

## **Fast-growing reeds could fuel Europe's future**

By Norman Dunn and Daniel Clery

Trials are just beginning in Britain of a giant reed which may have a higher yield as a biomass fuel than any other crop. In Germany, research with the crop is further advanced and more than 130 hectares of trial plots are growing this year. Farmers and industrial companies are examining its potential as a fuel and as a raw material for making paper and chipboard.

The reed is a perennial called *Miscanthus sinensis*, native to northern China and Japan. German researchers claim that it can yield 30 tonnes of dry matter per hectare per year.

"We are having to answer inquiries from farmers every day of the week," says Manfred Dambroth of the Federal Research Institute for Plant Breeding and Crop Husbandry in Brunswick. The reed can grow as high as 3 metres in one season, so local farmers call it "elephant grass."

According to Colin Speller of ADAS, a government-owned agricultural research agency near Ely in Cambridgeshire, it could compete with short-rotation coppicing using trees such as willow and poplar, which usually achieve yields of up to 16 tonnes per hectare per year. He sounds a note of caution, however, ADAS has just completed a review of studies around the world on *Miscanthus* for the government's Energy Technology Support Unit at Harwell. Speller says that estimates of the plant's yield vary widely, from below 20 tonnes annually per hectare to as high as 35 tonnes. But if *Miscanthus* can achieve annual yields over 20 tonnes per hectare then it "moves into a new league," he says.

Interest in the crop is such that the Ministry of Agriculture, Fisheries and Food has commissioned ADAS to carry out a six-year trial at a cost of £45 000 in the first year. ADAS has planted plots this spring at its centre in Ely as well as ones in Herefordshire and Devon.

*Miscanthus* meets many of the requirements of an ideal biomass crop: it is dry when harvested, burns cleanly and can be harvested annually. Speller believes such a crop will be more appealing to farmers than those requiring coppicing, as they can only be harvested every three years and require machinery.

*Miscanthus* also has a different metabolic pathway for photosynthesis from all British crops except maize. British crops are suited to temperatures below 25°C, while *Miscanthus* is more characteristic of subtropical plants. It thrives in high light and high temperature

conditions and uses water more efficiently. This is why Speller is reluctant to predict yields for Britain's temperate climate.

As with any biomass fuel, any carbon dioxide produced when the reed is burnt was extracted from the air when it grew, so producing and burning it does not add carbon dioxide to the atmosphere. There are other environmental benefits as well. "It offers high production on minimal chemical input," explains Dambroth. "No pesticide sprays are required and the plants' rhizomatous root system has proved to absorb fertilizers efficiently, so helping prevent seepage of nitrate into ground water."

In Germany, some farmers are pressing ahead with production. A group of Bavarian growers has signed contracts to supply Miscanthus to a local crop drying cooperative. Twenty hectares of Miscanthus have been planted. The plan is for the crop drier to change over from heating oil to 80 per cent home-grown fuel by 1995.

In Dresden, a paper manufacturer is testing locally grown Miscanthus as a cellulose source instead of timber. Its tests have shown cellulose from Miscanthus to be just as good as that from timber and better than that from any other annual farm crop.

VEBA, an oil and chemicals company near Gelsenkirchen in the Ruhr, has planted over 30 hectares of Miscanthus plots this year. The crop is used to produce hydrogen gas which in turn is used in the refining process for crude oil.

The most obvious users for Miscanthus would be power stations. "Systems must be created: with farmers supplying the Miscanthus on contract to small community central heating and power stations, for instance," says Dambroth. "Machinery must also be developed for harvesting and packing the Miscanthus into tight bales for efficient transport and handling."

One problem with the crop as a power source is that it is all harvested at one time in the year. Speller believes it will be suitable for integrated power stations which at different times of year could burn Miscanthus, wood chips from coppicing, straw or even domestic waste.

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