



MINAGRIS

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Connect with us:



Hello, and a warm welcome...

...to our first newsletter!



Professor Violette Geissen,
Project coordinator

In this edition, we will share updates on our 5-year EU funded Horizon 2020 project on agricultural plastic use. Working as a consortium of 20 partners across Europe, across 11 case study sites, MINAGRIS will:

- Assess the impact of plastic debris in agricultural soils on soil health, plant productivity and ecosystem services
- Improve our understanding of the movement and degradation of plastics in the environment
- Provide tools and recommendations for the sustainable use of plastic in agriculture at the farm and field levels
- Support safe and economically viable food systems in Europe

We hope you enjoy our first newsletter. Please get in touch if you have any questions:
coordination@mail-minagris.eu.



Background

Plastic plays an important role in agriculture and is used to produce weed-suppressant mulches, silage wrap, tractor tyres, netting and more (see photos). Whilst useful for agricultural production, these items shed micro- and nano- plastics, the impacts of which are largely unknown. Other sources of micro- and nano-plastics in agricultural soils include sewage sludge and compost.

Existing evidence suggests that micro- and nano-plastics in agricultural soils may:

- Accumulate in the soil, changing its physio-chemical properties and function.
- Be small enough to be ingested by a range of organisms.
- Cross biological barriers, being absorbed into the tissues of plants and animals.
- Accumulate chemical agents including pesticides and veterinary drugs.

These plastics may, therefore, affect **ecosystem services** such as soil water dynamics and nutrient cycling, whilst having an **unknown impact on the natural capital and economic viability of agricultural enterprises**.

MINAGRIS project objectives

In order to address the lack of research into the impacts of agricultural micro- and nano-plastics on agricultural soils, MINAGRIS will:

- Co-create with the stakeholder community a methodology to analyse the use and fate of plastics in European agriculture
- Establish a comprehensive overview of MNP concentrations in agricultural soils
- Assess the impact of MNP on soil biodiversity, physical and chemical soil properties, agricultural productivity, and related ecosystems services (ESS), and the interaction of pesticides, veterinary drugs and additives with this
- Determine the contribution of different processes to the degradation and disaggregation of plastics in agricultural soils, and their transportation to other environments
- Identify the benefits and risks associated with various (un-)intentional uses of plastics in agricultural production across Europe
- Inform stakeholders and the wider public of our findings on environmental and socio-economic impacts of MNP in agricultural soils
- Provide farmers with operational knowledge and tools to assess their MNP exposure, and support them in adopting sustainable agricultural practices



Photo credits: Plastics Europe, Wageningen Food & Biobased research, Tuinadvies, Kalliergeia, Future Farming, Teal Agrotechnologie

INTRODUCING THE MINAGRIS CASE STUDY SITES

As shown in the table below, 11 case study sites across Europe have been selected for the MINAGRIS project. These cover Europe's 6 main biogeographical regions.

At each site, we have recruited 10 farmers, who will share their expertise and access to their fields for soil sampling. Relevant local, regional, and national stakeholders will also be invited to connect with the project, as part of our multi-actor approach.



Case study number	Region	Country	Crop
1	Alpine	Slovenia	Cereals, vegetables, potatoes
2	Atlantic	Netherlands	Cereals, vegetables
3	Atlantic	United Kingdom	Vegetables
4	Boreal	Estonia	Cereals
5	Continental	Switzerland	Orchards, cereals
6	Pannonian Continental	Austria	Vegetables, cereals and potatoes
7	Humid subtropical	Italy	Vegetables and cereals (biogas maize)
7	Temperate subcontinental	Italy	Vegetables
8	Mediterranean	Greece	Vegetables, olive trees, grapes
9	Pannonian	Austria	Cereals, rape, vegetables
10	Semiarid	Spain	Vegetables
11	Continental	France	Vines





During a recent visit to one of our UK case study sites, we spoke with one participating farmer to find out whether they have been experimenting with alternatives to plastic products.

Our farmer stated that they would not be able to grow their organic leeks without plastic mulch. However, they have begun experimenting with biomulch on the farm, as they were unhappy with the amount of debris left by traditional plastic mulches.



The photos (left) show this biomulch, in amongst their now-established leeks, which will biodegrade more rapidly than plastic mulches.

Thank you to Charlotte Chivers for the photos.

MINAGRIS KICK-OFF MEETING

MINAGRIS kicked-off with a meeting in September 2021 in The Netherlands. This was part of a hybrid event gathering the work package and case study site leaders between 20-23rd September.

Each work package presented their overall objectives for the project, and we discussed how we will develop our experimental methodologies.





Plastics including mulch films, nets, twines and polymer coatings on fertilisers, considered 'intentional' plastics in agriculture, contribute to the load of micro- and nano-plastics to agricultural soils.

Plastics are unintentionally introduced into agricultural soils through shedding from vehicles and equipment and through the application of compost and sewage sludge containing plastics. These can amount to soil microplastic concentrations of 28 kg/ha in the soil.

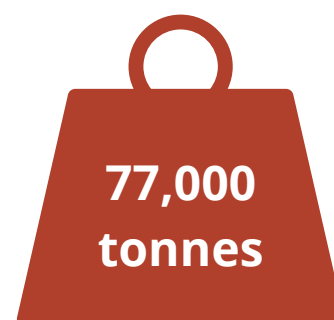
Levels of soil micro- and nano-plastics in agricultural soils are not well known, nor is what proportion comes from intentional or unintentional plastic use.

Initial findings from our survey of case study site farmers suggest that plastic use is not in general seen as a risk for agricultural soils by farmers. Mulches and foils were some of the biggest uses, with greenhouse horticulture relying most heavily on plastics.

Plastics varied from single-use films to irrigation systems kept in place for much longer periods, leading to questions around how they degrade over time. Our work continues to investigate the many unknowns uncovered so far.



5-25%
of plastic mulches are
not recovered from the
soil after use



**77,000
tonnes**
of plastic mulch
film was marketed
in Europe in 2019



**5000
tonnes**
of biofilm mulch
film was marketed
in Europe in 2019



**It is not known how
effectively biofilms break
down once in the field.**

ANNOUNCING THE MINAGRIS-PAPILLON JOINT STAKEHOLDER FORUM



WHO ARE PAPILLONS?

Papillons is another EU-funded Horizon 2020 project, which we have formed a partnership with due to our overlapping aims. They are exploring the impacts, lifecycles and long-term sustainability of plastics in agriculture.

The aims of Papillons is to understand the sources, behaviour and ecological impacts of micro- and nano-plastics in agricultural soils. They will reduce knowledge gaps and provide easily digestible information on micro- and nano-plastic use in agricultural soils.



@PapillonsUe



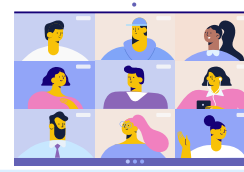
<https://www.papillons-h2020.eu>

We have now launched a joint stakeholder forum with the Papillons project. This is a collaborative effort to link up our projects and engage with stakeholders without causing fatigue. We will be holding biannual events for our stakeholders. These workshops are held online to increase the ability of all high-level stakeholders to attend.

Aim of the stakeholder forum

As multi-actor projects, it is important that we encourage discussions amongst different stakeholders. The joint stakeholder forum offers an opportunity to engage with EU-level stakeholders, including policymakers, plastic producers, environmental NGOs, farming organisations, recycling firms, trade associations, and more. Importantly, the forum will provide knowledge on relevant policy perspectives, which is key for several of our deliverables.

Both Papillons and MINAGRIS have now hosted stakeholder events. Papillons hosted the first workshop during November 2021, where the projects were introduced to respective stakeholders. MINAGRIS then hosted its first joint forum meeting in March 2022, where we began to gather stakeholders' views on both projects. We attracted stakeholders from a range of industries and presented both projects as well as encouraging discussions and participation throughout.



EU Horizon 2020 grant agreement
no. 101000407

MINAGRIS PRESENTS...



Plastic Health Summit 2021 -

Dr. Esperanza Huerta Lwanga presents her work on micro- and nano-plastics, soil health and food safety. Watch her video here:

<https://youtu.be/pZMXI6MzXIo>

Conventional and Biodegradable Plastics in Agriculture

- prepared in partnership with Papillons as part of the EU plastics strategy for a circular economy of plastics. Watch the video here:

<https://youtu.be/irMS3AijJA0>



MINAGRIS MEETS...

In September 2021, MINAGRIS met online with other contributing projects on the EU Plastics Strategy, part of the EU Circular Economy Action Plan. We introduced the MINAGRIS project, along with a dozen others aiming to transform the way plastic products are designed, produced, used and recycled in the EU.





University of Gloucestershire
carrying out major research
to protect soil

William Kellor
December 5, 2021 1:00 pm



MINAGRIS was highlighted in Agriland farming news amongst the other important soil health research being carried out at CCRI, University of Gloucestershire.



NEWS Impact of plastic waste on soil health

18 October, 2021



The impacts of plastic debris on soil health are largely unknown despite equal, or possibly greater, amounts of plastic entering soils than our rivers, seas and oceans ¹.

In this news article in Fruit Today, a Spanish agricultural magazine, the MINAGRIS project is introduced alongside an overview of the impacts of soil plastic waste on soil health.

Samstag, 9. Oktober 2021 Schweizer Bauer



BIOBERATUNG

Plastikrückstände in landwirtschaftlichen Böden

Plastik in der Umwelt ist ein Anblick, an den wir uns gewöhnt haben. In der Landwirtschaft durchgeführt. Das Projekt wird Entscheidungs- und Handlungsgrundlagen für den Einsatz von

Issues around plastic in agriculture and the MINAGRIS project were featured in Swiss German local farmers magazine Schweizer Bauer.



New EU project to explore the impacts of plastic debris on soil health and agricultural productivity

October 04, 2021

The impacts of plastic debris on soil health are largely unknown, although equal or possibly greater amounts of plastics enter our soils compared to our rivers, seas, and oceans. To shed light on the plastic residues in soil, an international team of researchers, including contributions from FiBL Switzerland and FiBL Austria, will investigate how plastic affects soil biodiversity, soil functions, associated ecosystem services and agricultural productivity. The EU-funded MINAGRIS project was launched in September 2021.



Sheep in the Netherlands feeding in a field with plastic debris. (Image: Minagris project).

Organic Research Institute and work package leaders FiBL announced their participation in MINAGRIS, outlining our aims.



EU project to explore the impacts of plastic debris on soil health and agricultural productivity



The impacts of plastic debris on soil health are largely unknown despite equal, or possibly greater, amounts of plastics entering soils than our rivers, seas, and oceans. The EU-funded project which launches today, will explore how plastic debris is affecting soil biodiversity, soil functions, related ecosystem services, and agricultural productivity.

CCRI's press release marked the launch of the MINAGRIS project, and was picked up by the University of Gloucestershire and Horticulture Week magazine.



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@MINAGRIS - H2020 project



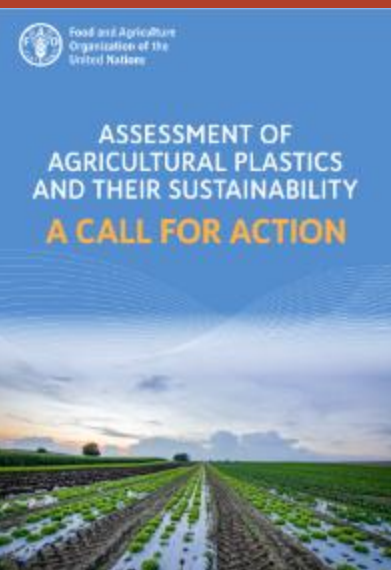
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UN Food and Agriculture Organisation (FAO): Call to action on agricultural plastics

- Global assessment of agricultural plastic products and use, and the benefits and harms associated with them
- Increasingly globally commonplace, the fate of agricultural plastics at end of life is not well documented
- There is a notable knowledge gap on the environmental and human health impacts of micro- and nano- plastics in agriculture, which the the MINAGRIS project seeks to remedy
- Recently featured along with project partner Papillons on the publically well frequented Civil Eats news platform

European Commission report on Conventional and Biodegradable Plastics in Agriculture



Conventional and Biodegradable Plastics in Agriculture

For the European Commission DG Environment. Project conducted under Framework Contract No ENV.B1/FRA/2018/0002 Lot 1

This European Commission study quantifies current levels of consumption of agricultural plastics, and their fate, before giving an overview of existing literature on the topic. It is found that most research into microplastics in agricultural soils is centred on China, where mulch films have been in use for 10-30 years. Comparatively little is known on the subject in European soils.

Microplastics in Freshwater and Terrestrial Environments: Evaluating the Current Understanding to Identify the Knowledge Gaps and Future Research Priorities



The above article is a state of knowledge review on micro- and nano-plastics in the terrestrial environment, identifying future research priorities including transport and degradation. They found that annual plastic release to land is estimated at 4-23 times that released to oceans, however comparatively little is known about terrestrial plastic pollution.

A Temporal Record of Microplastic Pollution in Mediterranean Seagrass Soils

A research study has found that high microplastic accumulation was found close to intense agricultural areas, notably Almería (pictured right), a region known for its intensive poly-greenhouse agriculture. Soil cores showed contamination was negligible until the mid-1970s, increasing dramatically since, with the highest concentrations found in the recent (since 2012) surface soils.



MINAGRIS PARTNERS



University of Ljubljana



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