

**Interreg**   
EUROPEAN UNION

**2 Seas Mers Zeeën**

European Regional Development Fund



# GRASSIFICATION

**New mowing head – improving the  
quality of grass clippings**





# The project

Roadside grass clippings are a problem fraction throughout the 2 Seas Programme area due to their high volume, subject to high processing costs. The industrial sector, however, is interested in the possibility of using roadside grass clippings as an alternative resource (as opposed to fossil sources or dedicated agricultural produce, e.g. isolation material).

The common challenges for applying roadside grass clippings as a renewable feedstock in industrial processes are currently threefold:

- the supply chains are not yet optimal, resulting in higher costs;
- a highly variable and heterogeneous quantity;
- an unsupportive institutional framework leading to legal and political challenges.

The overall objective of the Grassification project is to apply a multi-dimensional approach to roadside grass clippings refining in order to optimize it into a viable value chain for the biobased and circular economy. The project commits itself to optimize logistics and technical aspects of the grass clippings supply chain and processing, demonstrate its market potential as well as formulate policy and legal recommendations to create a more supportive framework for the recycling of this renewable resource.

These actions will increase the volume of usable material, lower costs, and generate a higher added-value for this so-called 'waste' streams. In this way, the use of roadside grass clippings as a renewable resource for the production of biobased products and hence the circular economy will become more attractive.

## Why develop a new mowing head?

An important goal within the Grassification project is to use roadside cuttings as feedstock for material and energy. To achieve this goal, the Grassification project developed a new mowing head to improve the quality of grass clippings.

The main improvement needed was to reduce the dirt/sand content of the clippings. Sand has the property to be very abrasive and corrosive to machines and burners. Even when being washed out, sand can block, pipes, pumps and sewage systems.

Besides the sand content, it is important that the mowing head does not smash or crush too much the plants so they can recover fast after mowing.

### Sand in grass clippings

Sand arrives in two ways on the clippings. In rainy weather, raindrops splash up and can leave important traces of mud and sand at the lower parts of the plants. Additionally, during cut and collection, more dirt will be taken up with the clippings if the mowing is done very close to the soil and if the force of aspiration is too strong.



## The new and improved mowing head

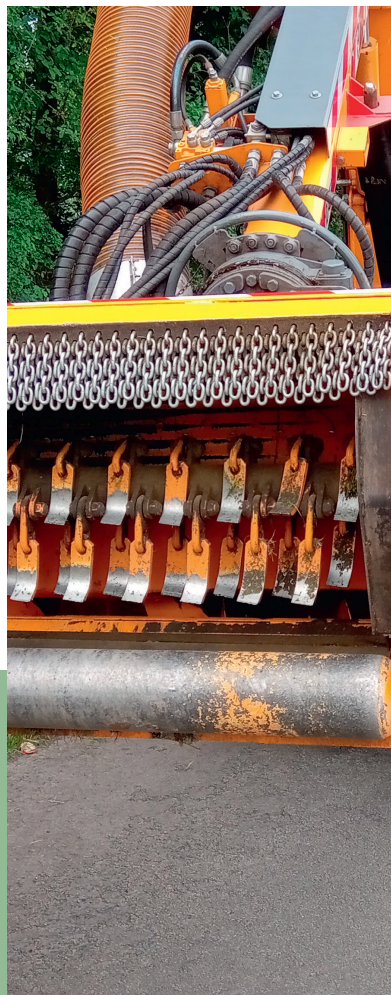
For developing the new mowing head, the Grassification project worked together with Vandaele, a constructor with relevant experience in building flail mowers.

The new mowing head is part to the mowing arm Pro Series. They can be mounted on almost every tractor brand and can be fixed on the right or left side of any tractor. The arms are controlled by a very compact, electronic joystick. The range varies between 5,50 and 10 meters Technical specification about the mowing arm can be found here: <https://www.vandaele.biz/GB-en/machine/mowers/mowing-arm-pro-series>.

Height is one of the main criteria that could have a result on the intake of soil particles during the mowing process. For the design of the new mowing head, Vandaele chose an option in which the operator cannot set the mowing head below a certain height. Vandaele has opted for the height mentioned in the Flemish legislation, Bermbesluit (Roadside resolution): 10 cm.

### Flail x circular mowers

Due to the centrifugal rotation, the flail mower lifts the grass upward, perpendicular to the rotating axis, and cuts or smashes the grass fibres by the forces of the rotation. Due to the rotation speed and force and the three rows of flails, the grass and plants are shredded in small particles. A horizontal circular mowing head evenly cuts the plant on the set height, which results in a mix of longer and shorter plant fibres. For the intended applications, smaller fibres are required, so the flail mower would be better suited.



## Testing the new mowing head

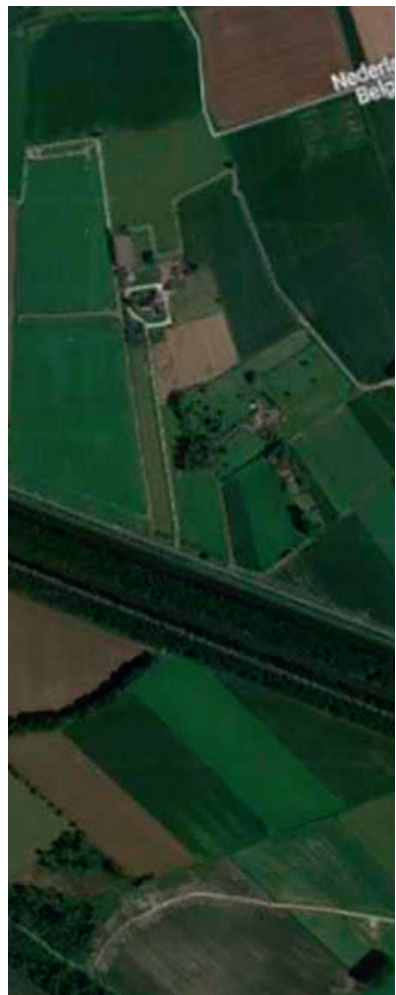
The municipality of Maldegem has experience with research projects and with different types of mowing heads and agreed to host the test of the developed mowing head. During the mowing test, the new mowing head of Vandaele was tested against the Eco mower of Herder, a horizontal circular mower developed during a former project, Interreg NWE Combine.

On-site, there was a remarkable difference in the verge after the mowing. There was a clear distinction visible, mostly due to the different mowing heights. Vandaele could not mow lower than 10 cm, while Herder was set on a height of 8 cm. In real conditions, there is a variation of 2 to 3 cm, so Vandaele could never mow lower than 8 to 7 cm and the Herder between 5 to 6 cm. The Herder mowing head gave a clear cut of the grass, often with contact of the knives with the soil.

Even though the distinction between the two mowing heads was well visible on the ground on the test day, one month later, a distinction was no longer visible, indicating that both mowing heads allowed for the plants to recover fast.

The flail mower was more efficient in producing less contaminated grass clippings, resulting in a sand content of  $2.9 \pm 0.8\%$  in comparison to the circular mower, which yielded clippings with  $8.7 \pm 2.2\%$  sand content.

As expected, the flail mower yielded smaller fibres, with a total average length, omitting the fraction of fibres  $< 4\text{mm}$ , of 13.6 mm compared to 28.5 mm for the circular mower.



# Conclusions

The developed new mowing head was able to reduce the sand content in the grass clippings when compared to a previously improved mowing head, indicating that limiting the mowing height to 10 cm was effective. Moreover, it did not have any harmful impact to the plants recovery and yielded smaller fibres, which is also seen as an advantage for further processing.

## Additional information

To read the full reports on the development and testing of the new mowing head, please visit:

[www.biorefine.eu/projects/grassification](http://www.biorefine.eu/projects/grassification).

To view the video of the testing of the new mowing head, please visit:

[www.youtube.com/watch?v=e25hdOsNkb0](https://www.youtube.com/watch?v=e25hdOsNkb0).

Project partners:



With the technical support of:



With the financial support of:



[www.interreg2seas.eu/en/grassification](http://www.interreg2seas.eu/en/grassification)

