NEWSLETTER
MAY - AUGUST 2016

SUMMARY

- Scientific journals publish project Riverphy progress
- First technical visit to the study area by the UMH students
- Life projects networking in Aragón
- Riverphy returns to the Agenda 21 Lorca
- Life Symposium 2016
- First application of chelating agents and microorganisms in plots
This fourth-month period Riverphy project has had 2 big publications in journals of great interest to both Spanish and international scientific community.

From the day April 4 of 2016 is now published online one of the first publications of the Riverphy project in an international scientific journal of recognized impact factor (2,206 in 2015 according to Impact Factor Journal Citation Reports @, Thomson Reuters). The paper is entitled “Geochemical speciation of chromium related to sediments properties in the riverbed contaminated by tannery effluents” by the journal Journal of Soils and Sediments. You can download it on our website www.liferiverphy.eu and is also available from the link http://link.springer.com/article/10.1007/s11368-016-1412-7. The article deals with the spatial distribution and speciation of chromium in the study area in its different forms (soluble, bioavailable and total).
The second publication of this fourth-period month has been at edition number 191 May-June 2016 of the Spanish journal RETEMA, a technical journal of environment. The article is titled as the project "Rehabilitation of a heavy metal contaminated riverbed by phytoextraction technique". The article shows the main objectives of the project and the phytotechnology by which aims to reduce high concentrations of metals in the Guadalentín riverbed. You can read the publication on our website and also through the link http://www.retema.es/revistas/mayo-junio-oFid.
FIRST TECHNICAL VISIT TO THE STUDY AREA BY STUDENTS OF THE
MIGUEL HERNÁNDEZ UNIVERSITY

On 8\textsuperscript{th} April the study area received the first technical visit by teachers and students of the first course of the Environmental Sciences degree from the Miguel Hernández University (UMH) from Elche. A total of 26 assistants, 21 students and 5 teachers and technicians of the UMH. The visit lasted approximately 4 hours and the bus was funded by the Miguel Hernández University. All assistants were given an illustrative brochure with information on the Riverphy project.

The visit was divided in 3 technical stops. The first technical stop was realized at the panel of the project before getting to the stretch 1 of the Guadalentín river. Assistants listened a brief introduction about the project, including its background and objectives.

Then, next to the experimental plots of stretch 1 the second stop was realized and the information was focused on research: the experimental methodology through the initial characterization of soil-plant system was performed to determine the degree of contamination by heavy metals in soil, the soil application of natural chelating agents and microorganisms and the phytoextraction technique in the stretches and the experimental plots.
And finally, at the last stop a simulation of the interpretive itinerary that pretends to carry out in the coming months was realized. Furthermore, the assistants received information about the approximate location of the panels and the elements that will make up the itinerary. Then a group photo with the Life flag with the beautiful castle of Lorca at the background was made.
In late April, on 27th and 28th a networking of Life projects related to the thematic of soil decontamination took place at the headquarters of the Government of Aragon in Zaragoza. A total of 11 assistants, the participants projects were four, including the Riverphy project with its thematic on soil decontamination of heavy metals by phytoextraction technique.

Among the participant projects were I+Dart project of the University of Oviedo (Spain) dealing with remediation of contaminated soils by arsenic and other heavy metals in industrial and mining areas. The Bioxisoil project of the Polytechnic University of Madrid which is based on optimizing the combination of physicochemical and biological techniques to recover large areas affected by organic contamination. And finally, the Discovered Life project of the Government of Aragon which studies at pilot scale environmental remediation of soil and the aquifer Bailín contaminated by dense contaminants and pesticides.

The networking lasted 2 days. The first day of the networking, Sandra Ortega, the Chief Executive Officer of Sustainability of the Aragón Government welcomed all assistants and a photograph with all was taken.
Then, the progress of every Life project was exposed since the last networking held last October at the Polytechnic University of Madrid. Later, a round table was performed to discuss the different points of view and ideas for the improvement in the implementation of specific actions related to the experimental monitoring and dissemination of the European projects.

And to end the day, the host project Discovered Life shared with all assistants a documentary on the problematic involved in its project. The documentary was titled "DISCOVERING THE LEGACY OF HCH LINDANE" and has won the Felix de Azara award (Huesca Provincial Council) in 2016, in the category of social communication. The second day of the networking, a field visit was realized to know the study area of the Discovered Life project in the town of Sabiñánigo and the facilities of the HCH (hexachlorocyclohexane) landfill dismantled from Bailín rift, one of the implementation areas of the project.
The networking had impact on digital media at the regional level as 20 minutos, Diario del Campo, lainformación.com y Aragón_hoy under the headlines “Aragón reúne a los cuatro grupos de trabajo de proyectos LIFE de España para la descontaminación de suelos”, “Reunión en Aragón de los cuatro grupos de trabajo españoles en descontaminación de suelos” and “Aragón acoge a cuatro grupos de trabajo de proyectos LIFE para la descontaminación de suelos”.

Aragón reúne a los cuatro grupos de trabajo de proyectos LIFE de España para la descontaminación de suelos

Aragón acoge a cuatro grupos de trabajo de proyectos LIFE para la descontaminación de suelos

Los suelos contaminados representan un importante problema desde el punto de vista ecológico, medioambiental y económico, incidencia de forma significativa en la salud de las personas. En España existen cuatro proyectos LIFE que persiguen la descontaminación de los suelos que van bien con financiación europea, entre ellos el proyecto Discovered Life que se lleva a cabo en Balún y Sardina (Sabaladrón) para luchar contra la contaminación provocada por induros. Diario del Campo acerca los datos más significativos de cada uno de estos cuatro proyectos europeos.
On 3rd May, the progress of the Riverphy project were presented at the general meeting of the Municipal Council of Environment and Sustainability held in the assembly hall of the Development Local Center of the Municipality of Lorca. The municipal council began with the presentation of the final version which will be adopted soon of the Air Quality Plan Improvement in the Region of Murcia 2016-2018, presented by María Encarnación Miñano Molina, Chief Director Officer of Quality and Environmental Assessment of the Water, Agriculture and Environment Ministry.

Next, the researchers at the Polytechnic University of Cartagena presented the Riverphy project, recalling the background and objectives of the project and also briefly outlined all activities undertaken since the project began in October 2013 to today. All the initial studies (geophysical, geotechnical, hydrological and biogeochemical studies) in the action area of the riverbed
Guadalentín were highlighted. And finally, the actions performed recently were also named such as clearing contaminated vegetation in the study area, the transport of contaminated plant material to the treatment plant and phytoextractor planting in the stretch number 1 last autumn. Leaflets and assessment questionnaires on Riverphy project were given to the assistants. The exposition concluded by highlighting the actions that will be undertaken in the coming months such as the installation of panels and elements of an interpretive itinerary, remediation and revegetation of slopes, carrying out technical visits to the Guadalentín riverbed and monitoring the efficiency of phytoextraction in stretches and study plots.

PROJECT MANAGEMENT

From May to August 2016, the coordinating partner and other associated partners have made three follow-up meetings to communicate and discuss all Riverphy project progress. The meetings were held on 17th May, 20th June and 14th July in the vicinity of the Executive Management of Quality and Environmental Assessment.

Some of the topics discussed were the following (the name of the action is indicated):
ACTION B2: PHYTOEXTRACTION IN SEDIMENTS.

- Cleaning vegetation and concrete factory transport: late summer / early autumn 2016.
- Planting of stretches 2 and 3: early autumn 2016.

ACTION B3: SLOPES PROTECTION AND REVEGETATION.

- Remediation and planting of slopes project: calendar, performances and conditioning access for machinery.

ACTION B4: ENERGETIC USE OF RESIDUAL CONTAMINATED BIOMASS.

- Transport of contaminated vegetation to the treatment plant (concrete factory) in early autumn 2016.

ACTION B5: EVOLUTION OF SOILS AND VEGETATION.

- Replanting in the experimental plots.
- Replanting in stretch 1: autumn 2016.
- Monitoring of the experimental plots: status of plants and soil and soil sampling every two weeks.
- Emergency irrigations of the plants of stretch 1 and the experimental plots during the summer months.

ACTION B6: ENVIRONMENTAL RECOVERY AND LANDSCAPE DESIGN.

- Last details of the plant species panel, installation of fencing and paving the way of the itinerary.

ACTION D5: TECHNICAL VISITS.

- Performing technical visits to the study area at the end of 2016 to bring the project to the population.

ACTION E2: NETWORKING WITH OTHER PROJECTS.

- Search networking opportunities with other projects and / or companies.
On 15th and 16th June, after several months of organization (from October 2015 to June 2016) the LIFE 2016 SYMPOSIUM was held under the title "Nuevas tendencias y retos en la recuperación de suelos contaminados" in the Escuela Técnica Superior de Ingeniería de Montes, Forestal y del Medio Natural of the Polytechnic University of Madrid.

The symposium was organized by members partners of the Life projects Riverphy, I+Dart, Bioxisoil and Discovered Life and attended about 200 people who were given the program of the symposium and a certificate of attendance. A dissemination space to catch informational brochures and to display information on projects and companies focused on the issue of soil decontamination was also enabled for the event.
The program of the first day of the Life 2016 Symposium was divided into 5 sessions, a first opening session by the principal of the ETSI Montes and staff of the Ministry of Defense of Spain, MAGRAMA, CDTI and Red Nicole. Subsequently 4 sessions were performed, each session was composed of three lectures of 30 minutes, the first lecture of each session was opened by a Life project followed by a business panel consisting of 2 invited private companies with talks of 30 minutes as well. The third session of the first day was for the Universidad Politécnica de Cartagena (UPCT) who presented the Riverphy project to the approximately 200 assistants (including Ministry staff, public and private companies and university staff), there were questions, suggestions and dialogue when the talk finished.
Regarding the second day of Life 2016 Symposium, the morning session focused on the role in soil decontamination of the public research entities such as IRTA, TECNALIA, IRNAS-CSIC and CAM.

In the afternoon several workshops were conducted simultaneously. The UPCT held a workshop entitled "Caracterización y medidas de fitorremediación de enclaves contaminados por metales pesados y metaloides" which was divided in 3 lectures of 45 minutes related to the issue of soil decontamination through phytotechnologies. The titles were “Caracterización y análisis de riesgos de emplazamientos afectados por metales y metaloides previos a la aplicación de fitotecnologías”, “Selección de la fitotecnología más apropiada para rehabilitar suelos contaminados por metales y metaloides” and the last lecture “Fitoestabilización asistida: limitaciones y fortalezas”. The UPCT workshop was attended by approximately 20 people.
Life 2016 Symposium assistants were also invited to fill out a short questionnaire to assess the impact of the actions taken by the following Life projects: RIVERPHY (LIFE11/ENV/ES/000506), BIOXISOIL (LIFE11/ENV/ES/000505), I+DARTS (LIFE11/ENV/ES/000547) and DISCOVERED LIFE (LIFE12 ENV/ES/000761), and the development of Life 2016 Symposium (15th and 16th June 2016, Madrid) organized by the aforementioned projects. The questionnaire was anonymous in order to obtain real and accurate data and consisted of 17 questions divided into 4 blocks (general, knowledge of the Life projects, impact and assessment of Life 2016 Symposium). The questionnaire results are presented below:

ANALYSIS OF QUESTIONNAIRE RESULTS:

The total registered to Life 2016 Symposium was 202 people divided as follows: 161 assistants, 41 absent and 5 people signed on the same days of the symposium.

In short, 166 people attended to the Life 2016 Symposium of who 64 responded to the survey, representing 38%, approximately.

ANALYSIS OF THE FIRST BLOCK OF QUESTIONS RELATING TO GENERAL MATTERS:

The age of the 62.5% of the participants is between 18 and 65 years old, most with a high level of education (bachelor or master) and their work is done in research centers or public universities (27%) followed by private companies related to the environment with 13%.

ANALYSIS OF SECOND BLOCK OF QUESTIONS RELATING TO KNOWLEDGE ABOUT LIFE+ PROJECTS PRESENTED:

On this issue, all LIFE+ projects presented at the Life 2016 Symposium are known, highlighting the Bioxisoil Project with 38%. Most assistants have known the existence of the organization of this Life 2016 Symposium through email communication and about 65% of assistants physically know some of the projects presented at the symposium.

ANALYSIS OF THE THIRD BLOCK OF QUESTIONS REGARDING THE IMPACT OF LIFE+ PROJECTS PRESENTED:
Most survey respondents (around 30%) consider very important the impact of these projects in the environmental and health risks areas, providing an assessment of 10 and 8 respectively. As for the economic and social issues, the approximately 20% of survey respondents believe that the impact is important offering an assessment of 8 and 7 points respectively.

Almost 40% of the survey respondents considered as low the knowledge of the population on contaminated soil, with an assessment between 2 and 3 points (96% of survey respondents). They also believe that is very necessary to do an awareness campaign to the population about the problems of contaminated soils and the need of greater involvement of government agencies to control this situation.

On the other hand, more than 60% of the survey respondents are aware of the existence of investments in their area for soil decontamination.

ANALYSIS OF THE FOURTH BLOCK OF QUESTIONS RELATED TO ORGANIZATION SYMPOSIUM:

The main conclusion offered by the results of the questionnaire is that the organization of the Life 2016 Symposium has been of the highest quality. According to the survey respondents the main reasons of this quality are:

- About 80% of the survey respondents have considered appropriated the length of the oral expositions.
- About 95% of the survey respondents have qualified speakers and the quality of their expositions between good and very good, that is, the level of the communications was very high.
- About 97% of the survey respondents have described the overall organization and the program of the Symposium Life 2016 between good and very good.
- About 93% believe that a symposium with similar characteristics should be repeated.
On June 29th the first application of natural chelating agents and microorganisms was carried out in the 15 experimental plots located between the stretches 1, 2 and 3 of the study area of the Guadalentin riverbed (5 plots per stretch).

By applying natural chelating agents and microorganisms the progress of the efficiency phytoextraction will be investigated. Five treatments: oxalic acid, citric acid, aminoacids, bacteria Pseudomonas fluorescens and control. The oxalic acid and the citric acid are natural chelating agents that together with other treatment (aminoacids and bacteria Pseudomonas fluorescens) are considered broths of microorganisms, all of them can help to increase the bioavailability of the metals present in the soil to be assimilated or absorbed by plants because metal compounds normally are not available to plants. A control treatment or blank (without
Chelating agents or microorganisms will be used to compare the soil and the plants behavior with and without treatment.

The application of natural chelating agents and microorganisms in the experimental plots will be carried out every 3 months until autumn 2017, with a total of 5 applications. The progress of the efficiency phytoextraction will be estimated by root soil sampling every two weeks and by plant and root/not root soil sampling every year. The first root soil sampling was performed before the first application of natural chelating agents and microorganisms. So far 5 root soil samples have been performed until moment.

The plant species under study are the species that are implanted in the plots of each stretch which are Atriplex halimus, Suaeda vera, Salsola oppositifolia and the spontaneous vegetation present.
NEXT EVENTS

- Replanting of *Suaeda vera* in experimental plots.
- Cleaning vegetation in stretches 1, 2 and 3 of the study area and transport concrete factory.
- Replanting in stretch 1.
- Phytoextractor planting in stretches 2 and 3.
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