

The Bioeconomy Consultants



News Review

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Each month we review the latest news and select key announcements and commentary on feedstocks used in the bioeconomy.



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Foreword

Welcome, subscribers, to the February edition of NNFCC's Feedstocks News Review.

2017 has kicked off in exciting style for Monsanto, who have not only acquired licenses for two different gene editing technologies, but have also announced encouraging results from their 2016 field trials.

The technologies they have acquired include the CRISPR Cpf1 technology, which has potential to be a much simpler and precise gene-editing technology than previous CRISPR incarnations such as the Cas9, and Monsanto believes that by expanding its already large portfolio of gene technologies it will be best placed to utilise its extensive knowledge of plant genomics to produce ever more productive GM crops. But it is not just genome editing where Monsanto has made acquisitions: it has also licensed NRGene's GenoMAGIC technology for the analysis of genomes, allowing that already broad knowledge to expand even further, meaning the company's selective breeding programmes can run even more efficiently towards targeted objectives. This offers the promise to unlock the full potential of its world-leading germplasm and genome libraries to develop a whole range of new crop traits.

The key question for the long-term is how such crops are accepted in Europe and in future in the UK. The UK will need to make its own decisions on acceptance of GM crops if it ends up lying outside the EU single market in future, but perhaps still influenced by the requirements of key market outlets within the EU.

In addition, Monsanto, in its BioAG partnership with Novozymes, has announced the results of its 2016 field trials with various microbial soil inoculants. The best strains resulted in a yield increase of up to 200kg/ha. BioAG believes that farmers combining their products could see yield increases of up to 340kg/ha. The products are set to be released on the market during the next few years, no doubt after more trials.

In other news, there have been interesting research breakthroughs regarding competing crops, with Miscanthus found to almost always have a much greater yield than Switchgrass across a wide range of growth conditions, perhaps suggesting a change of habit is needed in the US, where Switchgrass remains the more prevalent of the two when considering biomass feedstock options. Moving nearer to the equator, it has also been found that Napiergrass may be a more sensible alternative to Sugarcane as biofuel feedstock, the key advantages include greater addition to soil carbon and lesser irrigation requirement.

Read on for all the latest Feedstocks news.

Policy

EU Commission launches consultation on Common Agricultural Policy

Modernising and simplifying the Common Agricultural Policy (CAP), one of the European Union's longstanding policies, will allow it to better respond to today's social, political, environmental and economic challenges.

The European Commission has launched the first phase of the modernisation and simplification of the Common Agricultural Policy (CAP) with the opening of a three-month public consultation. The contributions received will support the Commission's work to define the agricultural policy priorities for the future. A modernised and simplified Common Agricultural Policy would address the key challenges that agriculture and rural areas are facing while at the same time contributing to the Commission's policy priorities (notably jobs and growth), to sustainable development, a budget focused on results, simplification and subsidiarity.

The public consultation will run for 12 weeks and will give farmers, citizens, organisations and any other interested parties the chance to have their say on the future of the Common Agricultural Policy. The input from the consultation will be used by the Commission to help draft a Communication, due by the end of 2017 that will include conclusions on the current performance of the Common Agricultural Policy and potential policy options for the future based on reliable evidence.

The results of the public consultation will be published online and presented by Commissioner Hogan at a conference in Brussels in July 2017.

Click [here](#) for more information.

Sustainable Fuel Register approved for Renewable Heat Incentive

There's a new approved fuel list for the RHI, the Sustainable Fuel Register (SFR) for non-woody biomass fuels. The SFR has been approved by the Government and is an independent register similar to the Biomass Suppliers List (BSL).

The Sustainable Fuel Register is an industry led register of non-wood based fuels and provides participants with a simple way of meeting sustainability criteria.

Fuels authorised on the Sustainable Fuel Register demonstrate compliance with the Renewable Heat Incentive (RHI) sustainability requirements. From field to boiler, all steps in the supply chain are traceable, providing complete peace of mind that the fuel has accounted for all of the greenhouse gas emissions associated to it.

Click [here](#) for more information.

Fees introduced for Biomass Suppliers List applicants

In a separate announcement, fees have been introduced for inclusion on the Biomass Suppliers List (BSL). Procurement of wood biomass from BSL listed suppliers provides RHI clients with confidence that feedstocks meets at least the minimum sustainability requirements required by Ofgem. The introduction of fees affects all new

applicants to the BSL submitted after 1 January 2017 and existing authorised suppliers on the BSL.

Click [here](#) for more information.

France outlines bioeconomy strategy

Stéphane Le Foll, Minister of Agriculture, Agri-Food and Forestry, spokesperson for the French Government, presented a communication on the national bioeconomy strategy on 18 January in the Council of Ministers.

The priority of this strategy will be an increased and sustainable utilisation of biomass, which protects the ecosystems producing raw materials (providing respect for biodiversity, landscapes, soil, and organic matter), and an optimization of the use of the biomass produced to guarantee the capacity to meet food and non-food needs.

The implementation of a bioeconomic strategy at the governmental level is fundamental to ensure consistency in all the approaches undertaken and to prevent them from competing by creating conflicts over the use of biomass.

The bioeconomy is, moreover, an area in which France has many assets to emphasize, including: significant biomass potential of agricultural, forestry, marine, or waste origin, and opportunities for the production of biomass. For example, hemp can be used in buildings to reduce their carbon footprint, and flax fibres are used in car parts to increase options for recycling. Wood-derived energy is developing, and biogas production by methanisation contributes to reducing energy imports and allows farmers to produce energy while reducing their dependence on nitrogenous mineral fertilizers.

With this national strategy, France now sees itself as one of the world leaders in the field of the

bioeconomy and will actively contribute to the upcoming revision of the European bioeconomy strategy.

Click [here](#) for more information.

NEPCon OÜ loses SBP & FSC approved status in Russia

Biomass Magazine reports that on January 11, Sustainable Biomass Partnership issued a statement that the approval status of NEPCon OÜ, which became an SBP-approved certification body (CB) in September 2015, is suspended in Russia.

On December 1, NEPCon OÜ's Forest Stewardship Council accreditation for Forest Management and Chain of Custody certification in Russia was suspended by FSC's accreditation organization, Accreditation Services International. ASI is now in the process of evaluating the response from NEPCon OÜ to the conditions they set to lift the FSC suspension in Russia.

As a result of the FSC suspension in Russia, NEPCon OÜ no longer meets SBP's requirements, and approval for SBP biomass producer (including supply base evaluation) and supply chain certification for Russia has been suspended effective January 6.

This means that NEPCon OÜ can continue conducting annual SBP audits and reassessments of all organizations that have already been certified by the certification body in Russia, but they may not enter into new contracts for SBP certification in Russia while suspended.

Click [here](#) for more information.

Markets

Concern over US-Mexico relations hits US maize market



UK grains market watcher AHDB highlights that US maize futures have recently weakened over concerns about the longevity of current free trade agreements with Mexico. Mexico is the world's second largest maize importer, with the bulk of supplies coming from the US. Mexico imports 10mt of maize, almost a third of its annual consumption. The US currently enjoys tariff free exports to Mexico under the NAFTA treaty. President Trump's promise to revisit NAFTA and his proposals to tax Mexican imports which has led to concerns in the US grain market, under the expectation that Mexico would look elsewhere for imports, benefitting Brazil and Argentina, but leaving US maize looking for a new home. US wheat markets are also heavily reliant on exports.

Click [here](#) for more information.

High UK wheat price set to hit exports

The UK's AHDB Cereals and Oilseeds reports that global competitiveness of UK wheat has slumped following a season where exports hit a 7-year

high. Weak exchange rates and high outputs of grain for 2 previous years meant the UK was very competitive. But, output has fallen, domestic demand has increased and further falls in sterling have meant that UK wheat price has soared compared to competitors burdened by abundant global supplies. The UK is now the most expensive compared to French and Chicago wheat futures in sterling terms. As a result, UK wheat exports are expected to temper.

Click [here](#) for more information.

Mixed fortunes for wood pellet market in forecasts

Louisa Blair of Hawkins Wright views prospect for wood pellet markets in 2017 in January's Bioenergy Insight which is summarised below.

There are still areas of uncertainty across Europe in 2017, The Netherlands has to clarify its position on coal phase out and announce the results of its latest auctions which have been dominated by biomass project in recent rounds. These announcements will determine whether the country will add 3.5 million tonnes of annual demand to the European landscape over the next few years.

Meanwhile, negotiations will start for the European Commission's winter package of proposals, including revisions to EU-wide biomass sustainability criteria and the second Renewable Energy Directive covering 2021-2030 (REDII).

In April, the UK will also hold its second contract for difference (CfD) auction for installations commissioning in 2021/22. It is expected that not many biomass installations will bid for support. Biomass power-only is no longer supported, there is currently no funding allocated for the biomass conversions pot, and there is no guarantee that

the Renewable Heat Incentive (support for the heat portion of biomass combined heat and power) will continue past 2020/21, making it financially difficult for biomass CHP installations. However, BEIS are apparently considering whether and how it would be appropriate to support future biomass conversions.

There is much evidence to suggest that 2017 will be an exciting year for the wood pellet industry, though at an operational level it is expected that the challenges of oversupply and generation economics will continue to affect the market until consumption ramps up in 2018.

Click [here](#) for more information.

EU wood pellet demand could double by 2020

In 2016, the wood pellet market in Europe reached 19 million tons per annum (Mtpa), while production capacity stood at 23.5 Mtpa, and consists of two largely independent sectors with only limited interaction. The industrial market (9.7 mt) is focused on large-scale bioenergy generation, while the premium market is focused on small-scale residential and commercial heat generation. Industrial market demand is likely to reach levels of between 12.4 Mtpa and 20.2 Mtpa by 2025, depending on political decisions.

Demand for premium pellets is expected to reach levels of between 10.1 Mtpa and 16.4 Mtpa by 2020 and 2021 to serve heat and cooling demands.

European premium pellet markets have been supplied by small- and medium-scale pellet mills (typically averaging output of 55,000 tpa), accessed through traders, wholesalers and distributors. This market segment currently has to cope with considerable overcapacity and low

utilization rates across an estimated 20.9 Mtpa of capacity. Exposure to raw material price fluctuations is a concern for many producers, especially independents, with sawmills increasingly establishing their own pellet production capacity. Stark evidence of this challenging market environment has been the insolvency of Europe's largest pellet producer, German Pellets, in early 2016.

Some producers are also concerned about the threat of pellet imports from overseas, as mills in regions such as the U.S. Southeast and Russia can supply at competitive price levels and, in many cases, have already gained ENPlus certification.

Likely further expansion of the premium sector post-2020 offers an opportunity for pellet producers to deal with the impact of the expected decline in industrial pellet demand post-2027 as support for current coal-conversions runs out.

Click [here](#) for more information.

US wheat stocks reach highest point in 30 years

AHDB analysis of the latest figures from the USDA show healthy stocks, with wheat stocks up 19% year on year, maize stocks up 10%, and soybean up 7%.

Wheat stocks are the highest in 30 years at 56.4Mt, Maize stocks were also highest ever for this point in the season at 314.6Mt, and soybean are also at the highest level on record at 78.8 Mt.

As a result of the impact of these record stocks on prices, the area planted to wheat for 2017 harvest is at its lowest for 100 years at 13.1 Mha, which is 10% down on the previous year. In contrast rapeseed areas are up sharply in key producer

states. Soy bean production is also expected to increase.

UK import of maize has been lower than in previous years in recent months, as UK feed wheat has been trading at a £33.50 discount to imported maize (CIF any origin). Recent rising wheat price has narrowed this to £9/tonne. Key markets for imported maize are the animal feed and bioethanol sectors.

Click [here](#) for more information.

Research & Development

Toray teams up with Mitsui to produce cellulosic sugar

Toray Industries, Inc. has announced that it has decided to establish a joint venture company with Mitsui Sugar Co. Ltd. to seek business opportunities for manufacturing cellulosic sugar, utilising the surplus bagasse generated at sugar mills.

The proposed technology uses membranes, utilising Toray's water treatment membrane and bio technologies.

Bioprocessing using membranes enables the production of a high quality, low cost cellulosic sugar from biomass while reducing energy use by 50%. Water treatment membranes are used in the saccharification and refining processes to extract resultant sugars.

The demonstration plant will have the capacity to handle 15 tons of bagasse per day (dry weight)

and will manufacture about 4.2 tons of cellulosic sugar after going through the processes of pre-treatment, enzymatic saccharification, and membrane separation.

In addition to cellulosic sugar, the plant will manufacture polyphenol and oligosaccharide, which can be made into livestock feed, using the same raw material and process to raise the economic benefit of using bagasse.

Click [here](#) for more information.

Nitrogen and Phosphorous from Waste Water for use as Fertiliser

Improving the capture of nitrogen and phosphorus from wastewater derived from anaerobic digestion and other treated waste waters could help recycle valuable fertiliser elements to agriculture while also helping to reduce the energy and carbon footprint.

Biomass magazine reports that Researchers at Aalto University have developed a new, energy-efficient method for capturing nitrogen and phosphorus from different liquid waste fractions. In laboratory studies, with the help of the method, it is possible to separate 99 percent of the nitrogen and 90-99% of phosphorus in wastewater and produce granular ammonium sulphate (NH₄)₂SO₄ and phosphorus precipitate suitable for fertilizers.

It is estimated that the industrial production of nitrogen used for fertilizers is responsible for approximately 2 percent of the entire world's energy consumption.

The construction of pilot equipment at the laboratory of Water and Environmental Technology at Aalto University will begin in spring 2017. The capture method is based on the use of

calcium hydroxide Ca(OH)_2 to convert ammoniacal nitrogen NH_4^+ into ammoniacal gas NH_3 , which are then separated through a semi-permeable membrane. Following this, the ammonium is dissolved into sulphuric acid to produce ammonium sulphate. In the process, the phosphorus is precipitated with the help of calcium salt.

Click [here](#) for more information.

Ethanol from Cassava pulp



Biofuels international reports that Japanese brewer Sapporo Holding has licensed Thailand-based fuel retailer PTG Energy to manufacture cassava-based bioethanol.

Innotech will use Sapporo's technology in producing ethanol from cassava pulp at a new plant scheduled to start operating in 2020.

The new ethanol plant, capable of producing 200,000 litres per day, will be built in Sa Kaeo province in eastern Thailand. PTG plans to double the capacity to 400,000 litres in 2021-22 by setting up a second plant at the same location. PTG currently requires up to 470,000 litres of ethanol per day and the need is expected to grow 35% to 1.15 million litres in 2020.

Thailand aims to increase ethanol consumption to 11.3 million litres per day in 2036 from the current level of 3.5-3.6 million litres, according to the country's alternative energy development plan.

Click [here](#) for more information.

New agricultural gene technology licensed by Monsanto

Monsanto Company announced today that it has reached a new global licensing agreement with the Broad Institute of MIT and Harvard for the use of the novel CRISPR-Cpf1 genome-editing technology in agriculture. The CRISPR-Cpf1 system represents an exciting advance in genome-editing technology, because it has potential to be a simpler and more precise tool for making targeted improvements in a cell's DNA when compared to the CRISPR-Cas9 system.

Researchers believe that the CRISPR-Cpf1 system may offer an expanded set of benefits for advancing and delivering improved agricultural products than the CRISPR-Cas9 system. Some of these benefits include greater flexibility in the method used to edit and in the locations where edits may occur. In addition, the smaller size of the CRISPR-Cpf1 system provides researchers with more flexibility to use the genome-editing technology across multiple crops.

Monsanto believes that genome-editing technologies – including the CRISPR-Cpf1 system – will continue to provide a powerful tool for its research in plant breeding and biotechnology, with the promise to unlock the full potential of its world-leading germplasm and genome libraries and contribute to the development of exciting new products. The company is exploring genome editing in a phased approach across single-gene knock-outs, single-gene edits and multiple-gene edits. Over the last year, Monsanto has licensed

multiple genome-editing technologies – including a separate license from the Broad Institute for use of the CRISPR-Cas9 system in agriculture – to develop a leading portfolio of tools in this field.

Click [here](#) for more information.

Monsanto licenses GenoMAGIC

Monsanto Company and NRGene announced today that the companies have reached a non-exclusive, multi-year global licensing agreement on NRGene's genome-analysis technology to enhance Monsanto's ability to predict, compare and select the best genetic makeup from its vast data sets of genetic, genomic and trait information.

NRGene's platform, GenoMAGIC, was developed by a unique mix of highly experienced algorithm designers, software engineers, plant breeders and plant geneticists and is used by seed companies and major academic and research institutions around the world.

With nearly half of Monsanto's annual R&D investment focused on plant breeding, the use of leading genome analysis technologies like GenoMAGIC – along with the industry's largest testing capability and scale and premier discovery technologies – are expected to increase current genetic gain. Monsanto may expand its relationship with NRGene into a longer-term commitment following an in-depth evaluation of the technology.

Click [here](#) for more information.

Napiergrass has reduced net GHG footprint compared to Sugarcane



Replacing fossil fuel with biofuel is environmentally viable from a climate change perspective only if the net greenhouse gas (GHG) footprint of the system is reduced. The effects of replacing annual arable crops with perennial bioenergy feedstocks on net GHG production and soil carbon (C) stock are critical to the system-level balance. This paper compared GHG flux, crop yield, root biomass, and soil C stock under two potential tropical, perennial grass biofuel feedstocks: conventional sugarcane and ratoon-harvested, zero-tillage napiergrass. Evaluations were conducted at two irrigation levels, 100% of plantation application and at a 50% deficit. Peaks and troughs of GHG emission followed agronomic events such as ratoon harvest of napiergrass and fertilization. Yet, net GHG flux was dominated by carbon dioxide (CO₂), as methane was oxidized and nitrous oxide (N₂O) emission was very low even following fertilization. High N₂O fluxes that frequently negate other greenhouse gas benefits that come from replacing fossil fuels with agronomic forms of bioenergy were mitigated by efficient water and fertilizer management, including direct injection of fertilizer into buried

irrigation lines. From soil intensively cultivated for a century in sugarcane, soil C stock and root biomass increased rapidly following cultivation in grasses selected for robust root systems and drought tolerance. The net soil C increase over the two-year crop cycle was three-fold greater than the annualized soil surface CO₂ flux. Deficit irrigation reduced yield, but increased soil C accumulation as proportionately more photosynthetic resources were allocated belowground. In the first two years of cultivation napiergrass did not increase net greenhouse warming potential (GWP) compared to sugarcane, and has the advantage of multiple ratoon harvests per year and less negative effects of deficit irrigation to yield.

Click [here](#) for more information.

Wood & Crop

UK's WRA announces partnership with German BAV

The Wood Recyclers' Association (WRA) has joined forces with its German equivalent BAV in a reciprocal arrangement that will see the two organisations sharing knowledge and information.

WRA Chairman Andy Hill and Executive Director Julia Turner attended a conference organised by BAV (the German Waste Wood Society) in Berlin at the end of last year.

Andy gave German delegates an overview of the UK's waste wood market. He also spoke about the impact the EA's FPP (Fire Prevention Plan) guidance had been having on the industry and the work the WRA is doing with the EA to try to influence future guidance.

Click [here](#) for more information.

Billion-Ton Biomass Report - A Sustainability Update

The *2016 Billion-Ton Report (BT16), Volume 2: Environmental Sustainability Effects of Select Scenarios from Volume 1*, has been jointly released by the U.S. Department of Energy's Bioenergy Technologies Office (BETO) and Oak Ridge National Laboratory (ORNL). It is a pioneering effort to analyse a range of potential environmental effects associated with illustrative near-term and long-term biomass-production scenarios from the *2016 Billion-Ton Biomass Report, Volume 1* released in summer 2016.

Most analyses in volume 2 show potential for a substantial increase in biomass production with minimal or negligible environmental effects under the biomass supply constraints assumed in BT16. Although corn ethanol has been shown to achieve GHG emissions improvements over fossil fuels, cellulosic biomass shows further improvements in certain environmental indicators covered in this report. The harvest of agricultural and forestry residues generally shows the smallest contributions to changes in certain environmental indicators investigated. The scenarios show national-level net SOC gains. Better outcomes for both biomass productivity and water quality can be achieved with selected conservation practices. Biodiversity analyses show possible habitat benefits to some species, with other species showing potential adverse effects that may require additional safeguards.

As estimated in BT16 volume 1, between 0.8 billion dry tons and 1.2 billion dry tons of biomass are potentially available annually by 2040 at \$60 per dry ton or less, under base-case and high-yield production scenarios, respectively. An

estimated 365 million dry tons of resources were used in 2015 (e.g., corn for ethanol, wood waste).

Click [here](#) for more information.

Enviva hopes to export pellets to DONG

Tim Portz in Pellet Mill Magazine assesses the impacts of Dong Energy's move from coal to biomass in Denmark.

Coal consumption across DONG's generation portfolio has fallen 74 percent since 2006 as the company ramps up the production of both wind- and biomass-derived energy. As 2016 drew to a close, DONG Energy concluded a massive conversion project at Avedøre Power Station near Copenhagen. This follows conversion of Studstrup. Together, Avedøre and Studstrup will introduce nearly 1 million tons of wood pellet demand to the marketplace.

Until recently, producers in North America found themselves on the outside looking in with regard to Danish pellet demand. In 2015, Denmark imported just 28,000 tons of wood pellets from producers in the United States. Historically, Denmark's pellet demand has been served by producers in the Baltics. In 2015, Denmark imported 600,000 tons of wood pellets from Latvia and 550,000 tons of pellets from Estonia, a combined value of nearly \$175 million. Volumes are expected to have increased through 2016. In recent acquisitions, Enviva Partners LP in the US have taken over a 10 year 420,000-metric-ton-per-year offtake agreement with an affiliate of DONG Energy Thermal Power A/S. This will diversify demand away from that of Drax which currently dominates export demand for US wood pellets.

Click [here](#) for more information.

Forest Fuels opens new depot in Liverpool

The ready availability of wood pellets for biomass boilers in the North West of England has been boosted with the arrival of Forest Fuels to its new facility in Liverpool.

The Forest Fuels' Liverpool wood pellet depot at Garston is the next stage in the company's plans to significantly increase its financial investment in the region.

The facility will hold nearly 10 times the amount that it held at its previous depot. This will greatly enhance availability of fuel – particularly for Forest Fuels long-term customers – from as far north as the Scottish borders to as far south as Staffordshire and Mid Wales.

The site also provides a boost for associated businesses in Liverpool, supporting jobs in Forest Fuels' supply chain, which delivers sustainable, environmentally-friendly wood fuel across the UK from its local depots.

As the UK's largest biomass wood fuel supplier, the company has recently increased the number of depots it has around the UK to 44, and is continuing to consolidate the market and develop its operations through key acquisitions and organic growth.

Forest Fuels' investment in the Liverpool facility is part of its long-term strategy to help biomass compete alongside fossil fuels, by ensuring the process of ordering fuel is simple, professional and fully automated. Now the UK's largest biomass wood fuel supplier, the company has recently increased the number of depots it has around the UK to 44, and is continuing to consolidate the market and develop its operations through key acquisitions and organic growth.

Click [here](#) for more information.

Microbe inoculants dramatically increase crop yield

The BioAg Alliance, Monsanto's and Novozymes' collaboration to improve crop harvests through products containing naturally-occurring microbes, has announced results from its 2016 field trial program and shared an updated research pipeline. Yield increases among top microbial strains averaged over 3 bushels per acre (200 kg/ha) for corn and over 2 bushels per (130kg/ha) acre for soy.

Among the pipeline highlights is the Corn BioYield 2 project, which builds upon the recently-launched Acceleron® B-300 SAT. Field trial results in 2016 showed Corn BioYield 2 project strains – combined with Acceleron B-300 SAT - increasing corn yields by up to an average of 5 bushels per acre (340kg/ha) over a base Acceleron seed treatment. A Corn BioYield 2 product is expected to launch in 2019. In earlier stages of development are other yield-increasing products for corn and soy, and a microbial product that can protect soy plants against nematodes. The Alliance also announced that it will start developing new products for wheat, the third crop in its pipeline.

The BioAg Alliance will introduce two new products in 2017. Acceleron B-300 SAT is a corn inoculant based on a fungus found in soil. The fungus grows along the roots of corn plants and increases nutrient uptake to the plants. Acceleron® B-200 SAT stimulates the growth of beneficial microbes in the soil to improve nutritional uptake of soy plants, which can lead to improved soy plant health.

BioAg Alliance biological products are derived from naturally-occurring microbes such as bacteria and fungi. The Alliance markets BioYield

products, which help plants with nutrient uptake, and BioControl products, which help protect plants against pests and diseases. The products can be applied to seeds before planting, to soil in-furrow, or to growing crops. They can be used by farmers that grow broad-acre crops such as corn and soy, and on fruits and vegetables. Microbial products can increase crop yields and complement or replace agricultural chemicals and fertilizers.

Click [here](#) for more information.

Database demonstrates Miscanthus yield more than double that of Switchgrass



Increasing demand for sustainable energy has led to research and development on the cultivation of diverse plant species for biomass production. To support the research and development required to domesticate and cultivate crops for bioenergy, the authors of this study developed the Biofuel Ecophysiological Traits and Yields database (BETYdb). BETYdb is a centralized open-access repository that facilitates organization, discovery, and exchange of information about plant traits, crop yields, and ecosystem functions. BETYdb provides user interfaces to simplify storage and discovery as well as programming interfaces that support automated and reproducible scientific workflows. Presently, BETYdb contains over forty

thousand observations of plant traits, biomass yields, and ecosystem dynamics collected from the published articles and ongoing field studies. Over half of these records represent fewer than ten genera that have been intensively evaluated for biomass production, while the other half represent over two thousand plant species reflecting research on new crops, unmanaged ecosystems, and land use transitions associated with bioenergy. BETYdb has been accessed over twenty-five thousand times and is used in the fields of bioenergy and ecosystem ecology to quantify yield potential and ecosystem functioning of crops and unmanaged systems under present and future climates. Here, this report summarises the database contents and illustrates its applications. It shows the database's utility in a new analysis that confirms that *Miscanthus* is twice as productive as switchgrass over a much wider range of environmental and management conditions than covered in previous analyses. The report compares traits related to carbon uptake and water use of these species with each other and with two coppice shrubs, poplar and willow. These examples, along with a growing body of published research that used BETYdb, illustrate the scope of research supported through this open-access database.

Click [here](#) for more information.

Other Feedstocks

Species diversity improves algal crop survival, but not yield

Algae-derived biocrude oil is a possible renewable energy alternative to fossil fuel based crude oil. Outdoor cultivation in raceway ponds is estimated to provide a better return on energy invested than closed photobioreactor systems. However, in these open systems, algal crops are subjected to environmental variation in temperature and irradiance, as well as biotic invasions which can cause costly crop instabilities. In this paper, the authors used an experimental approach to investigate the ability of species richness to maximize and stabilize biocrude production in the face of weekly temperature fluctuations between 17 and 27 °C, relative to a constant-temperature control. They hypothesized that species richness would lead to higher mean biocrude production and greater stability of biocrude production over time in the variable temperature environment. Counter to their hypothesis, species richness tended to cause a decline in mean biocrude production, regardless of environmental temperature variation. However, biodiversity did have stabilizing effects on biocrude production over time in the variable temperature environment and not in the constant temperature environment. Altogether, the results suggest that when the most productive and stable monoculture is unknown, inoculating raceway ponds with a diverse mixture of algae will tend to ensure stable harvests over time.

Click [here](#) for more information.

Feedstock Prices

UK spot prices of bagged wood pellets, and wheat and barley straw. Arrows indicate rise ↑, unchanged – or fall ↓ from previous month.

Date	UK Wood Pellets Delivered	UK Ex-Farm Barley Straw	UK Ex-Farm Wheat Straw
	(£/tonne, 5% VAT)	(D1000) (£/tonne)	(D1000) (£/tonne)
10 Feb	238-270 (↑-↑)	45-65(↑-↑)	40-60(–↑)

For wood pellets prices, we considered UK pellet traders selling prices.

For details on straw spot prices, see <http://www.farming.co.uk>

UK (LIFFE), French (MATIF) and US (CBOT) future prices for wheat, rapeseed, maize, and soybean. Arrows indicate rise ↑, unchanged – or fall ↓ from previous month's predictions.

Date	UK (LIFFE) Feed Wheat (£/tonne)	MATIF Wheat (€/tonne)	MATIF Rapeseed (€/tonne)	CBOT Wheat (cnts/bsh)	CBOT Maize (cnts/bsh)	CBOT Soyabean (cnts/bsh)
Mar 17	147.3 (↑)	169.7 (↓)		429.5 (↑)	366.5 (↑)	1040.0 (↑)
May 17	147.5 (↑)	170.7 (↓)	414.7 (–)	442.2 (↑)	374.2 (↑)	1050.0 (↑)
Jul 17	148.0			454.5	381.0	1058.7
Aug 17			386.7 (↑)			1056.5 (↑)
Sep 17		171.7 (↓)		469.2 (↑)	387.2 (↑)	1037.5 (↑)
Nov 17	137.5 (↓)		390.2 (↑)			1019.7
Dec 17		174.2 (↓)		486.2 (↑)	394.0 (↑)	
Jan 18	137.8 (↓)					
Feb 18			392.7 (↑)			
Mar 18	139.5 (↓)	177.5 (↓)		497.7 (↑)	401.0 (↑)	
May 18	141.1 (↓)	179.0 (↑)	390.2 (↑)			
Jul 18	141.8					
Aug 18			381.2			
Sep 18		178.5				
Nov 18	140.8 (↑)					
Dec 18		180.2 (↑)				
Jan 19	141.2					

For details on future prices see <http://www.hgca.com>

Other biomass feedstock prices are available upon request, simply contact enquiries@nnfcc.co.uk

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