



Nitrogen Release from Cover Crops (NiCCs) project

INTRODUCTION

- Some groundwater aquifers in the UK have high nitrate concentrations as a result of current and historic land-use and localised geology.
- Cover crops are very effective at protecting soils over winter and reducing nitrate leaching losses to ground and surface waters.
- The rotational & environmental impacts of nitrogen captured by autumn/winter cover crops is less well understood.

PROJECT OBJECTIVES

- The Nitrogen release Cover Crops (NiCCs) project compares two cover crop mixes with a stubble control treatment on:
 - i. Over winter nitrate leaching (winter 2021/22)
 - ii. The quantity and timing of nitrogen release from the cover crop and impact on the following crop (2022)
 - iii. Potential legacy effects of nitrate leaching (winter 2022/23) & crop performance (2023)
- Different destruction methods (glyphosate vs. chopping or rolling) have been used to better understand the potential of growing cover crops without glyphosate.



RESULTS AND IMPLICATIONS

- At both the Hertfordshire (Fig 1a.) & West Sussex sites, Mix 1 and Mix 2 reduced over winter (2021/22) nitrate leaching losses by c.90% & 70%, respectively compared to the stubble control which had a weedy cover.
- Spring soil nitrogen supply (soil mineral N + cover crop N) was up to 30 kg/ha greater where a cover crop (Mix 2) had been grown (Fig 1b.).
- The fate of nitrogen retained in the cover crops is the focus of ongoing work, with top soil mineral nitrogen being measured to track it's release to the growing spring crop.

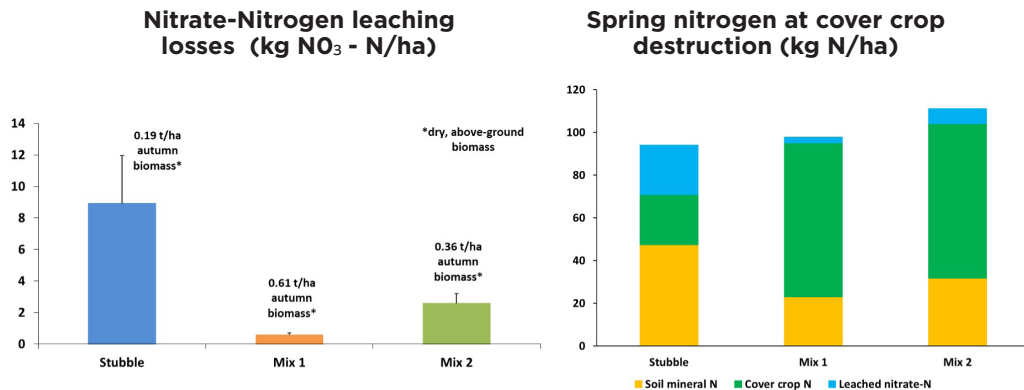


Fig 1.a) Overwinter nitrate leaching losses at the Hertfordshire site (left); b) Spring nitrate balance at the West Sussex site (Right). Mix 1: Phacelia (20%) and oil radish (80%). Mix 2: Non-brassica mix: Japanese Oats (45%), Buckwheat (45%); Phacelia (10%).

NEXT STEPS

The results will be used to underpin advice for growers on the appropriate management of cover crops, both in terms of maximising the nitrogen available to the next crop and minimising long-term nitrate leaching.

The work is funded by Affinity Water and Portsmouth Water, with the seed mixes kindly supplied by RAGT seeds UK. This is a collaborative project, working very closely with our host farmers, who are conducting farm operations, ensuring the results are representative of commercial practice.



Affinity Water

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