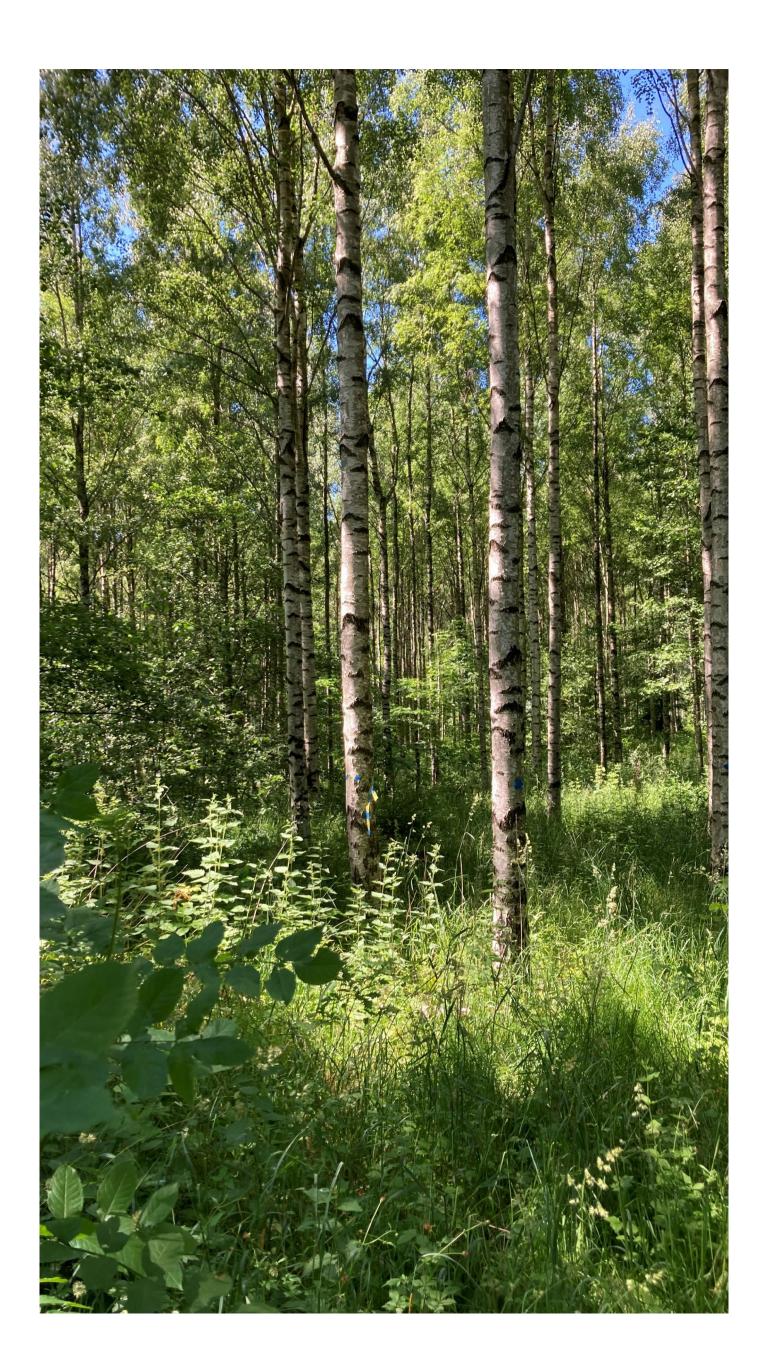


Table 3c. Popular publications 2023

Publication	Contributor	Title	Place/source
Article	Urban Nilsson	Stor efterfrågan på björk: "Nu tänker skogsägarna annorlunda"	Tillväxt
Press release	Thomas Kraft	Mer förädlad björk i nytt och unikt växthus	Skogforsk
Blog post	Urban Nilsson	Björk kan bli nytt huvud- trädslag - mer förädling på gång	Skogsforum
Article	Urban Nilsson, Thomas Kraft	Mer förädlad björk kan ge mer björktimmer	Woodnet
Radio feature		Björkträd ska odlas i åtta meter högt växthus	Vetenskapsradion Nyheter
Leader article		Fler ankungar behöver bli svanar	Land Lantbruk
Radio feature	Thomas Kraft	"Större behov av att välja mellan fler träslag"	P4 Kristianstad
Article	Urban Nilsson, Thomas Kraft, Anna Karlberg	Mer förädlad björk i nytt och unikt växthus	Skogsaktuellt
Article	Thomas Kraft	Jättelikt växthus krävs för framtidens träd	Skånska dagbla- det
Article	Louise Eriksson	Psykologin bakom omställ- ningar	Skogssällskapet
Article	Magnus Petersson	Stor satsning på forskning om snabbväxande lövträd	Södra
Article/event	Anders Ekstrand	Snabbväxande lövträd samlade experter, forskare och skogsägare	Södra
Article	Thomas Kraft	Snabb björk ger klimatfördel	Vision
Radio feature	Urban Nilsson	Experten: Så kommer den svenska skogen se ut i framtiden	P4 Skaraborg
Article	Thomas Kraft	Träden ska växa sig starka i ny gigantisk forskningsan- läggning	Skånska dagbla- det
Article	Kinga Stolarek, Henrik Holmberg	Björkplantor mår bra av markberedning	Södra
Article	Thomas Kraft	Nya växthuset för skogsträd invigt	Skogforsk
Article	Thomas Kraft	Nya växthuset för skogsträd invigt och fyra tidskapslar nedsänkta	Bioenergitidning- en
Article	Thomas Kraft	Jättesatsning på björk ger skogen fler träd att stå på	ATL
Radio feature	Adam Felton	Skogsägare på klimatkurs till framtiden	Vetenskapsradion Klotet
Article	Thomas Kraft	Nya trädslag på gång i norr	ATL
Article	Urban Nilsson	50-listan 2023 – de har gjort störst avtryck i gröna näringarna	Land Lantbruk

Table 3d. Other outreach 2023

Activity	Presenter	Title
Seminar	Urban Nilsson	Let´s talk science! Tillväxten - ökar den eller minskar den?
Conference, presentation	Henrik Böhlenius, Gud- mund Vollbrecht, Stina Johannesson	Alnarpskonferensen 2023: Framtidens håll- bara energilandskap – hur använder vi vår mark för mat, material och energi?
Study visit and workshop	Michelle Cleary, Henrik Böhlenius, Urban Nilsson, Stina Johannesson	Klimatnytta och samhällsnytta med snabb- växande lövträd
Presentation	Stina Johannesson	Annual meeting Grenverket (information about Trees For Me)
Presentation	Gudmund Vollbrecht	Skogssällskapet företagspresentation
Stakeholder event	Emma Holmström, Ax- elina Jonsson, Therése Strömvall Nyberg	Storskogsdag för hela familjen (information about Trees For Me and SLU)
Excursion	Gudmund Vollbrecht, Urban Nilsson, Sezer Oli- via Kaya, Ola Dosumu, Kinga Stolarek, Mateusz Liziniewicz, Emma Holm- ström, Stina Johannesson and more	Jubileumsexkursion Tönnersjöheden (SLU)
Study trip	Trees For Me and colla- borative Nordic organi- sations	
Showcase	Magnus Karlberg, Håkan Lideskog, Torbjörn Lind- bäck	Advancing Silvicultural Technology conference (SLU)
Presentation	Ulfstand Wennström, Mateusz Liziniewicz	Skogforskdagarna
Showcase	Michelle Cleary, Stina Johannesson, Mateusz Liziniewicz, Thomas Kraft, Charlotte Bengtsson	Inauguration greenhouse Skogforsk
Presentation	Emma Holmström, Ulf- stand Wennström	Höstexkursionen
Excursion	Andis Zwirgzdins, Karin Hjelm, Kinga Stolarek, Jaime Luna, Adam Fel- ton, Mateusz Liziniewicz, Gudmund Vollbrecht, Henrik Böhlenius	Trees For Me's excursion in Remningstorp
Showcase	Stina Johannesson	SLU Forest Damage Centre Conference
Presentation	Gudmund Vollbrecht/ Urban Nilsson	Årliga konferensen för skånsk skogsstrategi
Showcase	Stina Johannesson, Gud- mund Vollbrecht, Urban Nllsson, Michelle Cleary	Tema Lövskog
Showcase	Stina Johannesson, Gud- mund Vollbrecht, Urban Nllsson, Michelle Cleary	Tema Lövskog
Presentation, showcase	Mateusz Liziniewicz, Gud- mund Vollbrecht, Stina Johannesson	Konferens: Hur klarar skogen framtidens klimat?

Table 4a. Teaching 2023

- 1. Course responsible and lecturer in the first-year bachelor course "Trees: Structure and Function" in the new international bachelor program: Forests and Landscape (F&L) at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Michelle Cleary.
- 2. Course responsible and lecturer in the first-year bachelor course "Forest management methods" in the new international bachelor program: Forests and Landscape (F&L) at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Karin Hjelm
- 3. Course responsible and lecturer in the second-year bachelor course "Urban Tree- and Forest Health" in the new international bachelor program: Forests and Landscape (F&L) at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 7.5 HEC. Michelle Cleary.
- 4. Course responsible and lecturer in the second-year bachelor course "Forest and landscape biodiversity conservation and ecosystem services" in the new international bachelor program: Forests and Landscape (F&L) at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Adam Felton
- 5. Course responsible and lecturer in the third-year bachelor course "GIS in forest and landscapes" in the new international bachelor program: Forests and Landscape (F&L) at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 7.5 HEC. Emma Holmström
- 6. Course responsible and lecturer in the third-year bachelor course "Silviculture in forest and landscapes" in the new international bachelor program: Forests and Landscape (F&L) at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Urban Nilsson
- 7. Course responsible and lecturer in the Euroforester master course "Forest modelling for sustainable forest management" at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 7.5 HEC. Urban Nilsson
- 8. Course responsible and lecturer in the Euroforester master course "Sustainable forest management" at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Emma Holmström
- Course responsible and lecturer in the Euroforester master course "National and international forest policy" at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Vilis Brukas
- 10. Course responsible and lecturer in the Euroforester master course "Broadleaves History, ecology and management" at the Southern Swedish Forest Research Centre, S-Faculty SLU, Alnarp. 15 HEC. Magnus Löf
- 11. Course responsible "Industriella energiprocesser (F7009T)", civilingenjörsprogrammet inom industriell ekonomi, samt i masterprogrammet inom elektrifiering vid LTU 7,5 HEC. Elisabeth Wetterlund
- 12. Course responsible "Theory, processes and methods for technical product development", master course at LTU 7.5 HEC. Magnus Karlberg
- 13. Course responsible "SIRIUS Creative product development", master course at LTU,22.5 HEC. Magnus Karlberg

Table 4b. Master theses 2023

Student	Supervisors
Hanna Liebner	Emma Holmström & Mateusz Lizineiwicz
Michal Kibitlewski	Henrik Böhlenius & Mateusz Liziniewicz
Adam Isio	Michelle Cleary & Mateusz Liziniewicz
Mujeeb Zia	Michelle Cleary
Gayani Nilushika	Michelle Cleary

Table 5. New experiments

Title	Tree species	No. sites
Clearcut-age experi- ment	Silver birch	4
Cropping experiment	Silver birch, Norway spruce, Scots pine and larch	16
Spacing experiment	Silver birch and oak	4
Tree species, mixtures and spacing	Silver birch, Norway spruce, Scots pine and larch	5
Thinning	Silver birch	4

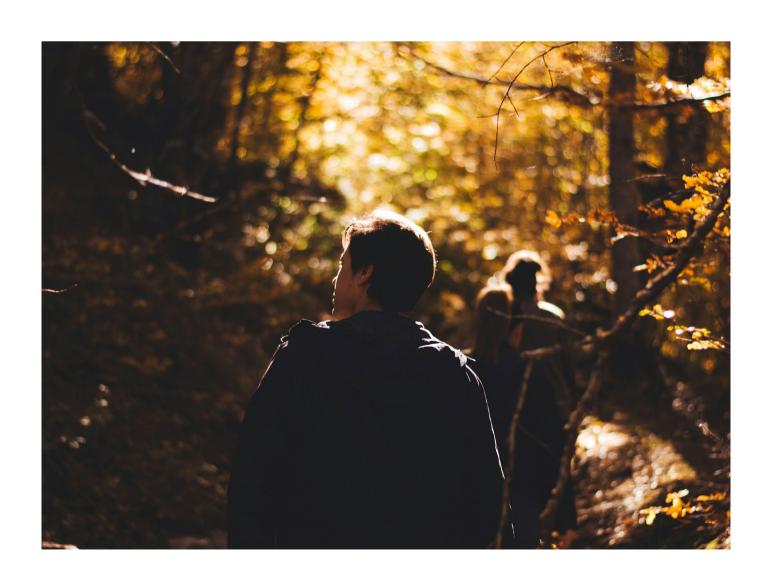


Table 6. Added funding 2023

Title	Funding org.	Duration	Total funds (million SEK)
Joining Nordic forces for more birch	Nordic Forest Resear- ch (SNS)	2023-2024	0,5
Diversification of Swedish forest to ensure its resilience and multifunctionality	FORMAS	2023-2026	10
Ungulate browsing resistance and tolerance in fast-growing broadleaves: new options for boosting biomass production in Sweden	FORMAS	2023-2025	3
Sustainable Autonomous Material Handling	Interreg Aurora	2023-2026	3
Expansion of biorefinery feed- stock supply by mobilization of woody residues from multifunc- tional silviculture treatments and marginal land operations – From Trash To Cash	Bio4Energy strategic free means	2023-2024	1.28
Study trip to Canada - Bronze birch borer	Vadim Britta Scho- larship	2023	0.25
Virtual Perception System Deve- lopment for Autonomous Utility Vehicles	LTU, Jubileumsfon- den	2023-2026	2
How to plant birch, study of planting spot, fertilizaion and plant	Skogssällskapet	2023-2026	1.2
Study trip to Canada - Bronze birch borer	Nordgen Scholarship	2023	0.023
WP2.8. Research visit to Canada	Bröderna Edlunds	2023	0.026
WP2.8. Study trip to Canada - Bronze birch borer	Jan Petterssons Fund	2023	0.01
WP2 Partnerskap Alnarp - exjobb thesis	Partnerskap Alnarp	2023	0.04
Study visit for Trevor Fenning	Bröderna Edlunds	2023	0.0185
Study visit for Milan Listeburek	Bröderna Edlunds	2023	0.012
Study visit for Johannes Schmidt	Bröderna Edlunds	2023	0.019
Study visit for Bronson Bullock	Bröderna Edlunds	2023	0.07
Study visit for Tod Ramsfield	Bröderna Edlunds	2023	0.035
Study visit for Alvin Yanchuk	Bröderna Edlunds	2023	0.035
WP2.8. travel grant for IUFRO Conference	KSLA	2023	0.015
WP2.5: Autonom skogsföryngring för en hållbar bioekonomi (Aut- oPlant 3)	VINNOVA	2024-2026	17.8

Table 7. Number of meetings in different groups

Group*	Number of meetings
General assembly (GA)	1
Operative Management Group (OMG)	19
Executive Management Team (EMT)	47
Executive Board (EB)	4
External Advisory Board (EAB)	7
PhD meetings	12
Reference groups	11
Internal Work Package meetings	9

*The groups are:

- General Assembly (GA) physical meetings with all stakeholders
- Operative Management Group (OMG) consisting of Executive Management Team and Work Package leaders, bi-weekly meetings
- Executive Management Team (EMT) Director, Vice Directors, Coordinator and Communicator, weekly meetings
- Executive Board (EB) with representatives from stakeholders, meetings four times per year
- External Advisory Board (EAB) International advisors meeting with the whole centre and with individual Work Packages one-two times per year
- PhD meetings organised by the centre are held every month on Zoom
- Reference groups Every Work Package has a reference group with representatives from stakeholders and meet at least twice annually.



Table 8. Partners and stakeholders 2023

Trees For Me is financed by and collaborate with the Swedish Energy Agency and the following partners:

Universities and research institutes

- Swedish University of Agricultural Sciences (SLU)
- Luleå University of Technology (LTU)
- Umeå University (UMU)
- Uppsala University (UU)
- Skogforsk

Private forest owner associations

- Södra
- Mellanskog
- Norra Skog

Large forest companies

- Holmen
- SCA
- Stora Enso
- Sveaskog
- Sydved
- Kopparfors Skogar
- Skogssällskapet
- Svenska Kyrkan

Small forest companies

- Poppelbolaget
- Skånska Landskap

Energy companies

- Skellefteå Kraft
- Harads Arctic Heat
- Uddevalla Energi
- Cortus Energy

Other companies

- Arevo
- Björkemar Construction & Consulting BCC
- Bracke Forest
- Organox
- Persson f.N.B
- Ramlösa plantskola
- Skogspodden
- SweTree Technologies
- Sydplantor
- TreeToTextile

Non-profits and other organisations

- Nordic Forest Research (SNS)
- Nordic Joint Committee for Agricultural and Food Research (NKJ)
- Naturskyddsföreningen i Skåne
- Naturskyddsföreningen i Blekinge
- Skogstekniska klustret
- Spillkråkan
- Biosfärområde Vindelälven-Juhttátahkka

Public administration

- Skogsstyrelsen
- Norrbottens skogsstrategi
- Skånsk Skogsstrategi (Länsstyrelsen i Skåne Län and Region Skåne)
- Smålands skogsstrategi
- Västerbottens skogsstrategi
- Svenska Jägareförbundet
- Lantbrukarnas riksförbund (LRF)

Trees For Me is a centre of excellence focused on fast-growing broadleaf trees for sustainable forestry, materials and energy in Sweden.

The centre is financed by the Swedish Energy Agency and almost 50 other private and public actors.

