



Monitoring Air Quality using Moss



Project number

282952

Project title

MossClone—Creating and testing a method for controlling the air quality based on a new biotechnological tool. Use of a devitalized moss clone as passive contaminant sensor

Call (part) identifier

FP7-ENV-2011-ECO-INNOVATION-TwoStage

Funding scheme

Collaborative project

<http://www.mossclone.eu/>

THE MOSSCLONE CONSORTIUM

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UNIVERSIDADE DA CORUÑA

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tecnoambiente

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TOTAL: 3,492,022.00 €



Creating and testing for controlling the air quality based on a new biotechnological tool. Use of a devitalized moss clone as passive contaminant sensor

The main MOSSCLONE objectives were:

- 1) design and standardize the moss-bags exposure
- 2) select a highly performant moss on the basis of literature data;
- 3) establish a clone of this species under highly controlled conditions;
- 4) characterize the moss clone molecularly and physical-chemically;
- 5) compare the accumulation performance of the moss clone with traditional materials (e.g. other wild mosses) and physical-chemical techniques (e.g. passive and active samplers).



LIST OF WORK PACKAGES (WP)

WP Number	WP Title	Type of activity	Lead beneficiary number	Start month	End month
WP 1	Project Management	MGT	1	1	36
WP 2	Moss clone cultivation and characterization	RTD	3	2	20
WP 3	Tool development	RTD	6	6	36
WP 4	Detectors	RTD	7	21	36
WP 5	Exploitation and dissemination	OTHER	2	1	36

Work package number	WP1	Type of activity	MGT
Work package title	Project Management		
Start month	1		
End month	36		

Objectives

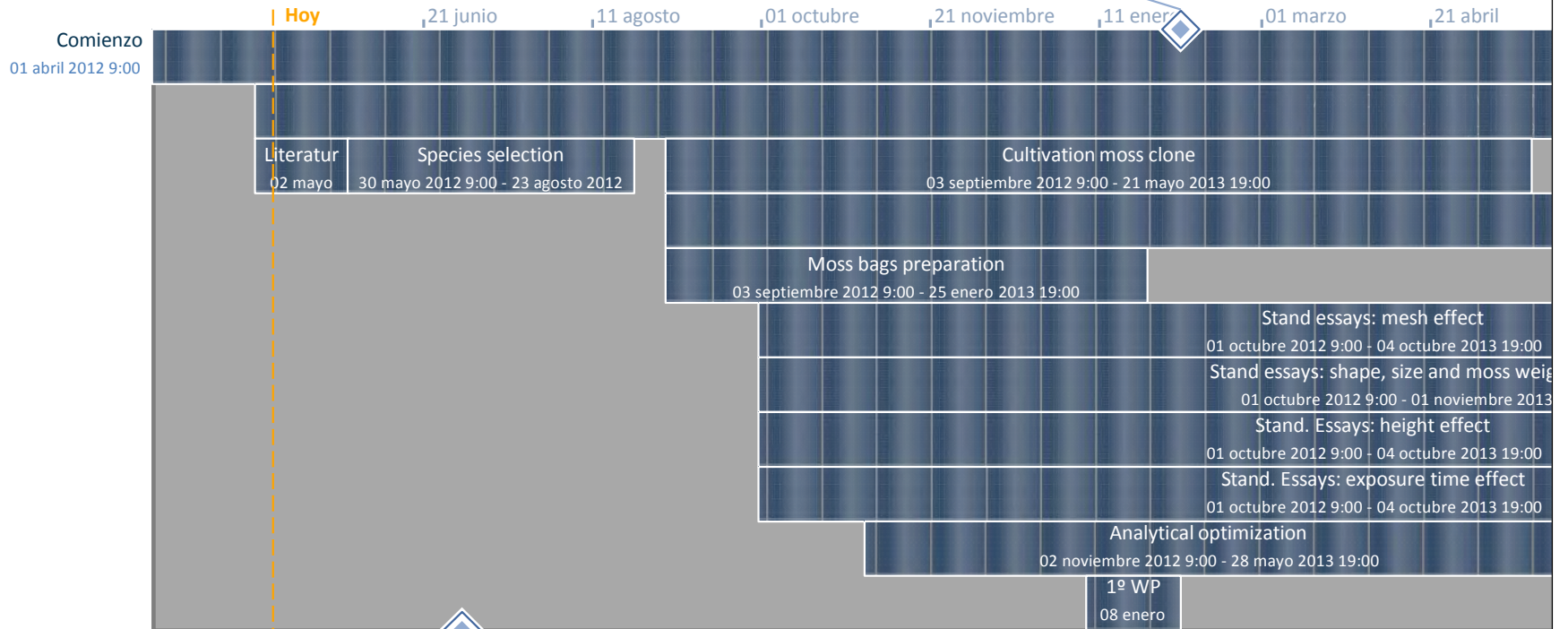
- Smooth management of the project to ensure cohesion and compliance with the Project Plan as presented here.
- To manage MOSSCLONE to ensure cohesion and compliance with the Project Plan; to allow decision making for the benefit of the entire project.
- The organization of the WP Leader meetings to: create cohesion (team building); exchange (preliminary) results; stimulate cross-WP communication; enable optimal work flow from WP to WP.

Description of deliverables

D1.1) Management of MOSSCLONE: [month 36]
D1.2) First WP Leaders meeting: [month 10]
D1.3) Second WP Leaders meeting: [month 20]
D1.4) Third WP Leaders meeting: [month 30]

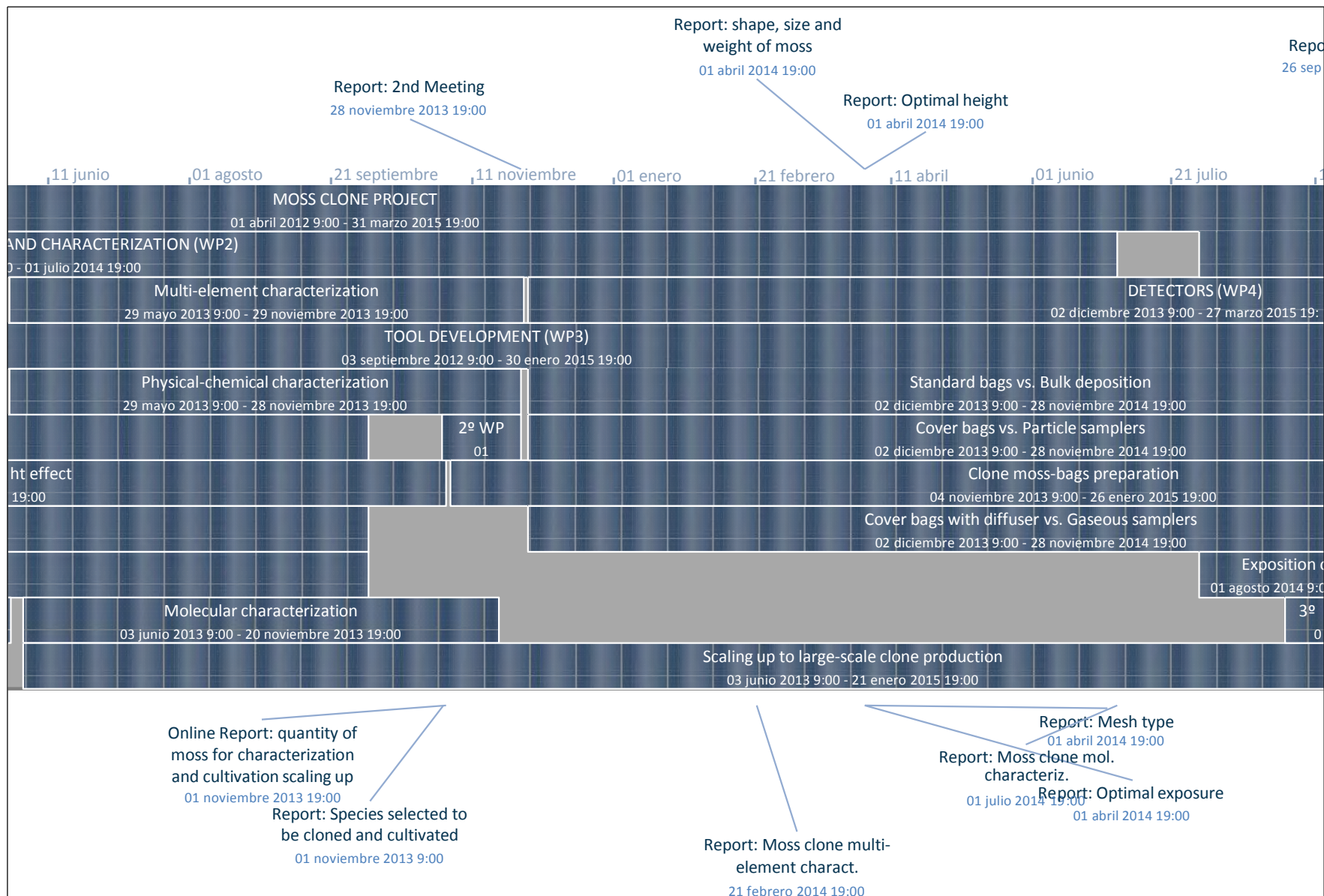
Report: 1st Meeting

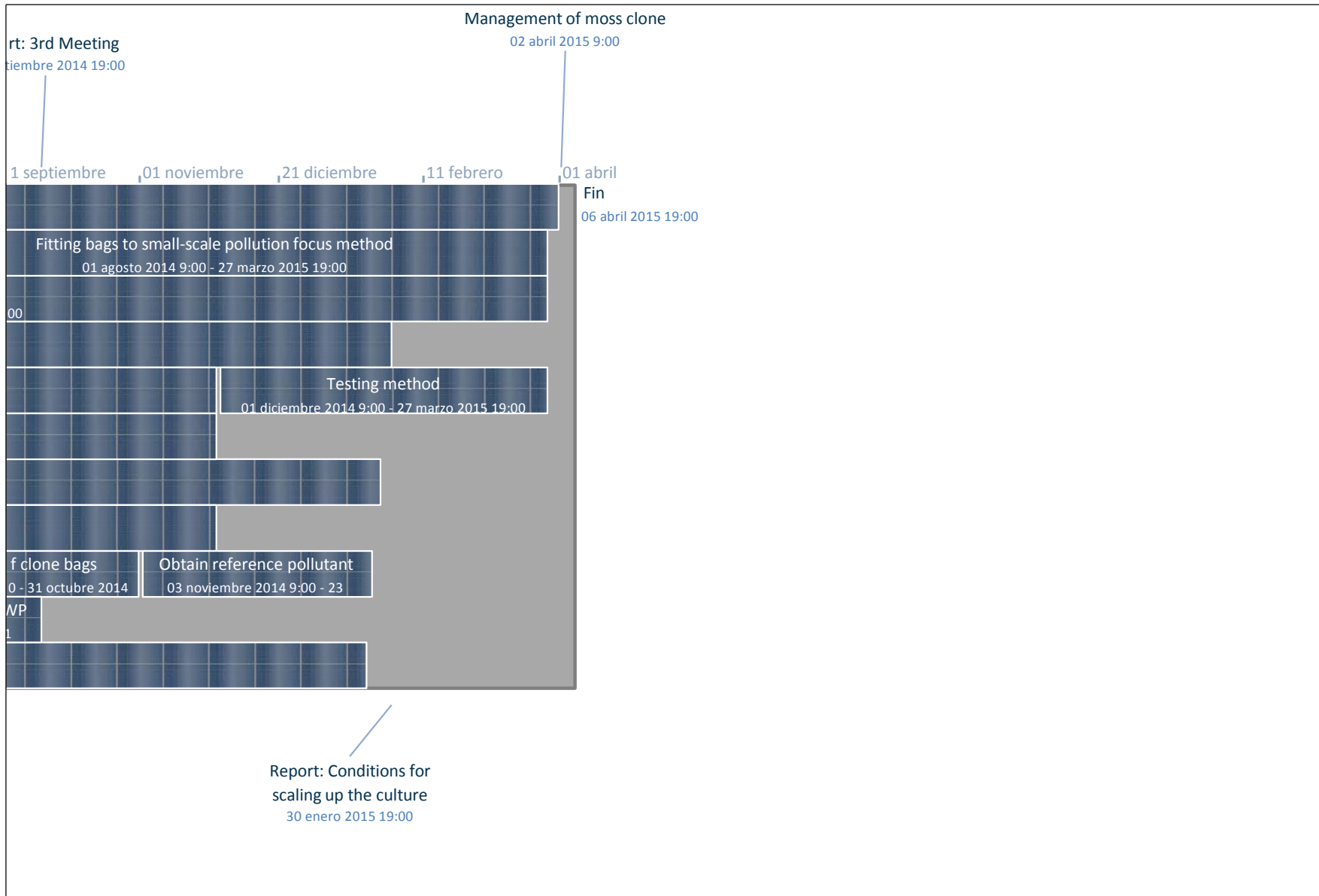
04 febrero 2013 19:00



Report: List of species
employed and the
descriptive statics of the use
of each one

02 julio 2012 19:00

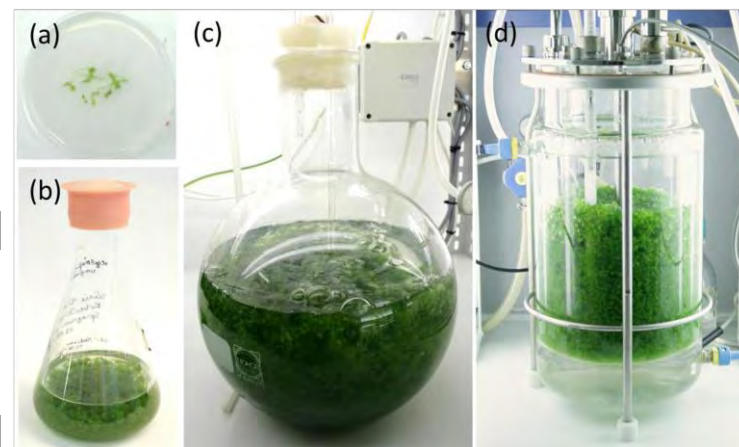
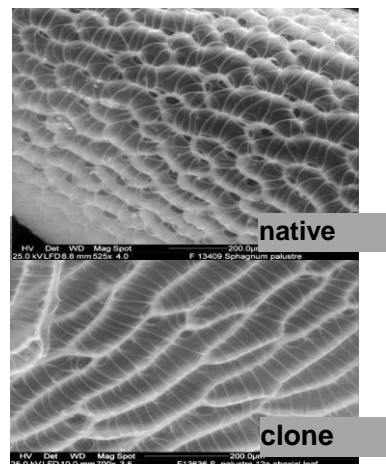
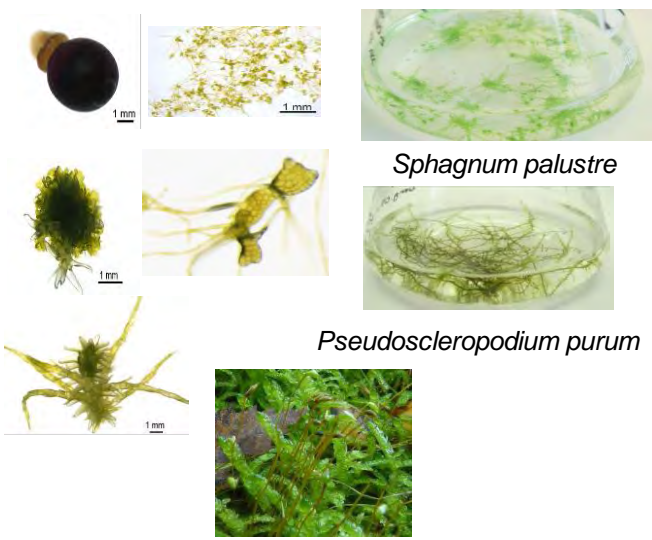




Work package number	WP2	
Work package title	Moss clone cultivation and characterization	
Start month	2	
End month	20	

Objectives

- To **select a** moss species that will be cultivated on the basis of it use as air pollution active biomonitor, and its pollutant accumulation capacity.
- To isolate and cultivate a clone of one of the moss species listed in objective 1 and define optimal cultivation conditions.
- To make a molecular characterization of the obtained moss clone with the aim of a possible patent registration.
- To make a multi-element characterization of the obtained moss clone with the aim to know the initial concentrations present in the moss prior to its use as air pollution monitor.
- To make a physical-chemical characterization of the obtained moss to know and understand in which quantity and way pollutants will be retained by the moss clone.



Description of deliverables

D2.1) Report about most used moss species: A report including the list of species employed in the scientific literature for active biomonitoring and the descriptive statics of the use of each one **[month 4]**

D2.2) Report about moss characteristics and species selection: A report including the results of the physical-chemical characterization, and based on these, the ordered list of the selected species according their accumulation capacity **[month 7]**

D2.3) Report about species selected to be used: A report including the finally selected species, which includes all the attempts developed for other species and the causes of discarding as candidates to be cloned and cultivated **[month 16]**

D2.4) Moss clone production for characterization and scaling culture: Enough quantity of the moss clone for its characterization and for subsequent upscaling to large-scale clone production (WP3) **[month 16]**

D2.5) Report about clone molecular characterization: A report on the results of the moss clone molecular characterization **[month 16]**

D2.6) Report about clone elemental characterization: A report on the results of the moss clone multi-elemental characterization **[month 16]**

D2.7) Report about physical-chemical characterization: A report on the results of the moss clone physical-chemical characterization **[month 16]**

Work package number	WP3	
Work package title	Tool development	
Start month	6	
End month	36	

Objectives

- To optimize and standardize the way in which the moss clone will be exposed.
- To prepare moss clone bags, following the results of the previous objective, to be used in WP4.



Envelope



Bag



Sphere

Description of deliverables

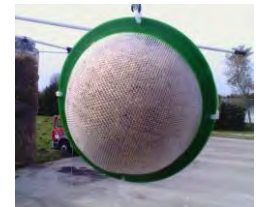
D3.1) Report about mesh to be used in moss bags: A report of the results of mesh type selected for moss bags preparation [month 21]

D3.2) Report about moss bags characteristics: A report of the results of shape, size and weight of moss selected for moss bags preparation [month 21]

D3.3) Report about optimal height for moss bags exposure: A report of the results of the optimal height to expose the moss bag to the air pollution [month 21]

D3.4) Report about optimal exposure period for moss bags: A report of the results of the optimal exposure period of the moss bag to the air pollution [month 21]

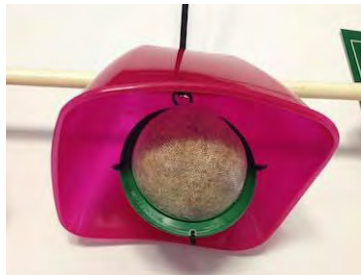
D3.5) Report about moss culture scaling up: A report about moss clone culture scaling up [month 30]

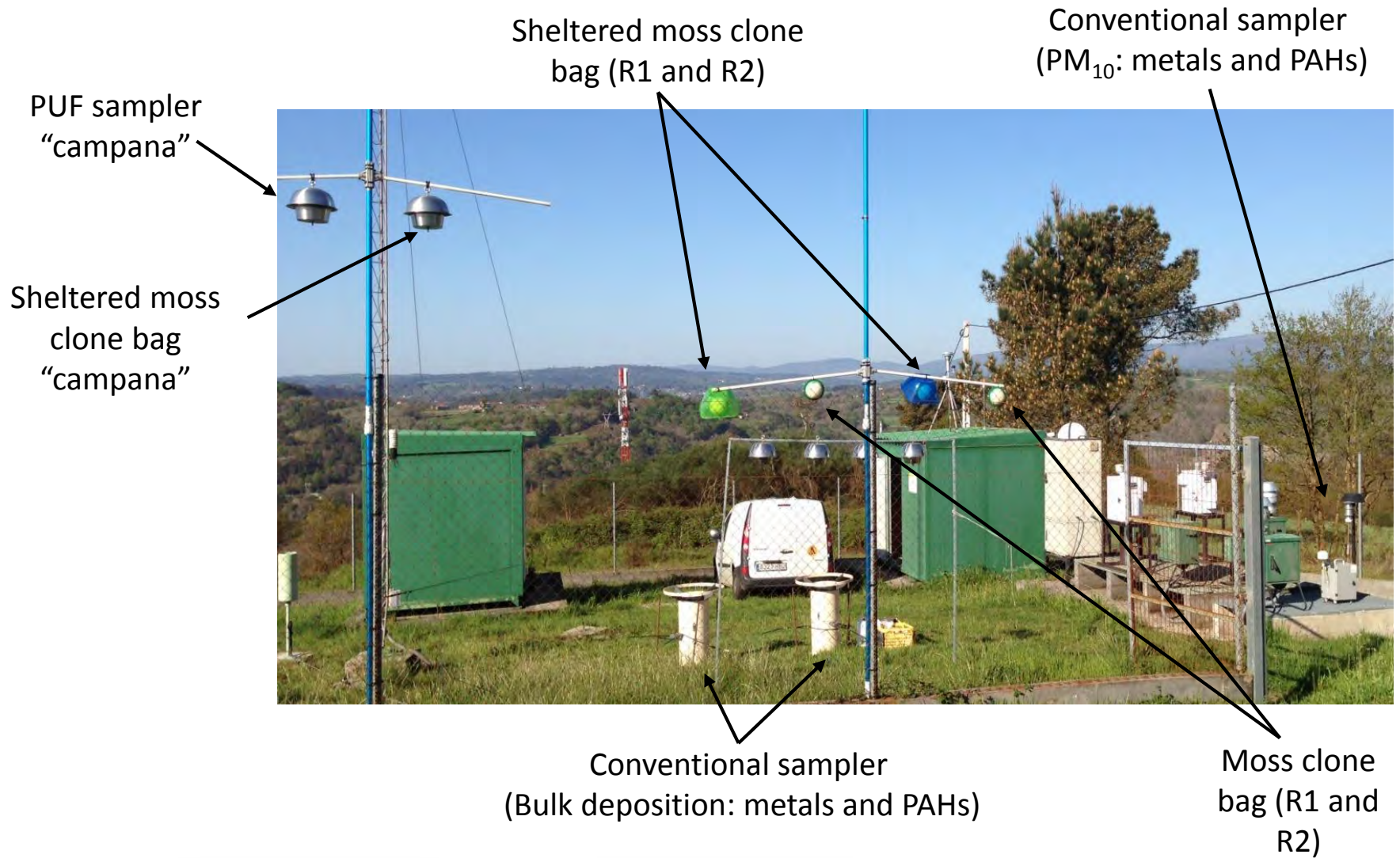


Work package number	WP4	
Work package title	Detectors	
Start month	21	
End month	36	

Objectives

- To compare the results obtained using moss clone bags with those of traditional techniques for monitoring heavy metals, metalloids and PAHs present in the atmosphere (bulk deposition collector, particle samplers, and gaseous samplers).
- To create a method to detect atmospheric small scale pollution focus using moss clone bags





Spanish stations	Sample code
O Saviñao (Background)	SB1
Ferroatlántica (Industrial)	SI1
La Torre (Urban)	SU1
IUMA (Urban-agricultural)	SA1

For metals and PAHs
in PM10 and bulk
deposition

SU2

Italian stations	Sample code
Costa Molina (Agricultural)	IA1
Masseria (Industrial)	II2
NA Museo (Urban)	IU1
NA Osservatorio (Background)	IB1
SET Depuratore (Agricultural)	IA2
Viggiano (Industrial)	II1

For metals and PAH in
moos



Description of deliverables

D4.1) Report about comparison moss clone bags-bulk precipitation: A report on the relationship between pollutants present in bulk precipitation and those present in moss clone bags [month 33]

D4.2) Report about comparison moss clone bag-particles: A report on the relationship between pollutants present in airborne particles and those present in moss clone bags [month 33]

D4.3) Report about comparison moss clone bags-gases: A report on the relationship between gaseous pollutants present in the air and those present in moss clone bags [month 33]

D4.4) Report about reference distributions from unpolluted areas: A report showing the reference normal distributions of the differences in concentration between pairs of sampling sites from unpolluted areas [month 36]

D4.5) Report about the use of MOSSCLONE method to potential pollution focus: A report on the results of the application of the MOSSCLONE method to the potential small scale sources of pollution [month 36]

Work package number	WP5	
Work package title	Exploitation and dissemination	
Start month	1	
End month	36	

Objectives

- Disseminate the output of the MOSSCLONE consortium
- Ensure exploitation of the activities and the results obtained to catalyze collaboration with other international groups of researchers working on (other types of) bio-monitoring strategies
- Specific objectives:
 - ✓ Task 1: To ensure MOSSCLONE visibility on the World Wide Web to external professionals and the interested public, and to provide a secured portal for open communication between all members.
 - ✓ Task 2: The organization of all full consortium meetings to: create cohesion (team building); exchange (preliminary) results; update all participants of MOSSCLONE progress; discuss matters relevant to the entire consortium (both Scientific and Management issues); communicate Management decisions as appropriate.
 - ✓ Task 3: To develop the Dissemination and Exploitation plan.
 - ✓ Task 4: To disseminate all relevant knowledge to all stakeholders.
 - ✓ Task 5: Identification of pre-existing know-how; early identification and protection of commercially exploitable know-how developed in the project; assure exploitation of commercially exploitable know-how; assure proper handling of IP and legal issues.

Description of deliverables

- D5.1) MOSSCLONE website: MOSSCLONE website operational and demonstrated at Kick Off meeting [month 1]
- D5.2) Dissemination and exploitation plan: First version of Dissemination and Exploitation plan [month 3]
- D5.3) Bi-annual newsletters: On-line MOSSCLONE bi-annual Newsletters (delivery dates: months 6, 12, 18, 24, 30 and 36) [month 36]
- D5.4) Website public information update: Updated public information on website (constantly updated up to month 36) [month 36]
- D5.5) Kick off Meeting: [month 1]
- D5.6) Midterm Meeting: [month 18]
- D5.7) Final Meeting: [month 36]
- D5.8) Report about Life Cycle Assessment: [month 36]
- D5.9) Pre-existing know-how identification [month 1]
- D5.10) Patent applications: Patent applications for all valuable IP generated within MOSSCLONE [month 36]

6 June 2013 Category: In the media
Video Introduces People, Project and First Field Tests in 14 Languages

The first video reporting about the European research collaboration was made by the news channel Euronews. Dr. Eva Decker explains why mosses are good candidates to measure air pollution. The analysis of airborne heavy metals is unreliable and expensive up to now but required by law. Prof. Dr. Ralf Reski says in which way biotechnology helps to create standardized moss material - a precondition to reliably measure contaminations. The first prototypes of air-permeable moss bags are now in a practical test in Spain where Dr. Carlos Carballeira Braña shows in which way the tests are run to measure pollution from cars, other vehicles and industrial plants. Inspired by first results Prof. José Angel Fernández Escribano provides an overview about other places and ecosystems that could be monitored in the future as soon as this new technique is approved - a technology which combines molecular biology and material sciences with ecology and bionics.

English video: [Biotechnology to fight air pollution](#)

French video: [De la mousse pour piéger la pollution atmosphérique](#)

German video: [Moose sollen Luftqualität kontrollieren](#)

Italian video: [Muschio clonato, ecco il nuovo rilevatore di inquinamento](#)

Spanish video: [Musgo para detectar la contaminación del aire](#)

other languages like Hungarian, Polish or Portuguese can be chosen on top of the [Euronews website](#)



2 December 2013 Category: In the Media
A Moss as Partner to Measure Air Contaminations

El Mundo, the largest digital Newspaper in Spain, reported about the MOSSclone project with the headline: "*El musgo, un aliado para medir la contaminación atmosférica*".

read article in [El Mundo](#)

2 December 2013 Category: In the Media
Spanish Video about Pioneer Work

A Spanish video of two minutes at the website of the Galician TV station *Televisión de Galicia* introduces the work of two of the European MOSSclone partners: Ana Isabel Rey Asensio talks about the part the Spanish Biovia company is taking care of and Prof. Simonetta Giordano explains what she and her group at the Italian University at Naples are contributing to the reach project's aims.

see video at [Televisión de Galicia](#)

11 December 2015 Category: In the Media
Peat moss and MOSSpheres for measuring air pollution

MOSSpheres are the device in which the cultivated mosses accumulate pollutants.

Monitoring air quality using MOSSpheres at measurement stations,
[Both images are licensed under CC BY-SA 3.0](#)

The Biotech and Life Sciences Portal Baden-Württemberg in Germany, BioPro BW, introduces the "MOSSpheres" in which MOSSclone's mosses are brought out in the field for biomonitoring pollutants.

Read English version:

["MOSSclone: peat moss for measuring air pollution"](#)

Read German version:

["MOSSclone: Torfmoos zur Messung der Luftverschmutzung"](#)

PATENT

Passive contaminant sensor device



RÜCKANTWORT
Bitte verschlossen versenden

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Mitteilung über Unvollständigkeit am:	
Ablauf der 4-Monatsfrist zur Inanspruchnahme am:	20.07.15
Entscheidung über Freigabe oder Inanspruchnahme erfolgte am:	

Erfindungsmeldung
bei der Universität Freiburg / Universitätsklinikum Freiburg

2014/10

Thanks for your attention by
the MOSSclone Research Consortium



<http://www.mossclone.eu/>

