Grassland comprises 50% of the total UK land area and is a crucial resource for the ruminant livestock industries within the agricultural sector. This land is predominantly sown with ryegrass: a high yielding species that can provide good forage but is reliant upon application of sufficient nitrogen fertiliser, and susceptible to drought. Nitrogen fertiliser is expensive and has a high carbon and nitrogen footprint. Therefore, it is important to consider whether there are viable alternatives to pure ryegrass pasture that are more environmentally friendly.

**What are diverse forages?**

There are many other plants that can be used for forage including legumes (e.g. clover) and herbs/forbs (e.g. chicory or plantain). Research has shown that grass pasture can be enhanced by the addition of legumes and herbs. Legumes capture atmospheric nitrogen as compounds that are used by the plant, replacing the need for nitrogen fertiliser, and some legume/herb species are deep rooting, improving soil structure and providing resilience to drought and flooding. In this way, mixed species work together to fulfil different functions, and potentially increasing the yield of the whole pasture above the yield of any one species sown alone.

**Project overview**

The DiverseForages Project is a five-year project funded by the Sustainable Agriculture Research and Innovation Club (SARIC), which is led by the University of Reading in collaboration with Duchy College, Rothamsted North Wyke, and Cotswold Seeds. The ultimate aim of the project is:

“To achieve acceptable yields of good quality forage for livestock production whilst having a positive and long term impact on the environment.”

Three forage mixtures comprising six, twelve or seventeen species (of those species pictured below) have been established and will be compared to fertilised ryegrass at multiple research sites and farms running from 2016-20. Measurements include:

- Biomass yield, forage quality and botanical composition in a long-term replicated trial plot study
- A comparison of pasture resilience under waterlogged vs. drought conditions assessed using trial plots
- A two-year evaluation of forage digestibility, nitrogen use efficiency, methane emission mitigation potential, and animal growth rate in growing cattle.
- A modelling exercise to determine economic and environmental impacts of the mixtures at a farm-scale.

**Contact information**

Prof. Chris Reynolds, Director of CEDAR Research, c.k.reynolds@reading.ac.uk | 0118 378 4684

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