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TEMPEC PROJECT
A STEP CHANGE IN THE RIGHT DIRECTION FOR ENERGY GRASS CROPS

Biomass grass crops offer sustainable material for energy generation in the UK, as well as a catalogue of environmental benefits. But there are barriers to these species reaching their full potential – which has been the primary focus for the TEMPEC project.


Photo courtesy of NEF

Grass crops like Miscanthus play an important role in accelerating renewable energy production, as well as environmental commitments to meet net zero and restore lost biodiversity.

However, most crops derive from one species variety – with it taking 15 years to breed a new cultivar. This not only restricts suitability and yield potential, but also attractiveness to farm and rural enterprises.

It's an issue that is compounded by typical propagation techniques, with crops bred not to produce a seed, to prevent invasive spread. Vegetive propagation can be time-consuming and labour intensive.

This has impacts for commercial enterprises as well as conservation and nature restoration work. For the UK to scale up biomass production and deliver on commitments like wetland restoration, there needs to be a step change.

Project

Having a deep understanding of the propagation of grasses, Paul Carver, CEO at New Energy Farms (NEF), saw an opportunity to bridge the gap in energy crop production. He therefore launched a project: Technologies to enhance the multiplication and propagation of energy crops (TEMPEC), under the UK Government-funded Biomass Feedstocks Innovation programme (BFI).

The project's primary objective is to deliver five to 10 new energy grass crop varieties with increased yield potential, to boost the UK average yield of Miscanthus and other energy grasses from 10-15t/ha to 25t/ha.

To achieve this, the project is evaluating over 40 new candidate energy grass crop varieties from existing global breeding projects – from miscanthus to cold-tolerant sugarcane.

It will also look at agronomic improvements; incorporating NEF's patented CEEDS technology. This is an 'artificial seed' propagule comprised of primed plant tissue, encapsuled in a growing medium and a modifiable coating, this will help identify and develop cheaper and easier ways of multiplying and planting energy crops.

Land use and environmental enhancement is also on the agenda, exploring phytoremediation; the use of plants and associated micro-organisms to clean up contaminated water, air, and soil. It will also consider paludiculture; the application of farming and agroforestry systems using wetland-tolerant plants to restore or generate new wetlands, helping to reduce greenhouse gas emissions and enhance biodiversity, while producing a commercial crop.

By bringing to market new varieties with higher yield potential, improved establishment and environmental solutions, the project will encourage more planting across the UK, with benefits throughout the supply chain.

"It takes 10 to 15 years to breed a new energy crop – we've been able to reduce that to three years by taking a different approach"

Latest

To date, the project has shortlisted 10 of the 40 contenders, as having high yield potential. It initially filtered out the weaker contenders by running small-scale plots, before taking the best performing varieties into larger replicated trials across the UK.

"We're trying to make it easier and profitable to scale up the planting of these crops"

It has already successfully reduced breeding processes from 15 years to three years – by sourcing plant material from global breeding projects, saving significant time and cost. This will go a long way in helping to speed up the delivery of new varieties to market.

The project has also made progress in growing grasses on contaminated land and degraded wetland. Currently Miscanthus can be planted on field margins to create an organic barrier above and below the soil line. And the project is working with water companies and third-party projects to collect data on the impact the crop has on pollutant levels.

In addition, the team have worked with Warwick University to look at the biological soil profile of miscanthus plantations, to understand how Miscanthus provides long term soil improvement and biological benefits.

From the project's paludiculture angle, it is working on propagation solutions for key wetland crops to help meet the UK Government's target to plant 200,000ha of wetland by 2030.

On target to deliver five to 10 new energy grass crop varieties, the project's next step is to continue with field-scale trials that were started earlier this year (2024), to evaluate yield and establishment protocols.

The use of CEEDS already provides a host of benefits. These include faster planting, with 40-50 times less material per hectare equating, to improved efficiencies and costs. Cleaner planting material – free from pest and diseases – reduces labour and improves worker health and safety, with propagules designed for mechanical planting. A fully automatic planter is also currently being constructed for this project and will be used in UK field trials in April 2024.

The project will continue to develop a business model under which CEEDS can be licensed, helping to drive commercial solutions and meet biomass feedstock planting requirements in the UK.

It will also continue with its phytoremediation and paludiculture strategy; engaging with key stakeholders alongside collaborative trial work to find agronomic and environmental solutions.

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"Grass crops like Miscanthus have a known benefit in water pollution mitigation"

To learn more about the TEMPEC project, or to get involved, please contact:
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