

NOVEL TECHNOLOGIES FOR SUGAR CANE

Sugar cane is an important crop globally for both food and bioethanol production, but in terms of research effort into improved production methods the crop has tended to be overlooked. Mr Daniel Bachner, global head of Sugar Cane, Sao Paulo, explained to Crop Protection Monthly how Syngenta is bringing forward in Brazil, and potentially elsewhere, novel technologies. The furthest advanced is the Plene planting technology system which will dramatically improve the cost of planting and management. Bruce Knight reports (Crop Protection Monthly May 2010).

Brazil is the world leader in sugar cane production, with around eight million hectares under cultivation, producing 650 million tonnes of cane annually. Brazil produces over one third of the world's bioethanol supply. The traditional method of planting cane in Brazil is very labour intensive. Normally 30-40 centimetre long cuttings are planted and usually using hand labour. Invariably many of the cuttings planted do not reach maturity resulting in yield losses of more than 12 tonnes of cane per hectare.

The *Plene* system, first announced in 2008, has been going through proving trials since then and should be ready for commercial launch by mid 2011. It is based on the production and planting of sugar cane segments, or buds, which are less than four centimetres in length. Daniel Bachner described how the *Plene* system offers real benefits in terms of the management of crop protection methods. The buds will be pre-treated with specific seed treatment technologies and other protectants maximising early plant development. Sugar cane seedlings produced by the *Plene* system also offer the opportunity for greater varietal purity and ultimately better traceability using fingerprinting technologies.

There are also significant management and environmental benefits. Planting costs, using adapted seeders, are estimated to be 15% per hectare lower than conventional methods. The simpler and quicker planting system can provide the option of minimum cultivation and the benefit of quicker turnaround from harvest to re-planting. So growers can harvest and replant sugar cane more frequently, and thereby increase their annual yields by five to 15 tonnes per hectare. Average yields in Brazil are over 80 tonnes per hectare.

To further improve the planting process Syngenta has been working in partnership with farm machinery company John Deere to develop a specialised planter providing both speed of operation and, as it is relatively light, a much more fuel efficient approach with less risk of soil compaction. With low carbon footprint all important, particularly where the crop is grown for bioethanol production, the *Plene* system has an advantage due to the reduced number of mechanical field operations.

Marco Bochi, Syngenta's director of New Sugar Cane Technologies for Brazil, expects the demand for sugar cane to grow significantly. "*Plene* will broaden our offer for sugar cane customers based on an integrated seed, crop protection and technical support programme, with its clear productivity and cost benefits." According to Mr Bachner, cane seedlings have a market potential of \$1.5 billion per year by 2025 in Brazil. Syngenta is committed to introducing a number of innovations in the Brazilian sugar cane market with some 40 projects now underway. Mr Bochi added: "The focus of the research is on agronomy performance, weed and insect control, and raising sugar content."

In February 2010 the company signed a long-term collaboration agreement with the Agronomy Institute of Campinas (IAC) of the São Paulo Agribusiness Technology Agency, a research arm of the Department of Agriculture within the São Paulo State Government. This agreement will provide Syngenta with access to a set of genotypes from the IAC. According to Marcos Landell, co-ordinator of the IAC Sugar Cane Programme, the use of IAC's genotypes will accelerate development and selection of varieties that are better adapted to *Plene*. The collaboration with the IAC includes mutual training of researchers and technicians.

Syngenta also possesses exclusive licenses for other sugar cane, gene related, technologies such as *SugarBooster* and Chromatin gene stacking. Exclusive rights to the sugar enhancing trait, *SugarBooster*, was acquired by Syngenta under license in 2009 from the Australian sugar refining company CSR, with access worldwide, except Australia. It is claimed that the collaboration with IAC will enable the company to bring these traits to the market in Brazil much sooner.

Syngenta is also working on improving the productivity of other biofuel crops (*CPM March 2010*). The *Enogen* system for corn is based on the introduction of high amylase into the seed which improves the efficiency of the conversion process to bioethanol. Syngenta is also looking at the production of second generation biofuels from, for example, corn stover by expressing specific enzymes as a potential means of ligno-cellulose conversion.