

COST Action

Final Achievement Report

(21/11/2014 to 20/11/2018)

FP1403: Non-native tree species for european forests - experiences, risks and opportunities (NNEXT)

The Action was approved by the Committee of Senior Officials (CSO) on 14-5-2014 and has the MoU reference COST 039/14.

This report was submitted on 19-12-2018 by the Action Chair on behalf of the Management Committee in fulfilment of the requirements of the rules for COST Action Management, Monitoring and Final Assessment.

Action leadership and participants

Leadership positions

Position	Name	Contact details	Country*
Chair	Dr Elisabeth Pötzelsberger	elisabeth.poetzelsberger@boku.ac.at +4314765491332	Austria

Position	Name	Contact details	Country*
Vice Chair	Mr Heinrich Spiecker	instww@uni-freiburg.de +497612033737	Germany

Working groups

#	WG Title	# of participants	WG Leader	Country*
1	MONITORING	16	Prof Hubert Hasenauer nnext@boku.ac.at	Austria
2	PATHWAYS	27	Dr Monika Konnert monika.konnert@gmx.de	Germany
3	SILVICULTURE	34	Prof Godefridus M.J. (Frits) Mohren frits.mohren@wur.nl	Netherlands
4	RISKS	59	Dr Anna Gazda rlgazda@cyf-kr.edu.pl	Poland

Other key leadership positions

Position	Name	Contact details	Country*
STSM Coordinator	Dr Oscar Godoy	oscar.godoy@uca.es	Spain
GH Scientific Representative	Prof Hubert Hasenauer	nnext@boku.ac.at	Austria

* The country displayed is: for the Action Chair, the country of the person's primary work affiliation; for the Vice Chair the country that nominated the person as a Management Committee Member, for all other leadership positions, if the person is a MC Member the country displayed is the country of nomination, otherwise it is the country of the person's primary work affiliation.

Participants

COST members having accepted the MoU

AT	03/07/2014	BE	16/10/2014	BA	22/07/2014	BG	06/06/2014	HR	04/07/2014
CY	27/10/2014	CZ	11/08/2014	DK	19/04/2016	EE	03/07/2014	FI	11/08/2014
FR	29/07/2014	DE	28/05/2014	EL	28/05/2014	HU	12/12/2014	IE	07/08/2014
IL	29/10/2014	IT	20/02/2015	LV	19/04/2016	LT	22/12/2014	ME	19/04/2016
NL	16/06/2014	MK	09/01/2015	NO	07/07/2014	PL	28/05/2014	PT	03/07/2014
RO	10/06/2014	RS	03/06/2014	SK	31/01/2015	SI	19/06/2014	ES	09/06/2014
SE	09/10/2014	CH	20/08/2014	TR	10/07/2014	UK	20/05/2014		

Other participants

Institution Name	Country
University of Alberta	Canada
Scion	New Zealand
Oregon State University	United States
Ukrainian National Forestry University	Ukraine
Northwest A&F University	China
Ukraine Research Institute for Mountain Forestry	Ukraine
Al-Hussein bin Talal University	Jordan

Summary

Main aim/ objective

The main objective of the Action is to establish a multidisciplinary platform of researchers for a state-of-the-art knowledge transfer on non-native tree species in European forest ecosystems and in-depth analysis of the associated risk and challenges in growing these species within European forestry sector.

The Action addressed this as described below

COST Action FP1403 NNEXT has fully achieved its goal of establishing a multidisciplinary platform for knowledge transfer on non-native tree species in European forest ecosystems. NNEXT consists of members from 36 countries (34 full COST-member countries and 2 near-neighbour countries), who jointly managed to draw this unexpectedly diverse picture of non-native tree species distribution, utilisation, regulation (by hard and soft law) and management, socio-economic and ecological concerns. The number of collaborators including training schools and STSMs exceeded 220, involving researchers at academic and non-academic institutions, M.Sc. and PhD-students, and practitioners (tree breeders, forest managers, forest administrators, the wood processing industry). Additional stakeholders got involved in our research activities as experts who contributed data and responded to questionnaires (concerning national forest inventories, forest reproductive materials, pest impacts and legal restrictions on growing non-natives). Local experts and practitioners communicated their experiences and concerns regarding non-natives during many field excursions. NNEXT-findings are communicated through numerous joint reports, booklets, a policy brief and many scientific publications, i.e. the NNEXT-Country Reports on the current importance and research on non-native forest trees (available also as printed book) and the several reports on non-native tree genetics, laboratory analysis, provenance recommendations, breeding and natural reproduction, and the extensive work on invasiveness traits, biotic and abiotic threats and ecosystem services. The NNEXT-webpage will continue to serve as platform for the exchange of data, manuscripts, and announcements and more, not only concerning the project but also being of interest to the larger community (e.g. by announcing related conferences and job openings). A non-native tree species long term monitoring trials database with up- and download option has also been integrated into the webpage and is available for researchers as tool to share meta-data and find trials on non-native tree species across Europe.

Regarding the subject matter – comprehensive information on the diversity of non-native tree species in European forests, current species distribution, historic reasons for introduction and stage of introduction has been compiled, which revealed that over 200 non-European tree species are being grown and tested on about 4% of the European forest area, and that the reasons for introduction and utilisation are manifold, ranging from food and fodder supply (many archeophytes), ornamental purposes and land reclamation (afforestation and improvement of degraded land), to improving and diversifying the fibre and timber supply. Studies on species traits influencing reproduction and spread, and impacts on ecosystem services have shown that the potential impact of non-native tree species is very context dependent, and that only very few species can cause serious problems. Several non-native tree species with Europe-wide importance were dealt with in more detail. For example, a book on Douglas-fir was published in the series 'What science can tell us', and reviews on red oak and black locust have been written. A synthesis of the results was published for the interested public in the printed NNEXT-Booklet 'Should we be afraid of non-native trees in our forests? Stories about success and failures with versatile tree species with migration background.' and in a short policy brief.

Action website

<http://nnext.boku.ac.at>

Achievement of MoU objectives, deliverables and additional outputs/ achievements

MoU objectives

The Action reported the following achievement of its specific objectives.

MoU objective	Level of achievement	Further information (hyperlink or other)
Collect, process and harmonise existing information on non-native tree species distribution in Europe. This step includes an analysis of the historic reason in promoting species, maps, and existing data. Based on this initial step we may select certain key tree species for an in depth analysis across Europe.	76 - 100%	<p>Information about the current situation and use of NNT in Europe were collected from all participating countries by asking them 12 detailed questions. At the first joint WG/MC meeting, every country representative presented the current situation. http://nnext.boku.ac.at/internal/nnext-all-presentations. The response to the 12 questions were published as country reports and updated. Currently we have the 3rd edition.</p> <p>http://nnext.boku.ac.at/images/publications/NNEXT_2017_Country_Reports_E3.pdf</p> <p>The information of the Country Reports was used for further studies of all working groups. A goal of WG1 was to show the full range of non-native tree species in Europe, either growing in the forest or in trials, to provide estimates for the share in forest area/timber of the range of the tree species in the countries and to get an overview on the invasiveness stage of the different species. Based on this information, key species of highest importance in Europe have been determined to have a core short-list of species which should be analysed under all different aspects according to the goals of the other working groups. A manuscript on the non-native tree species diversity and distribution in Europe was submitted. BRUS, R., P&Ouml;TZELSBERGER, E., LAPIN, K., BRUNDU, G., ORAZIO, C., STRAIGYTE, L., HASENAUER, H. Extent, Distribution and Origin of Non-native Forest Tree Species in Europe (submitted).</p> <p>We also collected information through country experts on the date of introduction and the current stage of introduction (absent, planted, casual, established – naturalised, naturalised and spreading) for the most important non-native tree species. This status information was relevant for the work of WG4 on invasiveness. Results were presented at NIEOBIOTA Conference 2018 'Introduction and naturalisation of key non-native forest trees in Europe: Results from the COST Action FP1403 NNEXT' and will be published as a peer-reviewed paper.</p> <p>https://www.eiseverywhere.com/file_uploads/ff473c451a9a0cfd38b54ab0df2a57b8_NEOBIOTA_lowres.pdf</p> <p>In a next step all possible information on species distribution and biomass for the main tree species was collected. Different data sources like forest inventory data and occurrence records from floras and expert observations were utilised to compile the most complete distribution dataset (important input e.g. for WG4 potential distribution modelling), and to determine the relative importance of non-natives in terms of biomass relative to native tree species. A selection of maps of current species distribution have been presented at several meetings, but already also to the wider research community at different conferences/workshops.</p> <p>http://nnext.boku.ac.at/images/FP1403/01-WG1/01-4-manuscripts/2018/HasenaueWG1_NNEXT_report_final_Vienna_Conference.pdf</p> <p>The long term monitoring trials database for non-native tree species has been developed together with EFIATLANTIC, the Atlantic European Regional Office of the European Forest Institute who hosts the database and provides technical support for the database. The database is available to be filled over the coming years by anyone in Europe managing forest trials on non-natives in Europe. http://nnext.boku.ac.at/nnext-db/trials</p>
Assess introduction and distribution pathways (including geographic origin) of non-native species. Defining the role of natural regeneration in the integration and	76 - 100%	<p>The current situation of forest reproductive material (FRM) for non-native tree species in Europe, FRM pathways and legal regulations on introduction to Europe and trade, were analysed in detail based on a questionnaire sent to all NNEXT members and answers from 24 member countries. Summarised results were presented during NNEXT meetings.</p> <p>http://nnext.boku.ac.at/images/FP1403/00-all/00-4-meetings/2016/FP1403_20161004_Talk_KONNERT.pdf</p>

persistence of non-native species in native forest ecosystems.

A publication on these results is in progress. Title: Forest reproductive material for important non-native species in Europe. An important result is that introduction of FRM from the countries of origin or from third countries into European countries is extremely low, whereas the transfer among European countries is intensive but with large differences among countries and regarding the species, starting from low to extremely high movements. For nearly all important non-native forest species numerous seed stands exist in European countries. For Douglas-fir, a highly demanded non-native tree species, a list of seed orchards in Europe was compiled and distributed to the member countries.

http://nnext.boku.ac.at/images/publications/NNEXT_Seed_orchards_Douglas-fir.pdf

Another crucial topic for researchers and practitioners alike is genetics and breeding of major non-native tree species. Monographs for the 10 most important NNT were compiled and published. SHORT REVIEWS ON THE GENETICS AND BREEDING OF INTRODUCED TO EUROPE FOREST TREE SPECIES; Eds. M. Konnert and E. Alizoti. *Silva Slovenica*. (2016) 151: 1-47

http://nnext.boku.ac.at/images/publications/NNEXT_2017_WG2_Short_reviews.pdf

To elucidate the role of natural regeneration in the integration and persistence of non-native species in native forest ecosystems a literature research was done with the aim of finding information on genetic variation and diversity in natural regeneration of important non-native species. A report was published. Neophytou, C., Schueler, S., van Loo, M., Konnert, M. (2018) Natural regeneration of non-native tree species – Genetic aspects – WG2 Short report. University of Natural Resources and Life Sciences, Vienna, Austria. 9 pages.

http://nnext.boku.ac.at/images/publications/NNEXT_2018_WG2_Report_4_Natural_regeneration_Genetic_aspects.pdf

The provenance question is of high importance for the introduction of non-native species to Europe. To formulate provenance recommendations at a European level a questionnaire on provenance tests and recommendations at national levels was outlined and sent to all NNEXT member countries. 22 countries answered the questionnaire. Data from the questionnaires were summarized and complemented with published data from a literature search. A report on provenances recommendations in Europe was prepared and a position paper is in preparation for a peer reviewed journal.

Konnert, M., Alizoti, E., Bastien, J.C., et al. (2018) European provenance recommendations for selected NNEXT species – WG2 Report. University of Natural Resources and Life Sciences, Vienna, Austria. 53 pages.

http://nnext.boku.ac.at/images/publications/NNEXT_2018_WG2_Report_2_Provenance_recommendations.pdf

Furthermore, we produced technical guidelines for traceability of genetic material based on molecular markers for 10 tree species. The guidelines contain the actual state of the art for genetic analysis of these species and a summary of results obtained with such analysis. Recently, the guidelines were already applied to trace back the origin of Douglas-fir stands in Bulgaria and to control the origin of grand fir seeds within the German certification system for forest reproductive materials.

Milenkova A., Konnert M., Fussi B., Petkova K. 2018. Identification of varieties and genetic diversity of Douglas-fir stands in the region of Osogovo, South West Bulgaria. *Forestry ideas*, vol. 24, No 1 (55): 37 – 50.

http://nnext.boku.ac.at/images/publications/Milenkova_et_al_2018_Identification_of_varieties_and_genetic_diversity_of_douglas-

<p>Collect and analyse silvicultural management practices in Europe. This will include the assessment of the growth performance, the multifunctional role of given non-native tree species as well as a review of existing management models for non-native tree species. The management of these species for biomass production and for high quality wood materials as well as the profitability and performance of non-native tree sales at the wood markets will be addressed, as well as the possibilities for co-management of mixtures of native and non-native species.</p>	<p>76 - 100%</p>	<p>fir stands in the region of Osogovo SW Bulgaria.pdf</p> <p>Key questions relating to silvicultural management practices have been asked in the Country Reports (2. Economic value, 4. Key risks - Economic Risks, 5. Non-economic advantages/disadvantages, 6. Management systems, 7. General assessment of growth performance, 8. Options explored to establish mixtures of exotic and native species, 9. Key aspects for comparison of performance of exotic and native species).</p> <p>In addition, a questionnaire was sent to the project members on the productivity and silvicultural system of the important non-native and native tree species. A summary of the results including comparison of productivity between non-native and comparable native tree species has been presented at the final conference by the WG3 leader.</p> <p>http://nnext.boku.ac.at/images/FP1403/03-WG3/03-4-manuscripts/2018/MOHR_EN_Frits_WG3_NNEXT_report_final_Vienna_Conference.pdf</p> <p>Writing of a review paper on ecology of NNT is in progress, and will be subject of further review and consideration upon completion of the review of the NNT silviculture paper.</p> <p>http://nnext.boku.ac.at/images/FP1403/03-WG3/03-4-manuscripts/2016/NNEXT%20WG3%20review%201%20Ecology%201st%20draft%20October%202016.pdf</p> <p>Also, a review paper on silviculture of NNT is being produced, including an overview of productivity of NNT in comparison with comparable native species, based on current yield tables and expert information from WG3 members.</p> <p>http://nnext.boku.ac.at/images/FP1403/03-WG3/03-4-manuscripts/2016/NNEXT%20WG3%20review%202%20Silviculture%201st%20draft%20October%202016.pdf</p> <p>The first NNEXT training school ('Non-native tree species in Europe in the viewpoint of climate change: challenges, risks, opportunities – trade-offs') was organised by WG3 members and the Croatian Forest Research Institute and largely focused on WG3 topics. During field trips forest managers of different forest companies presented their non-native tree species forests and any issues they have with growing non-native trees were discussed with trainers and trainees. Training school organisers and students prepared a scientific publication on the state-of-the-art of using non-native trees and chances and opportunities of introducing and using non-native trees, focusing on the training school region in Croatia as a case study area.</p> <p>ĐODAN, Martina, BRUS, Robert, EISOLD, Anne-Mareen, NICOLESCU, Valeriu-Norocel, ORŠANIĆ, Milan, PRATASIENE, Kristina, PERIĆ, Sanja. 2018. Non-native tree species in the viewpoint of climate change : chances and opportunities - Croatia as a case study. <i>Šumarski list</i>, ISSN 0373-1332, 2018, vol. 142, no. 7/8, str. 391-402</p>
<p>Assess the ecological risks for native tree species. In particular we are interested in related changes on biodiversity and nature conservation issues associated with changes in the competitive situation of native tree species. New pests and pathogens which might be introduced and effect European forest ecosystems</p>	<p>76 - 100%</p>	<p>Key questions on the ecological risks by and for non-native trees have been addressed in the Country Reports. The risks information was synthesised and extended by expert knowledge and literature information and was made available as 'Risks Monographs' for the thirteen most important non-native tree species.</p> <p>http://nnext.boku.ac.at/images/publications/NNEXT_WG4_2017_Risks_Monographs.pdf</p> <p>In a second step, a database was designed to comprise country-specific synthesis information on impacts of biotic threats on 24 important non-native tree species, recording the type, level and extent of the impact, and also the origin of the pest, main host species, time of first observation of the pest,.... Template: http://nnext.boku.ac.at/images/FP1403/04-WG4/04-1-organisation/2017/NNEXT_Impact%20database_biotic%20threats_template.xlsx This database was</p>

will also be addressed. For selected non-native tree species, their potential for spreading across Europe will be assessed. This assessment will be based on climate and soil data maps. These data sources will (i) provide information about the opportunities (climate change adaptation/mitigation, biomass production etc.) for promoting non-native tree species (ii) assess the risks (loss in biodiversity and sustainability, loss in ecosystem stability and thus an increase in ecosystem vulnerability) for the established native forest ecosystems.

filled by ~ 40 country experts and now contains about 2000 entries, which are currently going through the final quality check. These data considerably improve the understanding of drivers of pest impacts. First results have been presented at meetings and the NNEXT-Conference, and two scientific publications (data paper and analysis paper) are planned for 2019.

http://nnext.boku.ac.at/images/nnext-conf/oral/Gossner_Martin_et_al_Drivers_of_pest_impact.pdf

Invasiveness as a concept was elaborated and the country reports were screened for information on reported invasiveness following the different concepts used.

http://nnext.boku.ac.at/images/FP1403/00-all/00-4-meetings/2015/2015_10_06_Presentation_WOHLGEMUTH.pdf

Traits influencing regeneration, spread and competitive success and information on the ecosystem impact were collected for the most important non-natives. Traits and the information provided by WG1 on the stage of introduction allow an interpretation whether a species is likely to become invasive and how strongly a species may influence different ecosystem parameters. The collected information was synthesised in species-IDs which will be published after a last round of editing.

http://nnext.boku.ac.at/images/FP1403/04-WG4/04-4-manuscripts/2018/specie_IDs_15.zip The comparative analysis of the traits and the interpretation of their ecosystem effects (soil, biodiversity) will be published. Results have been discussed repeatedly at WG meetings and were presented at the conference.

http://nnext.boku.ac.at/images/FP1403/04-WG4/04-4-manuscripts/2018/Wohlgemuth_WG4_2_Invasiveness_report_presentation_vienna_2018_09_13.pdf

A core topic was the impact of non-native trees on ecosystem services. We conducted a large-scale assessment of impact on non-native trees on ecosystem services. Existing data (published papers and other type of data) on the impacts of non-native trees on ecosystem services were systematically reviewed according to a scientifically acknowledged methodology. Also several STSMs dealt with this topic. The results have been presented at several international conferences and will be published in a high-impact scientific journal. Castro-Díez, P.; Vaz, A. S.; Silva, J. S et al. Global effects of non-native tree species on multiple ecosystem services. *Biological Reviews* (under review)

The impact on cultural ecosystem services was given additional attention and results were published and became a chapter of a PhD thesis. Vaz, A. S., Castro-Díez, P., Godoy, O., et al. (2018). An indicator-based approach to analyse the effects of non-native tree species on multiple cultural ecosystem services. *Ecological Indicators*. 85: 48-56

http://nnext.boku.ac.at/images/publications/Vaz_et_al_2018_NNT_CulturalServices.pdf

Potential distribution was investigated by improving and parameterising state-of-the-art species distribution models using current distribution data provided by WG1, supplemented with information collected during several STSMs, by relating distribution with climate and ecosystem functional attributes. The simulations have been completed; interpretation and mapping of the potential distribution is under way. First results were presented at the conference:

http://nnext.boku.ac.at/images/FP1403/04-WG4/04-4-manuscripts/2018/Vicente_WG4_Distribution_modelling_report_Vienna_Conference.pdf

Deliverables

The Action reported the following deliverables:

Deliverable	Timing of deliverable	Further information (hyperlink or other)
WG1/1 Country reports on the distribution and importance of non-native tree species of each participating country.	Delivered	http://nnext.boku.ac.at/images/publications/NNEXT_2017_Country_Reports_E3.pdf
WG1/2 Harmonized maps and information covering the historic development and general forestry statistics for non-native tree species growing in Europe.	Delivered	http://nnext.boku.ac.at/images/FP1403/01-WG1/01-4-manuscripts/2018/Hasenauer_WG1_NNEXT_report_final_Vienna_Conference.pdf
WG1/3 A list of long term research plots and available data and reports for the identified most important non-native tree species.	Delivered	http://nnext.boku.ac.at/nnext-db/trials
WG1/4 Potential distribution maps of selected non-native tree species based on climate, soil and ecological constraints.	Not delivered, but foreseen within 2 years	
WG2/1 Historical and present seed and plant material – pathways for important non-native species in Europe.	Delivered	http://nnext.boku.ac.at/images/FP1403/00-all/00-4-meetings/2016/FP1403_20161004_Talk_KO_NNERT.pdf
WG2/2 Provenance recommendations for non-native species in different European countries and transferring the results to different regions in Europe, compilation of available provenance tests and seed orchards in Europe (meta-database).	Delivered	http://nnext.boku.ac.at/images/publications/NNEXT_2018_WG2_Report_2_Profenance_recommendations.pdf
WG2/3 Reports on available and already tested markers for non-native species for identification of subspecies, varieties and provenances and thus allowing tracing back their geographic origin.	Delivered	http://nnext.boku.ac.at/images/publications/NNEXT_2018_WG2_Technical_guidelines.pdf
WG2/4 Summarizing knowledge on genetic aspects of natural regeneration of NNT species and its role in species persistence.	Delivered	http://nnext.boku.ac.at/images/publications/NNEXT_2018_WG2_Report_4_Natural_regeneration_Genetic_aspects.pdf
WG4/1 Synthesis review document and or meta-data base on existing potential biotic risks and abiotic risks.	Delivered	http://nnext.boku.ac.at/images/publications/NNEXT_WG4_2017_Risks_Monographs.pdf
WG4/2 Synthesis review on the invasive behaviour of natural regeneration of non-native tree species.	Delivered	http://nnext.boku.ac.at/images/FP1403/04-WG4/04-4-manuscripts/2018/Wohlgemuth_WG4_2_Invasiveness_report_presentation_vienna_2018_09_13.pdf
WG4/3 Analysis on the impact of the provision of non-timber goods and services including biodiversity and nature conservation issues in combination with non-native tree species management.	Delivered	http://nnext.boku.ac.at/images/nnext-conf/oral/CastroDiez_Pilar_et_al_Impacts_of_non-native_tree.pdf
WG4/4 Assessment of the potential future spreading (see also WG1/4) and the resulting (expected) biological risks for the provision of the non-timber goods and services of European ecosystems.	Not delivered, but foreseen within 2 years	
WG3/1 Collection of guidelines of existing	Not delivered,	

<p>regional experiences in management and production of non-native species across European countries. The guidelines should cover all tree species identified in WG 1.</p>	<p>but foreseen within 2 years</p>	
<p>WG3/2 List of available regional management models (growth and yield models or any other tools available) for non-native tree species management.</p>	<p>Not delivered, but foreseen within 2 years</p>	
<p>WG3/3 Report on existing long term research plots covering silvicultural experiences and data of key non-native tree species in Europe. How they address the integrated forest management needs (productivity, nature conservation, biodiversity) will be a key element of these reports.</p>	<p>Not foreseen</p>	
<p>WG3/4 SWOT analysis of risks and challenges in managing non-native tree species in European regions.</p>	<p>Not delivered, but foreseen within 2 years</p>	

Additional outputs/ achievements

The following outputs/ achievements also resulted from the Action:

The Action reported 21 publications on the topic of the Action, co-authored by at least two Action participants from two countries participating in the Action, and for which the Action networking was necessary.

Co-authored Action publications - peer-reviewed

1. [doi:10.1016/j.jnc.2018.06.003](https://doi.org/10.1016/j.jnc.2018.06.003) Title
Current and future conflicts between eucalypt plantations and high biodiversity areas in the Iberian Peninsula
Authors [E. Deus](#); J.S. Silva; P. Castro-Díez; A. Lomba; M.L. Ortiz; J. Vicente
DOI [doi:10.1016/j.jnc.2018.06.003](https://doi.org/10.1016/j.jnc.2018.06.003)
Type Journal article
Published in Journal for Nature Conservation
Published by Elsevier BV
ISSN [1617-1381](#)
Subjects Ecology; Nature and Landscape Conservation
Links <https://api.elsevier.com/content/article/PII:S1617138118300050?httpAccept=text/xml>;
<https://api.elsevier.com/content/article/PII:S1617138118300050?httpAccept=text/plain>
2. [doi:10.31298/sl.142.7-8.6](https://doi.org/10.31298/sl.142.7-8.6) Title
Alohtone vrste s gledišta klimatskih promjena
Authors Martina Đodan; Anne-Mareen Eisold
DOI [doi:10.31298/sl.142.7-8.6](https://doi.org/10.31298/sl.142.7-8.6)
Type Journal article
Published in Šumarski list
Published by Hrvatsko Sumarsko Društvo
ISSNs [1846-9140](#); [0373-1332](#)
Subject Forestry
3. [doi:10.2478/aslh-2018-0001](https://doi.org/10.2478/aslh-2018-0001)
Exotic Abies Species in Czech Provenance Trials: Assessment after Four Decades. Frýdl, J., Dostál, J., Beran, F., Čáp, J., Fulín, M., Frampton, J., Božič, G., Mátyás, C. Acta Silv. Lign. Hung. 14 (2018)(1):9–34
4.
Milenkova A., Konner M., Fussi B., Petkova K. 2018. Identification of varieties and genetic diversity of Douglas-fir stands in the region of Osogovo, South West Bulgaria. Forestry ideas, vol. 24, No 1 (55): 37 – 50.
5. [doi:10.1093/forestry/cpy032](https://doi.org/10.1093/forestry/cpy032) Title
Ecology and management of northern red oak (*Quercus rubra* L. syn. *Q. borealis* F. Michx.) in Europe: a review
Authors Valeriu-Norocel Nicolescu; Torsten

Vor; William L Mason; Jean-Charles Bastien; Robert Brus; Jean-Marc Henin; Ivo Kupka; Vasyl Lavnyy; Nicola La Porta; Frits Mohren; Krasimira Petkova; Károly Rédei; Igor Štefančík; Radosław Wąsik; Sanja Perić; Cornelia Hernea

DOI
Type
Published in

Published by
ISSNs
Subject
Link

[doi:10.1093/forestry/cpy032](https://doi.org/10.1093/forestry/cpy032)
Journal article
Forestry: An International Journal of Forest Research
Oxford University Press (OUP)
[0015-752X](https://doi.org/10.1093/forestry/cpy032); [1464-3626](https://doi.org/10.1093/forestry/cpy032)
Forestry
<http://academic.oup.com/forestry/advance-article-pdf/doi/10.1093/forestry/cpy032/25811427/cpy032.pdf>

6. [doi:10.1007/s11676-018-0626-5](https://doi.org/10.1007/s11676-018-0626-5)Title

Authors

Black locust (*Robinia pseudoacacia* L.) as a multi-purpose tree species in Hungary and Romania: a review
Valeriu-Norocel Nicolescu; Cornelia Hernea; Beatrix Bakti; Zsolt Keserű; Borbála Antal; Károly Rédei

DOI
Type
Published in
Published by
ISSNs
Subject
Links

[doi:10.1007/s11676-018-0626-5](https://doi.org/10.1007/s11676-018-0626-5)
Journal article
Journal of Forestry Research
Springer Nature America, Inc
[1007-662X](https://doi.org/10.1007/s11676-018-0626-5); [1993-0607](https://doi.org/10.1007/s11676-018-0626-5)
Forestry
<http://link.springer.com/article/10.1007/s11676-018-0626-5/fulltext.html>;
<http://link.springer.com/content/pdf/10.1007/s11676-018-0626-5.pdf>

7.

Spiecker, H., Schuler, J., Lindner, M. (Eds.) 2018. Douglas-fir – an option for Europe. What Science Can Tell Us series, European Forest Institute, 121 pages.

8. [doi:10.1016/j.ecolind.2017.10.009](https://doi.org/10.1016/j.ecolind.2017.10.009)Title

Authors

An indicator-based approach to analyse the effects of non-native tree species on multiple cultural ecosystem services
Ana Sofia Vaz; Pilar Castro-Díez; Oscar Godoy; Álvaro Alonso; Montserrat Vilà; Asunción Saldaña; Hélia Marchante; Álvaro Bayón; Joaquim S. Silva; Joana R. Vicente; João P. Honrado

DOI

[doi:10.1016/j.ecolind.2017.10.009](https://doi.org/10.1016/j.ecolind.2017.10.009)

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| <p>Type
Published in
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Ecological Indicators
Elsevier BV
1470-160X
Ecology; General Decision Sciences; Ecology, Evolution, Behavior and Systematics</p> |
| <p>Links</p> | <p>https://api.elsevier.com/content/article/PII:S1470160X17306337?httpAccept=text/xml;
https://api.elsevier.com/content/article/PII:S1470160X17306337?httpAccept=text/plain</p> |
9. [doi:10.1016/j.foreco.2018.10.065](https://doi.org/10.1016/j.foreco.2018.10.065)Title
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|---|---|
| <p>Authors</p> | <p>Different environmental drivers of alien tree invasion affect different life-stages and operate at different spatial scales
Joana R. Vicente; Christoph Kueffer; David M. Richardson; Ana Sofia Vaz; João A. Cabral; Cang Hui; Miguel B. Araújo; Ingolf Kühn; Christian A. Kull; Peter H. Verburg; Elizabete Marchante; João P. Honrado</p> |
| <p>DOI</p> | <p>doi:10.1016/j.foreco.2018.10.065</p> |
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Forest Ecology and Management
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Forestry; Management, Monitoring, Policy and Law; Nature and Landscape Conservation</p> |
| <p>Links</p> | <p>https://api.elsevier.com/content/article/PII:S0378112718315536?httpAccept=text/xml;
https://api.elsevier.com/content/article/PII:S0378112718315536?httpAccept=text/plain</p> |
- 10.
- Brus, R., Pötzelsberger, E., Lapin, K., Brundu, G., Orazio, C., Straigyte, L., Hasenauer, H. Extent, Distribution and Origin of Non-native Forest Tree Species in Europe (**under review**)
- 11.
- Castro-Díez, P.; Vaz, A. S.; Silva, J. S.; van Loo, M.; Alonso Á.; Aponte, C.; Bayón, Á.; Bellingham, P. J.; Chiuffo, M. C.; DiManno, N.; Julian, K.; Kandert, S.; La Porta, N.; Marchante, H.; Maule, H. G.; Mayfield, M. M.; Metcalfe, D.; Monteverdi, M. C.; Núñez, M. A.; Ostertag, R.; Parker, I. M.; Peltzer, D. A.; Potgieter, L.; Raymundo, M.; Rayome, D.; Reisman-Berman, O.; Richardson, D. M.; Roos, R. E.; Saldaña, A.; Shackleton, R. T.; Torres, A.; Trudgen, M.; Urban, J.; Vicente, J. R.; Vilà, M.; Ylloja, T.; Zenni, R. D.; Godoy, O. Global effects of non-native tree species on multiple ecosystem services. *Biological Reviews* (**under review**)

12.

Earth observation and social media: evaluating the spatiotemporal contribution of non-native trees to cultural ecosystem services. Vaz, A.S., Gonçalves, J., Pereira, P., Santarém, F., Vicente, J.R., Honrado, J.P., Remote Sensing of Environment (**under review**)

13.

Replacement of pine by eucalypt plantations: effects on the diversity and structure of tree assemblages and implications for landscape management. Vaz, A.S., Lomba, A., Honrado, J. P.; Landscape and Urban Planning (**under review**)

14. [doi:10.1007/s11295-018-1295-4](https://doi.org/10.1007/s11295-018-1295-4)Title

Analysis of microsatellite loci in tree of heaven (*Ailanthus altissima* (Mill.) Swingle) using SSR-GBS

Authors

[Charalambos Neophytou](#); Elnura Torutaeva; Silvia Winter; Harald Meimberg; Hubert Hasenauer; Manuel Curto

DOI

[doi:10.1007/s11295-018-1295-4](https://doi.org/10.1007/s11295-018-1295-4)

Type

Journal article

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Tree Genetics & Genomes

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ISSNs

[1614-2942](#); [1614-2950](#)

Subjects

Forestry; Genetics; Molecular Biology; Horticulture

Links

<http://link.springer.com/content/pdf/10.1007/s11295-018-1295-4.pdf>;
<http://link.springer.com/article/10.1007/s11295-018-1295-4/fulltext.html>

15.

Population bottlenecks have shaped the genetic variation of “European” *Ailanthus altissima* (Mill.) Swingle in an area of early introduction. Neophytou, C, Pötzelsberger E, Curto M, Meimberg H, Hasenauer H. Forestry (in revision)

16. [doi:10.1007/s10342-018-1115-2](https://doi.org/10.1007/s10342-018-1115-2)Title

The geographic origin of old Douglas-fir stands growing in Central Europe

Authors

Wolfgang Josef Hintsteiner; Marcela van Loo; Charalambos Neophytou; Silvio Schueler; Hubert Hasenauer

DOI

[doi:10.1007/s10342-018-1115-2](https://doi.org/10.1007/s10342-018-1115-2)

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Plant Science; Forestry
<http://link.springer.com/article/10.1007/s10342-018-1115-2/fulltext.html>;
<http://link.springer.com/content/pdf/10.1007/s10342-018-1115-2.pdf>

17.

Forest stand productivity derived from site conditions: An assessment of old Douglas-fir stands in Central Europe, Eckhart, T., Pötzelsberger, E., Koeck, R., Thom, D., Lair, G.J., van Loo, M., Hasenauer, H., *Annals of Forest Science* (in revision)

Co-authored Action publications - other

1. [doi:10.20315/SFS.151](https://doi.org/10.20315/SFS.151)Title
Short reviews on the genetics and breeding of introduced to Europe forest tree species
DOI [doi:10.20315/SFS.151](https://doi.org/10.20315/SFS.151)
Type Book
Published by Slovenian Forestry Institute, Silva Slovenica publishing centre,
2.
Hasenauer, H., Gazda, A., Konnert, M., Mohren G., Pötzelsberger, E., Spiecker, H., van Loo, M. (2016). *Non-Native Tree Species for European Forests: Experiences, Risks and Opportunities*. COST Action FP1403 NNEXT Country Reports, Joint Volume. University of Natural Resources and Life Sciences, Vienna (BOKU), Vienna, Austria. 370 pages. ISBN 978-3-900932-35-0
3.
Hasenauer, H., Gazda, A., Konnert, M., Lapin, K., Mohren G.M.J., Spiecker, H., van Loo, M., Pötzelsberger, E. (Eds.) 2016. *Non-Native Tree Species for European Forests: Experiences, Risks and Opportunities*. COST Action FP1403 NNEXT Country Reports, Joint Volume. 2nd edition. University of Natural Resources and Life Sciences, Vienna, Austria. 420 pages.
4.
Hasenauer, H., Gazda, A., Konnert, M., Lapin, K., Mohren G.M.J., Spiecker, H., van Loo, M., Pötzelsberger, E. (Eds.) 2017. *Non-Native Tree Species for European Forests: Experiences, Risks and Opportunities*. COST Action FP1403 NNEXT Country Reports, Joint Volume. 3rd Edition. University of Natural Resources and Life Sciences, Vienna, Austria. 431 pages.

Projects

The Action reported 5 project(s) and 1 proposal(s) resulting from the Action networking.

Key details of the projects are shown below:

1. Suitability of Douglas Fir and other non-native tree species in the restoration of forests through

- planting and sowing in Slovenia
(National)
- 2. Opportunities and restrictions on the use of non-native tree species in the forests of Lithuania in the context of the European Union.
(National)
- 3. Basic and applied aspects of the impact of invasive plants
(National)
- 4. Understanding the processes of naturalization of *Eucalyptus globulus* in Portugal through the use of remote sensing
(National)
- 5. Genetic variation of tree-of-heaven (*Ailanthus altissima* (Mill.) Swingle) in Eastern Austria
(National)

Other outputs / achievements

The following other outputs/ achievements contributing to the COST mission resulted from the Action:

1. We completed a study on the national regulations on non-native tree species (NNT) in all European countries. A questionnaire on NNTs regulations was sent to the participating countries in Europe. In addition, the FAOLEX and ECOLEX databases were used. We reviewed around 400 legislative acts to identify the most relevant instruments for legislation/regulation of NNTs and the legal strategies of investigated countries and categorised the countries' current approaches to NNTs in forests. Understanding the large variety of national approaches can help national and European policy makers identifying needs and approaches for common strategies on regulating the introduction and use of non-native tree species.

http://nnext.boku.ac.at/images/nnext-conf/oral/Ptzelsberger_Elisabeth_et_al_National_and_subnational_legal.pdf

2. An international multidisciplinary book on one of the most important non-native tree species in Europe – Douglas fir – has been produced under the lead of the MC-Vice-Chair, and has been published by the European Forest Institute (EFI) in the series 'What Science Can Tell Us'. The book is entitled 'Douglas fir: an option for Europe?' The book addresses stakeholders and the public and informs about the pros and cons of growing Douglas fir, which is a hot topic in Europe's forestry sector.
3. Break-through results on the origin, distribution history and genetic diversity of one of the most widely spread and controversially discussed non-native tree species in Europe - tree of heaven (*Ailanthus altissima* (Mill.) Swingle) - were achieved. The results shed new light on the introduction and spreading of this important tree species, indicate a discrepancy between perceived and actual spreading dynamics and will encourage discussion and research on distribution patterns and pathways of other widely distributed and spreading tree species. This required samples of plant materials from countries across Europe (31 countries participated) and an additional case study on regional distribution, genetic diversity and historic management of tree of heaven. The results have been presented at the conference and will be published in several peer-reviewed journals.

http://nnext.boku.ac.at/images/nnext-conf/oral/vanLOO_Marcela_et_al_Tree_of_heaven_Ailanthus.pdf

http://nnext.boku.ac.at/images/nnext-conf/oral/Neophytou_Charalambos_et_a_Origin_and_genetic_variation_of_tree_of_heaven.pdf

4. In total 13 NNEXT-members contributed to ten chapters of the book Krumm F, Vítková L (Eds.) 2016 Introduced tree species in European forests: Opportunities and challenges. European Forest Institute. 423 pp.

http://www.in-tree.org/uploads/images/book/Introduced_tree_species_EN_HighRes.pdf

Impacts

The Action reported the following impact(s):

Description of the impact, i.e. what will change, and for whom, as a result of what the Action achieved	Type of impact	Timing of impact
<p>A novel community has been created, consisting of researchers from different disciplines and – most importantly – all European regions, supplemented with practitioners active at the science-practice interface, who all deal with the management of non-native trees. This community did not exist before, as growing non-native tree species in many European countries so far was a marginal topic and only recently has received more attention due to the increasing pressure on European forests stemming from global change. This new community allows for an across-Europe transfer of the highly diverse experiences and strategies concerning the management of non-native trees. This allows for fast knowledge acquisition in these times when decisions on adaptation-strategies to global change are pressing.</p>	<ul style="list-style-type: none"> • Scientific / Technological • Societal 	<p>Achieved</p>
<p>The NNEXT Country Reports cover the current and historic situation of non-native tree species in 36 European and neighbouring countries. In twelve chapters per country knowledge was compiled which previously may have only existed in local language. The Country Reports a very valuable source of information for anyone interested in the specific situation in a country; and most importantly, for the first time it is possible to get a more detailed overview about the diversity in non-native tree species management across Europe, as so far the topic has only been covered in few European reports such as the Forest Europe report, which devotes three pages only to introduced trees.</p>	<ul style="list-style-type: none"> • Scientific / Technological 	<p>Achieved</p>
<p>Broadening the knowledge base for important non-native trees. - Cross-border research collaboration and information access on a large range of non-native tree species has been enabled. Different databases have been compiled that show the countries in which a non-native tree species occurs, where research trials exist, and who is doing research on that species. Several review papers on important non-native tree species are produced.</p>	<ul style="list-style-type: none"> • Scientific / Technological 	<p>Achieved</p>
<p>Stakeholders can access a new community of experts and a platform for knowledge transfer. The coverage of the project topics and the conference in popular forestry journals (e.g. http://nnext.boku.ac.at/images/nnext-conf/NNEXT_Conference_Forstzeitung_Nr_10_2018.pdf) raises awareness among practitioners. Also the interested public benefits through e.g. a synthesis report on non-native tree species, pros and cons, history, motivation, future prospects, which has been published. The interdisciplinary group of experts and dissemination approach for the first time provides a differentiated, comprehensive view on the topic. http://nnext.boku.ac.at/images/publications/NNEXT_2018_Booklet.pdf</p>	<ul style="list-style-type: none"> • Societal 	<p>Achieved</p>
<p>The comprehensive overview on import and transfer of seed and plant material and the list of seed orchards for important non-native species will improve for practitioners the supply with FRM (forest reproductive material) for these species. Knowledge on the availability of FRM of non-native species is of high importance for forest seed companies and forest nurseries and eventually for forest owners or scientists wanting to establish plantations or trials, but also for the nature protection sector.</p>	<ul style="list-style-type: none"> • Economic 	<p>Achieved</p>
<p>Provenance recommendations are the key to ensure the success of planting non-native trees in European forests. Until now, provenance</p>	<ul style="list-style-type: none"> • Economic • Societal 	<p>Achieved</p>

<p>recommendations have been issued only at the national level, if at all, and were hardly available abroad. To improve the adaptation potential under climate change, forest owners need extensive, trans-boundary provenance recommendations as they were provided by WG2.</p>		
<p>To control the origin of FRM and to investigate the genetic variation of populations, common genetic markers and standardized laboratory methods are necessary. The availability of these technical guidelines for 10 important tree species will facilitate any genetically based studies on these species.</p>	<ul style="list-style-type: none"> • Scientific / Technological 	<p>Foreseen within two years</p>
<p>NNEXT findings on the options to increase timber production by planting non-natives, management experiences, the potential ecosystem impacts and the risks are a valuable source of information that is essential for future management decisions, i.e. the species choice.</p>	<ul style="list-style-type: none"> • Societal 	<p>Foreseen within two years</p>
<p>The success of the Action visible by the number of publications and perceived by the members as a strong network and rich source of knowledge, and the smooth coordination of the Action encourage participation in and application for new COST projects.</p>	<ul style="list-style-type: none"> • Scientific / Technological • Societal 	<p>Foreseen two-to-five years</p>

Dissemination and exploitation of Action results

Dissemination and exploitation approach of the Action

The Action's dissemination and exploitation approach as well as all activities undertaken to ensure dissemination and exploitation of Action results and the outcomes of these activities are described below.

Next to regular update-emails, the NNEXT-website is a primary means of communication - open-access (sharing NNEXT-background information, announcements of meetings, jobs,..., NNEXT-output like WG-reports/deliverables, papers, Booklet, STSM-summaries, and Conference oral- and poster-presentations and Book of Abstracts - and password-protected (working/draft documents, meeting-minutes, meeting-presentations,...). NNEXT-results are published in peer-reviewed journals, self-published reports, and popular journals recognised by stakeholders; publications are promoted through various newsletters (e.g. EFI, EUFORGEN, e.g. <https://www.efi.int/news/non-native-tree-species-european-forests-changing-world-opportunities-and-risks-2018-09-14>) A synthesis of NNEXT-results was published as simple, professionally designed booklet for the interested public. Hardcopies were sent to all NNEXT-members for further distribution in their countries. Similarly, a short Policy brief was distributed to all NNEXT-members to pass it on to their Ministries,... The Final Conference was held 12-14 September 2018. The conference was promoted across Europe to reach all potentially interested researchers. In Austria and neighbouring countries, practitioners and other stakeholders were informed, e.g. through the newsletters of the Institute of Silviculture and BOKU-University. Almost 90 presentations were given and a stakeholder panel-discussion with representative of state-forests, nature-conservation, FAO (Planted Forests), forestry-genetics and wood technology was held. Discussions with practitioners were repeatedly included in NNEXT-activities, i.e. during field-trips following meetings and during the training school. NNEXT-members informed about NNEXT-results at many national and international workshops and conferences.

Dissemination meetings funded by the Action

The Action did not fund any Dissemination Meetings

Other dissemination activities

The Action also undertook the following dissemination activities:

Activity	Final NNEXT Conference - International Conference on NON-NATIVE TREE SPECIES for EUROPEAN FORESTS, 02-09-2018 to 14-09-2018, Vienna, AT. This International Conference was targeted for researchers and stakeholders concerned with Non-native tree species in European forests. Session topics included: ○ Distribution ○ Provenances ○ Reproduction ○ Management ○ Growth potential ○ Ecosystem services ○ Biotic and abiotic threats ○ Public perception ○ and more. In addition, a panel discussion with stakeholders was organised.
Target	The conference was relevant for scientists from a large range of disciplines, as well as for governmental representatives, forest owners and practitioners and NGOs.
Outcome	Over 140 people participated in this conference, about half of them non-NNEXT-members. With 50 oral and 38 poster presentations, the conference was a huge success. All presentations were published in the Book of Abstracts (http://nnext.boku.ac.at/images/nnext-pics/Bookofabstracts_finalforwebsite.pdf).
Link	http://nnext.boku.ac.at/nnext-conference

Activity	International workshop with presentations and a panel-discussion on Introduced tree species in European forests organised by the In-tree project.
Target	Stakeholders (Policy makers, forest owner associations,...) and researchers from different disciplines
Outcome	NNEXT was promoted and key NNEXT results were presented; Networking;
Link	http://www.in-tree.org/uploads/images/conference/Brussels%20event/IN-TREE_programme_Brussels18_11_2016.pdf

Activity	Presentation on non-native tree species diversity, importance and distribution in Europe at the Joint EFI Atlantic and IEFCA Annual Meeting on 9-12 MAY 2017 on The Role of Alternative Tree Species in the Forests of Atlantic Europe in Edinburgh, UK and at the Meeting of the Working Group on non-native tree species of the German Association of Forest Research Stations 12-13 April 2018 in Vienna, AT.
Target	The meeting were of relevance and interest to researchers, policy makers, practising foresters and others.
Outcome	Results were disseminated and Networking with other researchers and stakeholders was supported.
Link	https://www.prosilvaustria.at/aktivitaeten/externe-veranstaltungen/tagung-ag-gastbaumarten-wien/

Activity	Many invited talks on Impacts and risks of plant invasions and Impacts of non-native trees on ecosystem services, e.g. at NIOO (Wageningen, NL), ICHN (Barcelona, ES), University of Copenhagen (Copenhagen, DK), Universidad de Alcalá de Henares (Alcalá de Henares, ES), Queensland University (Brisbane, AUS), University of Sydney (Sydney, AUS), UIMP (Sevilla, ES), Phytoma meeting (Valencia, ES), International Conference on Ecology and Management of Alien Plant Invasions (EMAPI). Lisboa (Portugal) 4-8 September 2017; https://scb.iec.cat/invasions-biologiques-punt-de-trobada-entre-ciencia-i-gestio/ https://cpsc.ku.dk/calendar/2017/cpsc-lecture-with-montserrat-vil/ https://www.phytoma.com/simposio/objetivo-del-simposio
Target	Environmental managers, experts in the field, regional authorities, scientists and students;
Outcome	Results were disseminated and Networking with other researchers and stakeholders was supported.
Link	http://www.invasep.eu/book_of_abstracts_emapi14_lisboa.pdf

Activity	Presentation of results from the questionnaire on non-native tree species forest reproductive material at different meetings, e.g. the annual meeting of the nurseries association from South Germany (EZG), and the International conference of the Hungarian nursery association, Sopron, 9 Sep 2016
Target	Forest nursery owners, land owners, forest managers and policy makers
Outcome	Dissemination of results on available seed sources for non-native tree species is substantial for seed harvesting and trading companies, but also for decision makers and forest owners.
Link	http://publicatio.nyme.hu/1056/1/Hardwood_2016_Proceedings_final_cover.pdf

Activity	Presentation of monographs on the genetics and breeding of non-native tree species to the Members of the German Federal Working Group on Conservation of Forest genetic Resources during their meeting in Munich in March 2016
Target	Researchers and representatives of forestry administrations, including the German Federal Working Group on Conservation of Forest genetic Resources
Outcome	The interest was high and a proposal was issued to publish the monographs in different European languages as information for practical foresters, producers of FRM and land owners.
Link	http://nnext.boku.ac.at/images/publications/NNEXT_2017_WG2_Short_reviews.pdf

Activity	Talk, group discussion and panel-discussion at two COST information days (8 Sep 2016, 6 Nov 2018) of the Austrian Research Promotion Agency (FFG) involving the NNEXT Chair and the former Chair https://www.ffg.at/europa/veranstaltungen/cost_08092016
Target	Researchers from academic and non-academic research institutions interested in COST
Outcome	The interest in the successful Action coordination and involvement of many young researchers was high; Networking among other researchers interested in COST Actions;
Link	https://www.ffg.at/eu2018/veranstaltungen/cost_2018-11-06

Activity	Many more oral and poster presentations on a range of different results from NNEXT at various national and international conferences (e.g. International Conference on Life Sciences, in Timisoara, Romania, May 2018; National Conference on biodiversity: "Biodiversità 2018 XII Convegno Nazionale" Jun 2018;
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	World Forum on Urban Forests (WFUF) Dec 2018, Mantova, Italy https://www.wfuf2018.com/en-ww/the-project.aspx ; NEOBIOTA Conference 2018 https://www.eiseverywhere.com/file_uploads/ff473c451a9a0cfd38b54ab0df2a57b8_NEOBIOTA_lowres.pdf)
Target	Scientists from different fields, graduate and PhD students and stakeholders
Outcome	Results were disseminated and Networking with other researchers and stakeholders was supported.
Link	http://www.biodiversita2018.it/wp-content/uploads/2018/06/Convegno_Biodiversita_2018_poster.pdf

Activity	Contribution to a short course entitled 'Challenges of the management of biological invasions to preserve Biodiversity'. The course, organized by the International University Menéndez Pelayo, was held in Seville (Spain) in 17-18th Nov 2016.
Target	The course joint different stakeholders committed with the study and management of biological invasions. The course addressed graduates, undergraduates, environmental managers, ecologists, environment journalists, etc.
Outcome	Students and different stakeholders like environmental managers, ecologists, environment journalists were informed about risks for biodiversity caused by non-native species
Link	http://www.uimp.es/agenda-link.html?id_actividad=63BX&anyaca=2016-17

Exploitation activities

The Action undertook the following activities to ensure exploitation (use, in particular in a commercial context) of the Action's achievements:

Activity	Collaboration with companies for the selection and production of forest reproductive materials, e.g. poplar clones
Target	Forester owners and managers who are interested in improved forest reproductive material (FRM)
Outcome	Field tests have been established which will provide information on the suitability and productivity of different provenances or clones. These results will support the selection of the appropriate FRM.

Action Success(es)

The Action's two most significant successes were the following:

- NNEXT revealed an unexpected diversity of non-native tree species and richness in approaches of managing and utilising these non-native tree species for a wide range of purposes across Europe. Also the differences in the historic developments, the changes in perception and in the regulations of non-native species were astonishing. Having revealed all these regional differences will allow researchers designing the appropriate research approaches and data collection schemes that can deal with these large regional differences. The opportunities of learning from existing experiences across Europe were also highlighted. Furthermore, being aware of the differences in the historic and current situation of non-natives and of context-dependency of social and ecosystem benefits and impacts of non-native trees encourages the search for political decisions that allow for regionally-adjusted solutions.
- We consider it an extraordinary success that NNEXT became a research and training platform for young scientists. The numerous finished and ongoing M.Sc. and PhD-thesis which at least partly depended on research done in the frame of NNEXT are proof. The impact of creation of research ideas, broadening of views and access to data and knowhow from across Europe goes beyond that and is invaluable for young, developing researchers. "During my PhD-studies, NNEXT turned to be a relevant and valuable initiative, providing many opportunities to discuss and develop new ideas and methodologies on how to target my research. The meetings organised under NNEXT were of utmost importance for developing my skills and for advancing my learning about non-native trees, their opportunities and risks, at the interface with ecosystem services. NNEXT also allowed me to experience an STSM, strengthening collaborations with many interesting academics and providing research tools needed to accomplish a chapter of my PhD-thesis. The collaborations and ideas discussed resulted in another PhD-thesis-chapter, and were further explored in other scientific publications. Finally, the opportunity to assist on the organisation of a Training School further contributed to my organisational skills, alongside the improvement of a fruitful scientific collaboration network."

Action Expenditure

The table below shows the budget allocated to the Action for each Grant Period:

#	Grant Period	Start Date	End Date	Budget allocated to Action (EUR)
1	CGA-FP1403-1	1-1-2015	30-9-2015	81,680.27 (EUR)
2	CGA-FP1403-1B	1-10-2015	30-4-2016	144,984.49 (EUR)
3	AGA-FP1403-3	1-5-2016	30-4-2017	140,999.43 (EUR)
4	AGA-FP1403-4	1-5-2017	30-4-2018	184,999.99 (EUR)
5	AGA-FP1403-5	1-5-2018	20-11-2018	123,299.55 (EUR)