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# **EUFORINNO**

## **European Forest Research and Innovation**

7<sup>th</sup> FP EU Capacities - Regional Potential Programme, RegPot,  
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The project EUFORINNO - European Forest Research and Innovation – supports the Slovenian Forestry Institute to increase its scientific excellence and visibility as an innovative forest research centre, the Reference Centre for Central and South-East Europe, preserving the European ‘biodiversity hot-belt’ in sustainably managed forests, contributing to the regulation of carbon and water fluxes in time and space.



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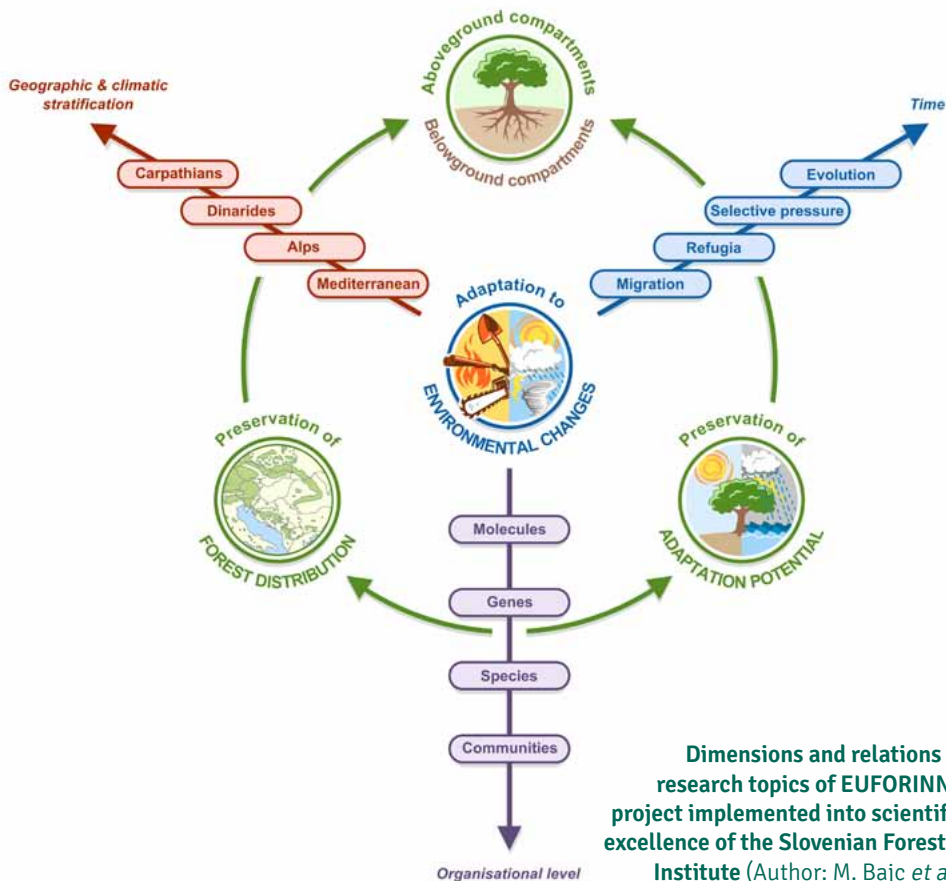
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Forests cover more than 60% of the area of Slovenia, and are, besides water, its most important renewable natural resource. A great responsibility for forestry and forest science is to provide support to management, planning and protection of forests and the conservation of the exceptional biodiversity found in Slovenian forests.

The Slovenian Forestry Institute is a public research institute of national importance, which bases its research on scientific excellence and professional competence. Research and professional activities within SFI are organised within the institute's six departments, which participate in the Research Programme Forest Biology, Ecology and Technology as six

working groups. The Research Programme is supported by the Infrastructural programme of the Slovenian Forestry Institute. In accordance with the Forestry Act (1993), all departments are also involved in the Civil Forest Service, and include delegated tasks of the authorised professional body: SFI is the state authority for approval of forest seed objects and certification of forest reproductive material, for providing a prognostic-diagnostic service for forest health, and for leading a national reporting service on carbon pools in forests as part of the Public Environmental Service.

The overall goal of EUFORINNO was to increase excellence of the Slovenian Forestry Institute by developing the means to under-



stand and quantify the structure and function of forests in Slovenia, to extend the same principles in Southeastern Europe and on a broader scale, and provide the means and practices for international recognition of SFI as an innovative forest research centre. These goals of raising the scientific excellence and visibility of the Slovenian Forestry Institute were met through actions divided among four Research Infrastructure Development (RID) objectives:

- A** Development and standardisation of a system for genetic monitoring of forest trees
- B** Biodiversity & functional diversity at gene, species and community level
- C** Belowground complexity and carbon dynamics
- D** Net ecosystem carbon exchange in time and space

and three supportive transversal non-scientific actions:

- 1** Publishing
- 2** Innovation and IP management
- 3** Networking

Among the main tasks of EUFORINNO were an upgrade of equipment, methodological and technological expertise, and improvement of human capacities through secondments, seminars, training, networking and conferences, as well as an increase in the visibility and importance of the Slovenian Forestry Institute.

EUFORINNO combined efforts of predominantly four departments of SFI within four RID objectives, and three supportive transversal non-scientific actions aimed at the institute as a whole. The project components covered the development of observational and experimental techniques to understand forest function, mainly biodiversity and carbon fluxes, and to quantify the impacts of forest management on biodiversity, carbon fluxes, and the associated mechanisms that regulate these functions. For the achievement of RID objectives, eight partners have contributed to fulfil the EUFORINNO Action Plan in their recognised outstanding fields of expertise.

At the end of the EUFORINNO project the 515 m<sup>2</sup> of the new labs are fully operational, with unique research equipment purchased, installed and utilised: 16 Installation & Maintenance Protocols (IMP), 15 User Manuals (UM) and 18 Standard Operating Procedures (SOPs) have been elaborated to different levels.

The manuals and SOPs were developed and tested with the help of the project partners through secondments (96 in total from SFI to CPs) and 51 training provided by CPs at SFI. Scientific excellence was further promoted through training in scientific publishing, active participation at scientific conferences and organising four conferences by SFI in Slovenia, the last of which, EUFORIA, brought together over 120 participants from 23 countries and 19 invited keynote speakers, and finishing with a public round table on the future of the European forest research and innovation area.

The overall visibility of SFI has increased largely through the EUFORINNO web page, its newsletters, networking, organisation of regional and intercontinental workshops on specific subjects, and supported by national contact points, by boosting the SFI publishing centre *Silva Slovenica* and its main publications, the journal *Acta silvae et ligni* and *Studia Forestalia Slovenica*, organisation of the open access repository *SciVie*, and through preparation and a broad discussion of Intellectual property rights regulation and the SFI IP management strategy.

Furthermore, a project incubator and a project management office have been initiated at SFI, networking with potential project partners within the region and more widely, global initiatives have been tackled, and a number of project proposals prepared at the national and international level, with several having already been accepted, providing a solid support for the long-term post-EUFORINNO strategy to flourish.



(Photo: B. Rantaša)

The Slovenian Forestry Institute (SFI), established in 1947, is the leading forestry research institute of national importance in Slovenia, and conducts basic and applied research on forests and forest landscapes, forest ecosystems, wildlife ecology, hunting, forest management, and other uses of the renewable resources and services forests provide. The scientific knowledge from these fields helps further research on forest biodiversity and its management in relation to climate change. As part of its research programme and related studies, the Institute also provides forestry and environmental services in the public interest. Another of the Institute's functions is to provide scientific knowledge on all aspects of sustainable development, with the purpose of increasing knowledge and awareness of the importance of forests within the environment and the importance of sustainable forest management. In short, the Institute is a scientific, professional, and cultural storehouse for Slovenia's relationship with its forests and the resources and services they provide.

It develops the means to understand and quantify the structure and function of forests in Slovenia, aiming to extend the same principles in Southeastern Europe and at the

global scale. The specific goals of SFI are to continue to improve traditional close-to-nature sustainable forest management and forest biodiversity; to promote ecosystem goods and services provided by Slovenia's forest resources; to foster public understanding of forestry and its importance in Slovenia; to maintain sustainable production capacity, ecosystem resilience to changes under stress and halt biological diversity loss – the key factors ensuring a healthy forest ecosystem; and to apply environmentally sound techniques and technologies in forestry, among all other environmental, natural and socio-economic goals. Its main approaches are in continuous support of scientific excellence, research infrastructure, scientific networking and education of all scientific, technical and support staff, supporting the visibility of forests, forestry and the SFI, the IP management strategy and acknowledging all contributions within SFI and in all collaboration within Slovenia, Europe and at a global scale. SFI is also the state authority for approval of forest basic material and certification of forest reproductive material, for prognostic-diagnostic services regarding forest pests and diseases, and for reporting on forests in LULUCF.

## Public Forestry Service

The Slovenian Forestry Institute intensively monitors forests as part of the public forestry service. This includes surveying and recording forest degradation and damage, providing a diagnostic reporting service, developing an information system for research purposes, and monitoring forestry seeding and nursery activities.

The Institute is also committed to sustainable forest management and the conservation of its biological diversity, as well as to further development and organisation of the Slovenian forestry system and forestry policy.

## Public Environmental Service

The Slovenian Forestry Institute's public environmental service monitors emissions and sinks of greenhouse gases resulting from land use, land use change, and forestry (LU-LUCF). As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), Slovenia is required to submit an annual report on greenhouse gas emissions and sinks. Slovenia is also a signatory to the Kyoto Protocol, which requires countries to reduce greenhouse gas emissions to 1990 levels (for Slovenia to 1986 levels). The Kyoto Protocol allows for flexibility in the manner of cutting emissions. Countries may, for example, partially offset their greenhouse gas emissions with their forests, which remove carbon dioxide from the atmosphere.

The Slovenian Forestry Institute collaborates with Slovenian forestry, timber, and nature

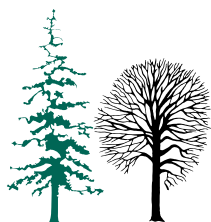
conservation organisations, such as the Slovenia Forest Service, forestry commissions and others, as well as with other educational and research organisations both in Slovenia and abroad.

## Vision

The Slovenian Forestry Institute is a public research institute of national importance, which bases its research on scientific excellence and professional competence. The research it conducts on forest biodiversity and its management in relation to climate change gives the Institute an important role in increasing knowledge and awareness of the importance of our forests and the way we interact with them. The Institute's work reinforces its position in society. Highly regarded both at home and abroad, it is Slovenia's principal treasury of knowledge, innovation, and creative ideas in researching forests, forest ecosystems, wildlife ecology, hunting, forest management, and the use of resources and services that forests provide.

## Mission

The Slovenian Forestry Institute is the only public research institute of national importance which conducts basic and applied research on forests, forest landscapes, forest ecosystems, forestry, wildlife, and hunting in Slovenia. The Institute will continue to develop as a scientific, professional, and cultural storehouse for Slovenia's relationship with its forests and the resources and services they provide.



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## ● EUFORINNO Modern Laboratories in brief

**In the nearly 70-year history of the Slovenian Forestry Institute (SFI), laboratories have always been part of the institute's infrastructure. However, the extent of the laboratories has varied from one period to another. Before the EUFORINNO project, the total area of the laboratory facilities at SFI was 356 m<sup>2</sup>, and new laboratories had been needed for many years.**

In 2009 the six-year funding of the infrastructure programme began and gave impetus to researchers' dreams for competitive working conditions with the renovation of old offices into laboratories. In 2012 SFI finished the renovation of 515 m<sup>2</sup> of work space in the main building, but the new empty rooms were far from realisation of the SFI infrastructure objectives.

In 2009, laboratory facilities were spread across nearly 288 m<sup>2</sup> in 16 rooms, including archives for soil and foliar samples in the basement and old microscopy room on the first floor. In 2009, SFI occupied 5017 m<sup>2</sup>. The share of the laboratory area to the total SFI area was 8.9%.

In 2009, SFI succeeded in the National call for infrastructure programme for strategic development of the laboratories, IT, research plots and scientific collections and databases. In the three-year period an additional 67 m<sup>2</sup> of new laboratories were established and nearly 53 m<sup>2</sup> of existing laboratories were renovated. During this period, a large investment plan for conversion of offices into new laboratories was prepared

and approved, and construction work began in autumn 2011.

In May 2012, construction work for 515 m<sup>2</sup> was completed, together with the laboratory and office furniture. The share of the laboratory area to the total SFI area increased to 25.2%. At this point, the new laboratory area had no research or laboratory equipment.

The EUFORINNO project was intended to give life to the new laboratory area. Practically all core research equipment and all general-purpose laboratory equipment were installed into a new laboratory tract in the left wing of the ground floor. New employment and a vast capacity building process were undertaken in order to put the 22 pieces of the durable equipment towards RID objectives. All planned equipment was bought, installed, and intensively exploited by SFI employees and CP (collaborative partners) over the last two years. Based on CP knowhow, equipment custodians developed 16 Installation & Maintenance Protocols, 15 User Manuals and 18 Standard Operating Procedures.

### Development of SFI laboratory facilities 2009-2016

| Period        | Number of rooms | New laboratory area |
|---------------|-----------------|---------------------|
| 2009          | 16              | 287.98              |
| 2009-2011     | 4               | 67.50               |
| 2012-2015     | 23              | 515.40              |
| Total in 2016 | 43              | 870.88              |



The EUFORINNO project has fully succeeded in mobilising the new infrastructure potential. Besides the main building, SFI also operates laboratories for forest seed testing with a greenhouse in a small building besides the main one. There are 5 rooms with basic laboratory equipment on 56.09 m<sup>2</sup> and the greenhouse and storage area of 168.73 m<sup>2</sup>. These areas have not been included in any reconstruction since 1990, and will be part of the next infrastructure project in the near future.



**Old offices were demolished (picture above: R. Robek) in order to design optimal layout of the new laboratories (picture below: D. Finžgar).**

## ● Impact of EUFORINNO on laboratory equipment

**The acquisition, integration and implementation of new equipment for selected RID themes were among the key objectives in the EUFORINNO project, therefore the entire work package 1 (WP1) was set to reach these objectives.**

WP1 was divided into four tasks: equipment list, equipment purchase, installation, maintenance, quality assurance and standardisation of procedures and accreditation. WP1 activities started immediately after the official project start, and one month later the list of equipment, valued at over one million euros, was accepted by the project advisory board. Six core research equipment units and twelve pieces of general laboratory tools were carefully selected for purchase within the EUFORINNO budget. By the end of 2013 the planned purchase was successfully realised, with five national public tenders and one international one. The following research units were delivered and installed in the renovated laboratory tract:

- IC-Ion Chromatograph with accessories
- Motorised stereomicroscope and motorised microscope with camera and image analyser and microscope with microdissection and sample collector and computer workstation
- IRMS Isotope Ratio Mass Spectrometer
- Trace Gas Analyser System

- Two walk-in growth chambers with controlled environment laboratory chambers
- Molecular laboratory upgrade (17 pieces of equipment)

During the installation of the new equipment, equipment custodians were recruited and trained for basic operational skills. Within the first year of the equipment operation several issues were resolved by SFI researchers, collaborative partners and equipment providers.

The installation and maintenance protocols and operational manuals prepared gave SFI researchers the basis for targeted use of the new equipment. During numerous interactions with collaborative partners (CP), secondments of SFI researchers at CP facilities and visits by CP staff at SFI for on-site training in the period between December 2012 and May 2015, 18 draft SOPs were written and evaluated in new SFI laboratories. Seven draft SOPs were translated into English and four of them were harmonised



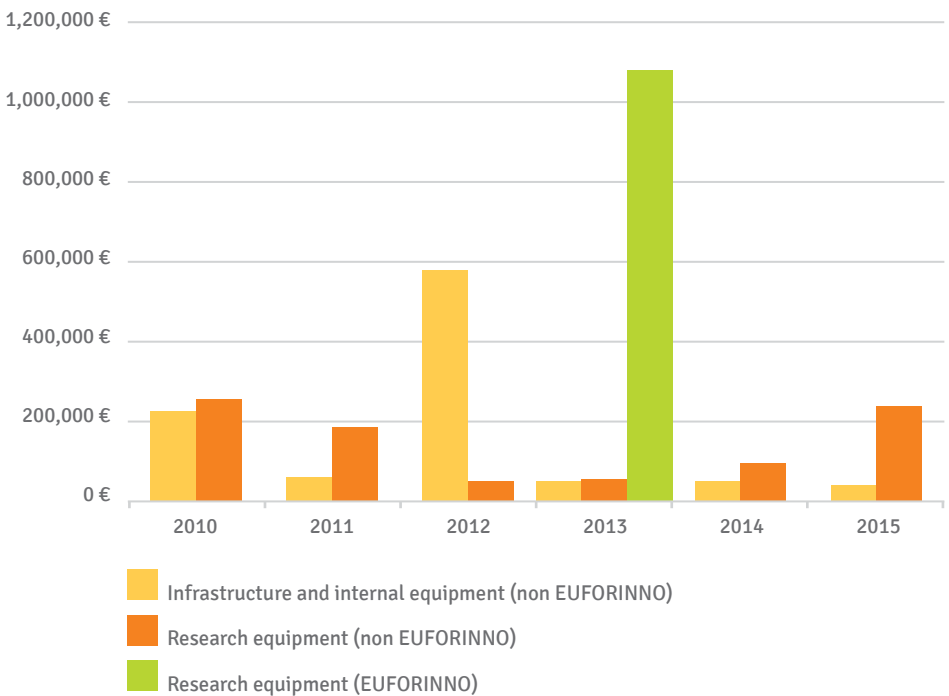
1. **Training on motorised microscope.** (Photo: R. Robek)
2. **Dedicated researchers coordinated equipment purchase, acquired operational skills and established research activities.** (Photo: R. Robek)

with the technical requirements for accreditation that were gained through accreditation consulting and training organised by EUFORINNO.

During the extension period of the EUFORINNO project, a general discussion about SFI accreditation initiatives and strategy was raised in the SFI scientific board. At the project's end, three major findings are evident regarding WP1:

- 1 WP1 equipped more than 300 m<sup>2</sup> of SFI laboratory area with cutting-edge research equipment and ensured (together with other WPs) their full exploitation in the future.
- 2 All planned project deliverables were prepared on time.
- 3 Impacts of the WP1 results are reaching beyond the EUFORINNO project, since further development of the SFI research infrastructure is on the way.

**The outstanding contribution of EUFORINNO project dedicated to purchase, installation and operationalisation of equipment is clear in particular for the year 2013, when over €1M was invested in long-term beneficial fixed assets of the Slovenian Forestry Institute.**



The scientific excellence activities significantly enhanced the excellence of SFI researchers, their research methodology and RID outputs. Activities focused on four main tasks: recruitment of senior scientists and postdocs specialised to operate new equipment, organisation of secondments of SFI staff at project partners, organisation of trainings at SFI, participation at and organisation of scientific conferences.

## ● Recruitments of specialists significantly contributed to the success of EUFORINNO

Three positions were filled by superior and expert scientists, who contributed significantly to the overall success of the EUFORINNO project and have a positive impact on research performance and interpersonal relations at the Slovenian Forestry Institute. All recruitments have been proven to be of utmost importance for the project achievements.

### Dr. Tanja Mrak

Tanja was employed as a full-time specialised postdoc for microscopy techniques and micro-cryotomy of wood samples. Her main activities were the participation in the tender for purchase of microscopes and a laser dissecting microscope, specifically: “Motor-

ised upright research microscope”, “Motorised dissection microscope” and “Motorised invert microscope with laser microdissection system”. She also prepared SOPs for all units and exchanged knowledge through all activities within WP2, in particular secondments, workshops and conferences. She also cooperated in internal (Slovenian Forestry Institute) research tasks, several tasks provided for the market, as well as in preparation of SFI international project proposals.

Tanja Mrak co-authored the Atlas of Woody Plant Roots (Mrak, Gričar 2016) and a recent paper: Influence of soil temperature on growth traits of European beech seedlings (Štraus, Mrak et al. 2014).



### Dr. Nate McDowell, Senior scientist

Nate was employed as a part-time senior scientist in November 2012 for a period of 36 months. His main tasks were related to on-field trace gas isotope technology and mortality in forest ecosystems. In particular, the focus was on publishing in the field of mortality in forest ecosystems, as support to the purchase of on-field trace gas isotope technology and additional research tasks related to drought stress. His contribution during project was mainly to RID aim: Net Ecosystem Carbon Exchange in time and space.

His important scientific contribution was also in setting up and adapting the experiment of Dr. Ines Štraus in drought effect-related experiments on beech. In addition, he participated in purchasing, adapting, installing and running the on-field trace gas isotope technology. Nate McDowell prepared an invited lecture, Accelerating Forest Mortality, for the EUFORIA conference.



(Photo: N. McDowell)

### Dr. Saša Zavadlav

Saša was employed as a full-time postdoctoral researcher to provide research and technical assistance in the Laboratory for Stable Isotopes. She was in charge of day-to-day operation and maintenance of the EA-IRMS analysing system, implementation of stable isotope analytical techniques, and preparation of samples for stable isotope analysis. She participated in several secondments and training to improve knowledge and skills on isotope ratio mass spectrometry techniques, and prepared several SOPs related to stable isotope analysis. Additionally, she participated in workshops as a lecturer covering the stable isotope research field. She now continues her work in the field of stable isotope biogeochemistry, focusing her research interests on studying plant and soil response to changing environmental conditions.

Saša co-authored a review paper: Allocate carbon for a reason: priorities are reflected in the  $^{13}\text{C}/^{12}\text{C}$  ratios of plant lipids synthesised via three independent biosynthetic pathways (Zhou, Zavadlav *et al.* 2015).



(Photo: T. Levanič)

## ● Secondments abroad – a rich source of new experience and connections

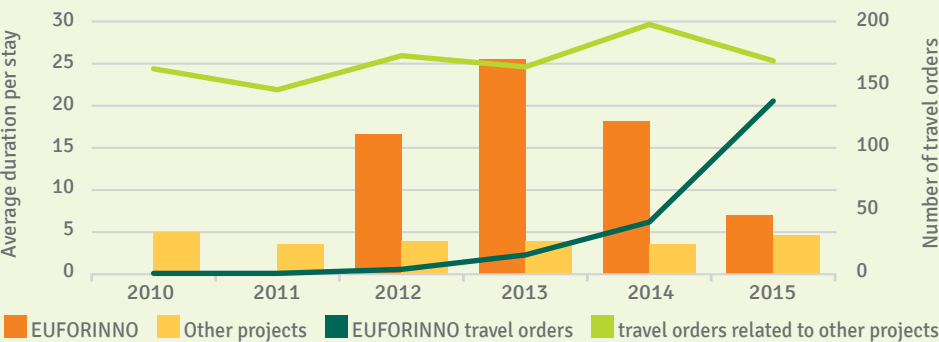
Over the duration of the project, we have executed **96 secondments** of Slovenian Forestry Institute researchers to the eight selected host institutions (CPs). The total duration of all visits was **1602 days** and their contribution to the EUFORINNO aims and non-scientific transversal actions was fairly balanced. The most visits contributed to RID aim C (39), followed by D (29) and B (28). RID aim A achieved the level of the others in the final period of the project with a total of 26 visits. Regardless of the slight imbalance in absolute numbers, all RID aims were fulfilled and the overall success of the executed secondments abroad was significant. All the secondments contributed not only to the RIDs but

also directly to other work packages, in particular to WP1. The synergistic effects were observed with all major parts of the equipment purchased through the EUFORINNO project, enabling secondment participants to familiarise themselves with the equipment and methodologies and support their efforts in preparing, publishing and accepting in practice the SOPs and specific methods for use at Slovenian Forestry Institute laboratories. Several secondments also contributed to the non-scientific transversal action – Publishing through preparation of publications and in some cases, also finalisation and publishing of highly ranked scientific papers in international and SCI cited journals.

### Number and duration of secondments within WP2

| Institution acronym | CP  | Duration of visits (days) | Number of executed visits |
|---------------------|-----|---------------------------|---------------------------|
| PLECO               | CP2 | 329                       | 11                        |
| ASP                 | CP3 | 156                       | 20                        |
| HMGU                | CP4 | 44                        | 9                         |
| ZALF                | CP5 | 307                       | 15                        |
| SWANSEA             | CP6 | 337                       | 8                         |
| IBAF CNR            | CP7 | 165                       | 18                        |
| UH FOR              | CP8 | 211                       | 11                        |
| ULUND               | CP9 | 53                        | 4                         |
| Sum total           |     | 1,602                     | 96                        |

### Secondments changed the mobility of researchers at SFI: Average duration per stay (days/per stay) and number of travel orders, financed by EUFORINNO and other SFI sources





## ● Selection of impressions from secondments

### **Domen Finžgar • Development and standardisation of a system for genetic monitoring on forest trees (RID A)**

The idea of a functional forest genetic monitoring system (FGM) has been keeping foresters busy for at least two decades. The rather difficult implementation and limited practical experience are, however, two reasons that still ensure a vibrant debate about this idea.

For this such reason I have been thrilled to participate in secondments connected with FGM. During these sessions I've been able to visit and work on the pioneer FGM plot near Freising, debate about phenology, indicators and verifiers, observe the workflow at the ASP genetic laboratories, listen to lectures at the EUFORINNO workshop in Thessaloniki, exchange numerous scientific papers on the topic and meet the people that have worked on FGM since the very beginning. I cannot stress out how important it is for a young researcher to learn from the best in the field. In 2015, Slovenia acquired its own pioneer FGM plots, on which I am currently conducting most of my research work. My aim is that the work on these two plots proceeds with as few mistakes as possible in order to obtain relevant data. I am sure that EUFORINNO

secondments have contributed significantly to the chances that this aim will be achieved.



(Photo: M. Rupel)

### **Tijana Martinović • Applying new methods – a challenge facilitated by the EUFORINNO project (RID B)**

As a young scientist at the very beginning of my research career, I find it very beneficial to participate and be actively involved in in-

fluential conferences and other types of interactions with more experienced scientists. I am currently working towards my master's degree in microbiology where all the experimental work for my thesis is being done at SFI, as part of a still running project. While the methods that we have started with have proven efficient in the past, we soon realised it was necessary to improve and introduce newer technology, in this case next generation sequencing for the purpose of analysis of microbial communities in environmental samples. This is a very challenging method to apply, especially for the first time, and all the journey of discovering, understanding and applying it would have been very difficult, if not impossible, without the EUFORINNO project. Getting the background knowledge and sharing ideas was crucial and this was achieved through several workshops, conferences, partner visits, etc. This project had an immeasurable impact on my goals to acquire a respected and high educational level whilst being in a sound environment to elevate my life dynamically and productively. This project fulfilled my expectations, over and beyond my level in all spheres. I find the people at the partner institutions very friendly and open, with such a pleasant professional environment. Coming in contact with charming people from all around the world comes as yet another positive aspect of being involved in such a project. I am truly astounded by and thankful for all the different opportunities provided and constant support of my enthusiasm towards scientific work.



**Working on the NGS samples, SFI, October 2015**

(Photo: B. Rantaša)

### **Tanja Mrak • Gaining new knowledge and experience during secondments (RID C)**

My visits to three different partners of the EUFORINNO project (ULund, ZALF and CNR Italy) gave me a great opportunity to obtain insight into the organisation of laboratories in different institutions, to learn new techniques that can be transferred to our laboratories and perform common work with renowned scientists from different fields of forest research that are valuable connections for my future work. Visits of duration of one to two weeks were just long enough to adopt knowledge on a single topic to be able to perform it on my own. Since part of the work of the research group that I am involved in is mainly on fungal-plant interactions from different aspects, I learned ergosterol extraction procedure, which enables us to estimate fungal biomass in ingrowth mesh bags, soil and woody debris.



**Sampling of soil for ergosterol extraction in Swedish forest**



**Embedding of mycorrhizal roots into polymer resin**

Embedding of mycorrhizal root tips into polymer resin is used to prepare semithin sections of mycorrhiza for observation under the light microscope to perform anatomical observations of mycorrhizas. With sampling of root systems of different species of oaks exposed to drought and ozone stress as a part of multi-level experiment we will obtain an insight into the structure of the mycorrhizal community and development of root systems under different stress conditions. I am looking forward to scientific papers that are emerging or are going to emerge from these collaborations.

### **Iztok Sinjur • Boreal Forest Reflects Changes (RID C)**

In high latitude boreal forests, where ecosystem productivity, decomposition and accumulation of organic matter are low, high spatial diversity in soil conditions and weather variability significantly affect the amount of released carbon dioxide into the atmosphere. During the EUFORINNO secondment abroad at the forest research station Värriö (University of Helsinki) an investigation of soil respiration was accompanied by detailed trenching as well as continuous CO<sub>2</sub> concentration measurements using closed-path system chambers. Within long lasting field campaigns at the SMEAR Research Plot, I visited plots where consequences of fire on forest stands were studied. Besides work in the international research team, methodologies of wildlife monitoring were also demonstrated practically. The secondment at the Hyytiälä research station represents an important part for comprehensive insight into the chain from in situ measurements to the data storage, further evaluation, data value lifecycle as well as eligibility costs. Both secondments at the well-equipped Finnish research stations initiated fruitful collaboration and contributed valuable experience which will be useful not only in my professional work but also in personal life.





**At the SMEAR I station at Kotovaara**  
(Photo: I. Sinjur)



**Measurements of soil respiration at the SMEAR I station** (Photo: I. Sinjur)

### **Saša Zavadlav • Stable isotopes as tracers of environmental change (RID D)**

Saša provides research and technical assistance in the Stable Isotope Laboratory at SFI. To date her secondments within the EUFORINNO projects have been focused on the use of stable isotopes as natural tracers of biogeochemical processes in plant ecosystems. She visited the Leibniz Centre for Agricultural Landscape Research (ZALF, Müncheberg, Germany) and Swansea University (Swansea, UK), where she was involved in different research projects, including (1) carbon allocation in different tree species under drought stress conditions, (2) fractionation of stable hydrogen and oxygen isotopes of pore waters under capillary forces, (3) stable carbon isotope fractionation during synthesis of structural and non-structural

biochemical components in leaves of C3 and C4 plants, and (4) stable carbon and oxygen isotopes in tree rings of oaks growing in lowland areas. During the course of all these projects, Saša helped in setting up the drought experiments, improved the water extraction system for stable isotope analysis, and performed extractions of structural and non-structural carbohydrates from plant leaves and organs. The results of these projects will help improve the understanding the effects of environmental/climate changes on forest ecosystems.



**Extraction of lipids from leaves of C3 and C4 plants.** (Photo: T. Levanič)



**Drying the extracted lipids**  
(Photo: S. Zavadlav)

### **Jožica Gričar • Secondments as a scientific career boost** (Transversal non-scientific actions: Publishing)

I find one-month visits of various research institutions (i.e. partners of the EUFORINNO project) very useful for a number of reasons:

(i) I was able to fully focus on unfinished tasks associated mainly with emerging publications; (ii) I was given the opportunity to exchange knowledge and expand my scientific network, as I met researchers with whom I had not yet had the opportunity to collaborate; (iii) I was able to discuss my research work and questions with colleagues working on similar or complementary topics; (iv) at some institutions I had the opportunity to attend seminars presented by Slovenian and foreign researchers and interact with numerous pre- and postdoctoral researchers; (v) in two cases I gave a lecture to students and researchers where I briefly presented my research work; and (vi) when offered I used the opportunity to visit their research plots and laboratories. Thus, my scientific visits were very fruitful and productive because I strongly believe that there is an added value in achieving the project results through international collaborative research. Such collaboration enables introduction of new methods and techniques, and fosters transfer and exchange of knowledge among researchers. It allows pooling of skills and existing knowledge. Finally, the project outputs are relevant not only locally but also on the transnational level.



International research experience  
(Photo: K. Eler)

## ● Trainings Highlights

Sending researchers from SFI abroad is not a sufficiently sustainable training scheme to inject extra knowledge in SFI. In order to facilitate the durable adoption of new methodologies and protocols, collaborative partners were invited to come to SFI to lecture at training seminars and summer schools. WP2.3 actions were complementary to the secondments, in particular to inject extra knowledge through the sustain-

| Partner code | Number of training seminars | Slovenian Forestry Institute | Slovenian University |
|--------------|-----------------------------|------------------------------|----------------------|
| CP2          | 10                          | 106                          | 37                   |
| CP3          | 8                           | 63                           | 19                   |
| CP4          | 3                           | 38                           | 19                   |
| CP5          | 5                           | 50                           | 15                   |
| CP6          | 11                          | 106                          | 51                   |
| CP7          | 6                           | 71                           | 10                   |
| CP8          | 6                           | 75                           | 11                   |
| CP9          | 2                           | 40                           | 10                   |

## ● Scientific dissemination and networking

The EUFORINNO project also supported participation at international scientific conferences. A total of 32 researchers participated in 16 conferences worldwide, either with poster presentations

able training scheme and to support the activities within WP1.

All training and summer schools have been reorganised to give a clear role of each of the partners and their expertise. In total 51 training seminars or summer schools were organised either at the Slovenian Forestry Institute or at selected attractive and stimulation sites around the country to create the best learning

and supportive environment for both lecturers and participants.

**Total number of training seminars/schools per participant, total number of participants on the particular occasion according to their profile/institution and average number of visitors per training seminar/school organised by a particular partner**

| Origin of participants |                                    |                                   |             |                      |                  |                              | Average number of participants per occasion |
|------------------------|------------------------------------|-----------------------------------|-------------|----------------------|------------------|------------------------------|---|
|                        | Higher and professional schools SI | Public services and Ministries SI | Industry SI | Foreign Universities | Foreign Industry | Total number of participants |   |
|                        | 0                                  | 5                                 | 3           | 66                   | 1                | 218                          | 21.8  |
|                        | 13                                 | 14                                | 17          | 31                   | 3                | 160                          | 20.0  |
|                        | 0                                  | 0                                 | 0           | 16                   | 0                | 73                           | 24.3  |
|                        | 0                                  | 2                                 | 0           | 14                   | 0                | 81                           | 16.2  |
|                        | 0                                  | 6                                 | 0           | 25                   | 0                | 188                          | 17.1  |
|                        | 0                                  | 0                                 | 0           | 83                   | 4                | 168                          | 28.0  |
|                        | 0                                  | 1                                 | 0           | 16                   | 1                | 104                          | 17.3  |
|                        | 0                                  | 0                                 | 0           | 20                   | 0                | 70                           | 35.0  |

or with (invited) lectures. Additionally, four conferences with international participation were organised by SFI, specifically “Gozd in les” (Forest and Wood) in 2013, 2014, and 2015, with Dr. Georgio Matteucci,

Prof. Dr. Donald G. Hodges, and Dr. Monika Konnert as invited speakers, and also in 2015 EUFORIA – the final 4-day EUFORINNO conference with 19 invited speakers and over 130 participants.

## WP3 Exploitation and Visibility

SFI is strongly oriented towards international cooperation. Within the EU and more widely we apply for different projects and within different consortia. For SFI it is of utmost importance to be visible and recognised as a potential partner, lead partner or project coordinator.

All activities within WP3 were focused on one single goal – to increase the visibility of SFI. For this reason, we focused on different activities to increase the visibility of SFI. The first thing we did was to update the web page of SFI and EUFORINNO and make it visually more attractive. The web page was used to announce all EUFORINNO events and workshops at SFI or abroad. It was also used for online registration for the events and workshops. This enabled us to rapidly process participants and significantly shorten the time needed for the organisation of the events and workshops.

Establishing a network of **national contact points (NCP)** was crucial for further work within the project and for future cooperation. For this purpose we organised an NCP meeting at the very beginning of the project. Our main targets were Central and Southeastern European countries (Croatia, Hungary, Romania, Serbia, Bulgaria, Bosnia and Herzegovina, Albania, Former Yugoslav Republic of Macedonia, Greece and Turkey) and some selected Mediterranean countries, such as Portugal. Two further NCP meetings were

organised: at the time of the EUFORIA conference on Rogla and towards the end of the project in January 2016 at SFI, where a brainstorming session was organised on the future common project proposals. This ended with a common strategy and action plan.

The EUFORINNO project was presented to stakeholders and potential end users of different networks and organisations, such as the **SBRA (Slovenian Business and Research Organisation)**, **EUFORGEN** and several **COST** actions.

**Workshops, both on a regional and inter-continental level**, were organised with several goals – the first goal was to establish contacts and present SFI facilities and expertise to our partners, the second goal was networking, the third goal was collecting partners for future projects and research work, and the fourth goal was presenting possibilities of our new equipment and gathering potential customers for our services. All workshops were well attended, and many connections were established. This gives a good basis for future research cooperation and common application for projects.

EUFORINNO proved to be a great opportunity to increase our visibility in the region and attract partners to apply for common projects, bilateral cooperation, common publications and also involve SFI researchers into teaching processes at universities.



Participants of EUFORINNO workshop in Tirana, Albania (Photo: M. Čater)



Participants of EUFORINNO workshop in Bhutan, December 2015 (Photo: A. Marinšek)

## Regional and intercontinental workshops, organised during EUFORINNO

| Level                         | Event  | Country              | Date       | Duration (days) | Lecturers   | No. of participant countries   | No. of participants |
|-------------------------------|--|----------------------|------------|-----------------|---|--|---------------------|
| Intercontinental              | 6th International Symposium on Physiological Processes in Roots of Woody Plants: Mycorrhizosphere complexity                             | Nagoya, Japan        | Sept. 2014 | 1               | Slovenia, Finland (CP8), Belgium (CP2), Austria (chair of the IUFRO section on woody roots) | international mixed  | 80                  |
|                               | XIV World Forestry Congress: European forest research and innovation - supporting and monitoring resilience of forests to climate change | Durban, South Africa | Sept. 2015 | 1               | Slovenia, Italy (CP7), Belgium (CP2)  | international mixed  | 38                  |
|                               |  | Thimpu, Bhutan       | Dec. 2015  | 7               | Slovenia, Belgium (CP2)   | 2 (Slovenia, Bhutan)   | 27                  |
| Intercontinental/<br>Regional | 9th International Soil Science Congress: Forest Soil Carbon Dynamics in Time and Space   | Antalya, Turkey      | Oct. 2014  | 1               | Slovenia, Turkey, Germany (CP5)   | international mixed  | 15                  |
| Regional                      | Dendrochronology, Ecophysiology and Below-ground biodiversity <sup>*1</sup>  | Tirana, Albania      | Feb. 2015  | 3               | Slovenia, Albania, Croatia, Montenegro and FYR Macedonia, Germany (CP5), UK (CP6)           | 5 (Albania, Montenegro, Kosovo, FYR of Macedonia, Croatia and Slovenia)                              | 22                  |
|                               | Forest genetic monitoring <sup>*2</sup>  | Thessaloniki, Greece | Mar. 2015  | 4               | Slovenia, Greece, Germany (CP3)   | 6 (Hungary, Croatia, Serbia, Bosnia and Herzegovina, Former Yugoslav Republic of Macedonia, Albania) | 40                  |
|                               | Dendrochronology, Ecophysiology and Below-ground biodiversity <sup>*1</sup>  | Fruška gora, Serbia  | June 2015  | 3               | Slovenia, Serbia, UK (CP6), Italy (CP7)   | 5 (Serbia, Bosnia and Herzegovina, Romania, Hungary, Croatia)  | 20                  |
|                               | Biodiversity, Climate Change, Ecosystem processes, and European Opportunities  | Blidinje, BIH        | Aug. 2015  | 3               | Slovenia and Bosnia and Herzegovina   | 2 (Slovenia and Bosnia and Herzegovina)  | 16                  |
|                               | Forest Genetic Monitoring and Forest Gene Banks  | Slovenia - Germany   | Jan. 2016  | 3               | Slovenia, Germany (CP3),  | 2 (Slovenia, Germany, Greece and Bosnia and Herzegovina)   | 28                  |

<sup>\*1</sup> combined 3 workshop for 4 countries

<sup>\*2</sup> combined 4 workshop for 6 countries

## ● EUFORINNO, we have liftoff!

BY MARKO BAJC, DOMEN FINŽGAR

**“Picture this. A pair of forestry researchers pull up in their vehicle at a convenient spot near their sampling area. Within minutes, they unload their equipment and launch a remotely controlled unmanned aerial vehicle (drone) that flies autonomously towards a set of pre-defined GPS coordinates miles away. As the drone reaches the waypoint, the operator takes manual control and with the aid of the on-board camera surveys the sample tree canopy, selects the most suitable branch to sample, carefully closes in and collects the sample with a sampling device mounted on the drone. The operator then pulls the drone up and commands it to autonomously return to the starting point and thus retrieve the collected sample. Researchers land the drone, bag and label the sample, and repeat the process. This may sound like a scene from a movie but at the Slovenian Forestry Institute (SFI) a team is on a mission to turn this high-tech concept into reality.”**

Sampling plant tissue or other biological materials in tree canopies has always presented a particular problem to forestry researchers. Until now this task was most often tackled by one of the following approaches: (i) use of trained climbers to scale the trees and collect samples in the canopy (drawbacks: expensive and time consuming); (ii) use of firearms or other projectile casting tools to shoot off samples from the canopy (drawbacks: potentially hazardous to collectors and forest biota, not sufficiently discriminating); (iii) collection of samples after felling (drawbacks: most invasive and terminal – no future sampling of the same individuals possible).

The popularisation of remotely controlled multirotor drones in hobbyist and professional communities has inspired personnel from the Department of Forest Physiology and Genetics at the Slovenian Forestry Institute (SFI) to start exploring the idea of developing a remotely controlled drone-based system for collecting samples in tree canopies. The research and innovation focused EUFORINNO project eventually provided the means to make the airborne tree canopy sampling concept come to life.

In order to achieve such an ambitious goal, SFI partnered with “Zavod 404”, a research and innovation oriented technology centre that provided the engineering knowhow and manufacturing capacities to create a device that would meet the very specific requirements set forth by SFI researchers. The resultant device is a remotely controlled





mechanical arm with a spring-loaded scissor type cutter and a grabbing tool that attaches to a multirotor drone and enables the operator to precisely and selectively cut the branch to be sampled remotely and retrieve it. The operator guides the drone and collects the sample with a help of an on-board camera displaying imagery on a display attached to the operator's remote control unit, thus also enabling "out of operator's visual range" operation.

Ground testing of the cutting/grabbing operation of the device was conducted during September and October 2015, while the first airborne testing of the sampling device took place on November 1st 2015, during which the drone operator successfully cut and retrieved the sampled branch. Based on the observations collected during ground and flight tests, the sampling device has been further improved and development and testing of a higher performance multirotor drone suitable for carrying the sampling device and with a high level of stability and control

input responsiveness was initiated. Additionally the tree canopy sampling device was submitted for grant of a patent at the Slovenian Intellectual Property Office (application no. P-201500288) and European Patent Office (application no. EP16150006.1). As the proficiency of the drone operator is a key factor in successful airborne tree canopy sampling, training was also organised within EUFORINNO for four SFI staff members to become proficient drone operators.

Although the airborne tree canopy sampling device is in a working prototype stage, successful testing of the device has filled the development team with enthusiasm to pursue the concept further and researchers at the Department of Forest Physiology and Genetics are planning to use the device in the field in ongoing and future projects. At SFI, we envision that the airborne tree canopy sampling system and other drone-mounted research instruments will become indispensable tools in forest and forestry research in the very near future.



1. Airborne tree canopy sampling system in action. High stability, high control responsiveness and excellent power-to-weight ratio of the Sky Hero Spyder X8 series octocopter enable safe operation literally among tree tops. (Photo: D. Finžgar)
2. A close-up of the working end of the sampling device. Curved rods serve as guides that help align the branch in the cutting/grasping plane of the device. The blue box that can be seen mounted on the arm contains a camera that displays imagery on the operator's display and aids in precise positioning of the drone during sampling. (Photo: M. Walter)
3. A ground view of the prototype tree canopy sampling device mounted on a Sky Hero Spyder X4 series quadcopter during the first airborne test. (Photo: J. Brezovar)

## ● Innovation and IP Management Highlights

An overview of the existing situation and the fields producing cases to be included into the IP management strategy, and training on patenting, was organised by the IP manager. The draft IP strategy and an SFI Regulation for the Protection of IP were prepared. Drafts were discussed by EUFORINNO AB and later confirmed by the Scientific Board of SFI. An office for IPR was established, serving also as a confidentiality service for possible disputes on co-authorships, and a general discussion as part of dissemination activities within SFI was initiated and has been well

established. These activities and their outputs form a solid basis for future IP management at SFI. During EUFORINNO, the office supported one patent application and 4 applications for trademark registration.

The IPM strategy is an active process, developing with needs, research and professional fields and services the SFI staff provides and encompasses; therefore, it will evolve over time. The main basis for an active and open discussion was established, and the IPM office will remain in operation over the long term at SFI.

### Slovenian Forestry Institute IP manager in brief

**Prof. Dr. Ivan Kreft** was involved in the construction of the draft of intellectual property (IP) strategy of SFI, which will be available as a possible sample for similar strategy documents for other forestry institutions in southeastern Europe. Ivan joined workshops in Nitra and Stara Lesna (Slovakia), Portorož (Slovenia), Nagoya (Japan), Luxemburg, and Thimpu (Bhutan), where he presented EUFORINNO activities. His presentations included discussion of the forest-agriculture interface in Europe and Asia, with special attention to buckwheat grown in oak tan-bark coppice after cutting, forest as a shelter for propagation of pollinators, and forest as protection of water sources and crop fields from strong winds. In December 2015 he organised a seminar on the protection of IP at SFI.





## ● The *Silva Slovenica* Publishing Centre Highlights



# Silva Slovenica

*Silva Slovenica* is the publishing centre of the Forestry Institute of Slovenia (SFI), established in parallel with the establishment of the Institute in 1949. In the beginning, it was named SFI Publishing House. As publishing of scientific knowledge became increasingly important, especially due to the need to increase accessibility of publicly funded research results, it was renamed the *Silva Slovenica* Publishing Centre. Through the centre numerous publications at the scientific or expert level have been published. The most visible are the scientific journal *Acta Silvae at Ligni* and the monograph series *Studia Forestalia Slovenica*.

During the EUFORINNO project, significant development of the publishing centre was achieved through professionalisation of the technical editor. Through available project funding and the efforts of the editor there has been an observable boost in publishing activities at SFI. In addition, the number of works published through *Silva Slovenica* has risen significantly during EUFORINNO. Through several high quality publications, the publishing centre has raised the quality of the publishing process and output on the professional international level. With the financial support of the project EUFORINNO, SFI has become a member of CrossRef, which is helping publishers them to establish URL links between their content and the content of other Crossref publishers by providing DOI number.

## ● EUFORINNO *Silva Slovenica* recruitments



**Tina Drolc**, technical editor of the *Silva Slovenica* publishing centre

Tina played an important role in the editorial tasks and procedures aimed at raising

the scientific excellence of SFI through the *Silva Slovenica* Publishing Centre. As technical editor, she was involved in the development of a modern publishing system that resulted in a number of high quality publications. She also worked on the introduction of the open access repository SciVie and as editor of EUFORINNO web pages. As a public relations expert she covered various aspects of project dissemination activities, such as organisation of project events like EUFO-

RIA. She contributed to the preparation of the LIFEENMON dissemination work package. Tina was succeeded by postdoc Dr. Peter Železnik for the last four months of the project.



**Dr. Peter Železnik**, technical editor of the *Silva Slovenica* publishing centre

Peter succeeded Tina Drolc for the last four months of the project life. He continued the planned activities such as publishing EUFORINNO Newsletters and different monographs. During his term two of the most esteemed monographs of *Silva Slovenica* were published (Atlas of Woody Plant Roots

and a review of *Quercus* genetic research). He also became involved in the IUFRO section on publishing in forestry, which further improved the international reputation of the publishing centre. In autumn 2015, he organised a 30-hour course on desktop publishing and a workshop on general legal and technical aspects of publishing in cooperation with experts of the Slovenian National Library. The application for DOI was processed and finished during his appointment. He succeeded in bringing the monograph *Virgin Forest* to a major Slovenian bookseller and thus to the widest possible audience.



### Irena Rebov

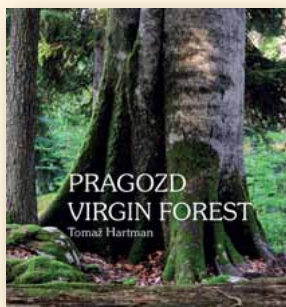
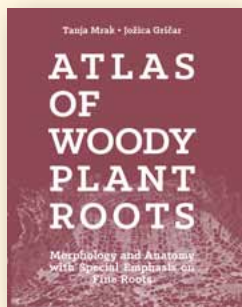
Irena Rebov was employed through the EUFORINNO project as the librarian tasked with the digitalisation and processing of studies and research reports

in *SciVie*. She also significantly contributed to the *SciVie* repository by maintaining the repository, digitalising research reports and entering information in the database.

She was also involved in the initial promotion of the *SciVie* repository among interested institutions and researchers, with the main goal of promoting the benefits of publishing articles in the repository.

## ● *Studia Forestalia Slovenica*

*Studia Forestalia Slovenica* is scientific and expert level monograph series published by the *Silva Slovenica* Publishing Centre in cooperation with the Department of Forestry and Renewable Forest Resources and Department of Wood Science and Technology of the Biotechnical Faculty of the University of Ljubljana. The monograph series has been published since 1949, with 147 titles published so far. One of the goals of the EUFORINNO project was development of the series to reach an international scientific level. Recent scientific publications represent a good step in that direction.



1. *Quercus petraea* and *Quercus robur*: Recent Genetic Research by Gösta Eriksson (2015)
2. *Atlas of Woody Plant Roots* by Tanja Mrak and Jožica Gričar (2016)
3. *Photo monograph Virgin Forest* (Hartman *et al.* 2014)

## ● *Acta Silvae et Ligni*

*Acta Silvae et Ligni* is the only Slovenian scientific journal dedicated to publishing original or review articles from the fields of forests, forestry, wood science and technology, forested landscape, nature and the environment.

With the financial support of the EUFORINNO project, the journal improved its visibility and achieved or is in the process of achieving several important milestones:



**106<sup>th</sup> Issue of  
*Acta Silvae et Ligni***

- an operationalised fully electronic submission system
- graphic design, home page, policy strategy, and open access were changed
- change of title for better visibility and easier tracking of articles
- copyright issues were resolved and an open access option finalised for all articles (from number 1 till recent)
- the DOI allocation to all current articles is in power and guaranteed for the next few years
- still under evaluation within Web of Science and Scopus
- complete online editorial process for paper submission, revisions and other communication among authors

Homepage: <http://www.forestry.bf.uni-lj.si/>

Online submission: <http://www.editorialsystem.com/asl/login/>

## ● *SciVie* open repository

The repository provides efficient re-use of past research from SFI and other member institutions (including a vast quantity of grey literature), convenient and efficient promotion of research results to researchers and institutions (increased citations and recognition of scientific works), and the opportunity for the general public to improve their lives based on research findings.



*SciVie* is a multi-institutional repository in the fields of natural and life sciences (currently four participating institutions), based on EPrints3 software with adjustments of open source to meet the requirements for Open Access Policies in the European Union. It enables deposition of new articles according to the publisher's policy (SHERPA/RoMEO), e-publishing of new e-publications in open access, and access to old literature. Digitalization process for already published works (dating from the establishing SFI in 1950<sup>th</sup>) was set up. 732 study reports, which considered as grey literature and the only copy exists in the Forestry library, were digitalized. That task has been a challenge even for the chosen digitalizing company, since materials were on a different paper formats, old or damaged paper and printed or typed in a diverse quality. Special challenge has been the digitalization of supplementary maps and other outsized material and finding a way to disseminate digitalized copies to public (via *SciVie*) as not too large files.

The repository is well accessed; in February 2016 the number of downloads of different material reached 32,299.

**The SFI scientific strategy** consists of an analysis of the scientific goals of SFI, its positioning within the European forest research and innovation area, and its targets in terms of research outputs (publications, projects, initiatives). SFI participates and contributes to a number of worldwide and EU-based programmes, strategies, and processes.

**The research programme of SFI** supports research and development in the areas of the six SFI research departments, aiming at scientific excellence, and in producing long-term impacts in science, technology, innovation, professional services, education, and in socio-economic aspects.

In order for all fields of research to remain closely linked to Slovenian forests and forestry, **the public forest service** tasks are being dealt with by researchers and professional colleagues from all SFI departments. Thus the scientific methods are being implemented in professional tasks, and ongoing development is guaranteed.

We will be gradually building a system of short, medium and long-term vision and goals, in a modular system, adapting easily to new research demands and development, yet pursuing the long-term vision for developing further into an important international centre of excellence and innovation in forestry.

## ● EUFORINNO unlocking SFI potential

### ● ASSET 1#: People

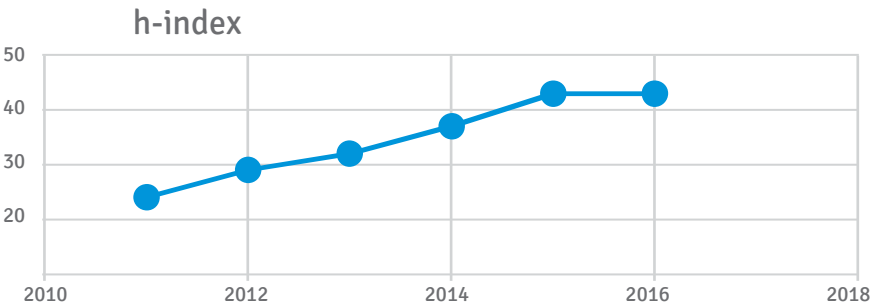
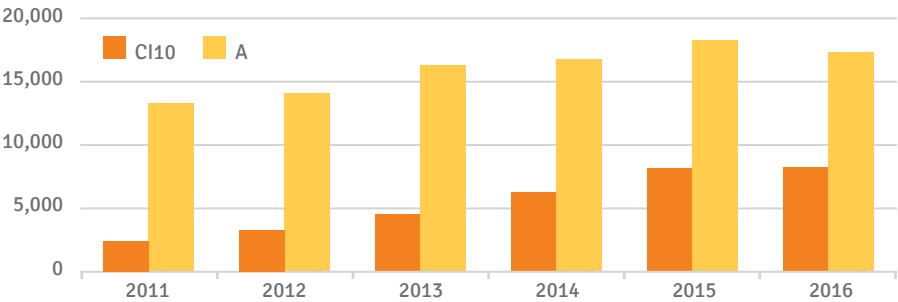
DR. PRIMOŽ SIMONČIČ, DIRECTOR: “The most important treasures of the Institute are people, their dedication to research and curiosity. Their commitment to clients and transmission of results to the public, their personal growth and long-term and medium-term objectives of public research organization.”

Prior to the EUFORINNO project, SFI employed 62 people. In 2015, the number of SFI employees reached 80. The overall level of education among SFI staff as well as of their scientific achievements has increased in the last five years.

**Educational level of SFI in the years 2010 - 2015** (Source: SFI internal data)

| Educational level | Number of employees 2010 | Number of employees 2015 | Share 2010  | Share 2015  |
|-------------------|--------------------------|--------------------------|-------------|-------------|
| IX: PhD           | 20                       | 37                       | 31%         | 47%         |
| VIII              | 5                        | 4                        | 8%          | 5%          |
| VII/2             | 23                       | 19                       | 36%         | 24%         |
| VII/1             | 5                        | 11                       | 8%          | 14%         |
| VI                | 3                        | 2                        | 5%          | 3%          |
| V                 | 4                        | 4                        | 6%          | 5%          |
| IV                | 2                        | 1                        | 3%          | 1%          |
| III               | 2                        | 1                        | 3%          | 1%          |
| <b>Total</b>      | <b>64</b>                | <b>79</b>                | <b>100%</b> | <b>100%</b> |

**SFI scientometrics—Number of citations (CI 10 years) and bibliometrical quantification (points A = A1 publications + A2 citations + A3 non-budgetary funds), and the h-index, for SFI researchers** (data and tables prepared by Maja Peteh, based on the database SICRIS, 11 February 2016)



● **ASSET 2#: Infrastructure**

The EUFORINNO project was aimed at giving life to the new SFI laboratory area. Practically all core research equipment and all general-purpose laboratory equipment were placed into a new laboratory tract in the left wing of the ground floor. New employment and a vast capacity building process were undertaken in order to put the 22 pieces of the durable equipment towards RID objec-

tives. All planned equipment was bought, installed, and intensively exploited by SFI employees and CPs (collaborative partners) over the last two years. Based on CP knowhow, equipment custodians developed 16 Installation & Maintenance Protocols (IMP), 15 User Manuals (UM) and 18 Standard Operating Procedures (SOPs, elaborated to different levels).

● **ASSET 3#: Financial**

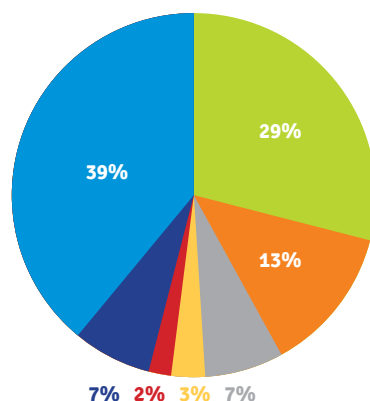
The national funding for research in Slovenia has decreased in the most recent period; however, SFI has been able to adapt and fo-

cus on acquiring projects from other funding sources. In 2015, EU-funded projects covered 41% of SFI’s annual budget.

The contribution of EUFORINNO in the past 3 years has provided a significant financial boost to several SFI activities in acquiring a number of projects. As seen in SFI budget figure, the effect of EUFORINNO coming to an end will

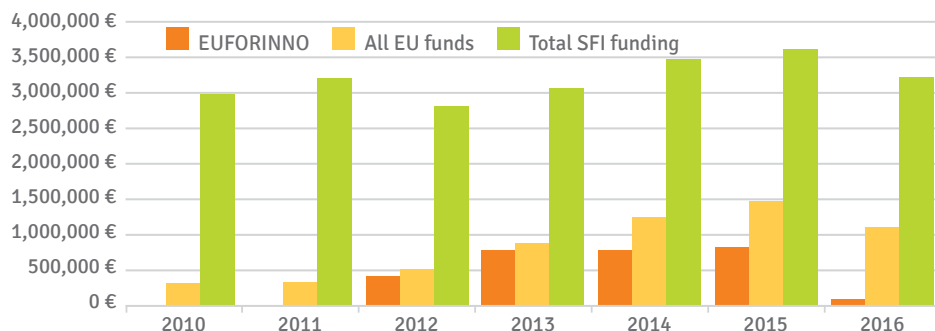
have financial implications, but the overall financing of the institute will remain stable. In 2017 it is expected that several projects now in the evaluation phase will be accepted and will ensure long-term financial stability.

### SFI budget in 2015 (Source: SFI annual report)



SRA - Slovenian Research Agency  
PFS - Public forest service  
MAFF - Ministry of Agriculture, Forestry and Food  
MESP - Ministry of the Environment and Spatial Planning  
MESS - Ministry of Education, Science and Sport

### SFI financing: Contribution of EUFORINNO in SFI EU funding and total SFI funding in the years 2010-2016 (Source: SFI annual report)



So far, one LIFE project LIFE GENMON with five partners and participating experts from the target region of SE Europe is a direct consequence of the EUFORINNO networking. The aim of the LIFE GENMON project is to support the long-term adaptability of forest genetic resources to a changing environment through the **development of a system for European forest genetic monitoring**. The project is

co-funded by the **European LIFE fund** (the Financial Instrument for the Environment), **national ministries and partner institutions**. It combines the efforts of **six partners from three European countries** (Germany, Greece and Slovenia and is coordinated by Prof. Dr. Hojka Kraigher of the **Slovenian Forestry Institute**; it lasts from **July 2014 until June 2020**, with a total budget of **€5,484,162**.

## ● Addressing future development and financing opportunities of SFI

The problems regarding further development and financing are manifold, and some paths to resolve them can be addressed at the general national, expert and within-SFI level, and internationally, as listed below:

### Nationally

#### ● At the general public level:

- Contributing actively to improving the national perception of the needs and effects of science
- Contributing actively to improving the national perception of the roles and functions of forests and the need for active forestry and its development in a changing world

#### ● At the expert level:

- With active participation in SRA expert bodies, contributing to improvement of the national policies on science, development and innovation
- With active communication and participation in committees preparing professional background documents for modification of national legislation in forestry
- With active participation in directing the civil forest service and the civil environmental service, improving among others national reporting methodologies, national monitoring in forests, communicating and educating about new emerging problems and research for their solutions

#### ● At the within-SFI level:

- Aiming at the highest scientific outputs, published in outstanding journals, or in the highest recognized scientific monographs
- Aiming at studies of processes and identifying newly emerging scientific questions and fields of research
- Aiming at understanding processes in well-delimited fields, and broadening the understanding to more holistic problems
- Aiming at understanding the general processes at a holistic level, and deducing them to specific well-delineated fields of research
- Aiming at establishing well-functioning teams of interdisciplinary profiles addressing the same questions and processes, contributing to the increase of knowledge and understanding of the subjects of study
- Supporting the possibilities for publishing, through training on scientific writing and publishing, within-team communication and mentorship regarding scientific publishing, through supporting further development of the publishing

- centre, and supporting of open access publishing
- Supporting the discussion and awareness-raising of IP management, patenting and other means of IPR protection
- Supporting continuous development of research infrastructure, including databases, collections, and field research plots
- Supporting continuous education of all SFI staff
- Supporting with financial, employment and interpersonal means the best research performers
- Supporting team build-up and adequate complementarity of the collaborating teams
- Supporting scientific and professional networking within Slovenia and abroad
- Supporting all general services including the Project incubator and the Project management office

### Internationally

- Through publishing excellent research results, international patenting, promoting research results and services
- Through scientific networking, bilateral and multinational collaboration, supporting mobility, training, workshops, conferences, organised and participated at by every researcher at a yearly basis
- Through collaborating in preparation of EU-wide strategies regarding research and forestry, background documents for regional and EU legislation, and in global activities and strategies
- Through collaboration in international scientific expert bodies
- Through internationalisation of *Silva Slovenica* and its publications, supporting the open access repository *SciVie*, collaboration in the extension IUFRO groups of publishers
- Through collaboration with international organisations and associations, such as IUFRO, forest owners, forestry students, and others
- Through collaboration with professional international organization in the field of research administration to bring to the SFI best practices and world-class support to researchers, such as EARMA, SRA International and others
- Through establishing possibilities for invited lecturers, leading lecture courses or collaborating in them for undergraduate and postgraduate forestry students abroad, and participating as hosts of international formal education systems
- And a number of others – through maintaining an open discussion and views on the internal SFI strengths and weaknesses, and national, regional, European and global threats and opportunities.

# EUFORINNO

## European Forest Research and Innovation



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Naslov / Contact: Gozdarski inštitut Slovenije / Slovenian Forestry Institute – the EUFORINNO project, Večna pot 2, SI-1000 Ljubljana, Slovenia, e-naslov: [info@gozdis.si](mailto:info@gozdis.si)