FRENCH RESEARCH INITIATIVE FOR A SUSTAINABLE BEET IMPROVEMENT: INNOVATIVE BREEDING STRATEGIES BASED ON ALLELIC VARIATION MINING, AND NOVEL GENOMIC AND PHENOMIC TOOLS

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In 2010, the sugar world production was rising up to 153 million t, 22% of which coming from sugar beet. Since Napoleon, the French sugar beet industry has grown to become the first one in the world, producing on 400,000 ha, 4 million t of white sugar, 3 million hectoliters of potable alcohol and 6 million hl of ethanol. Yielding actually 13.1 t/ha of white sugar, sugar beet improvement is keeping a constant 2% year rate of sugar yield increase. Within the next decade, due to bio-ethanol and world population increase, sugar demand will most probably grow. Major exporters will not be able to fulfill this demand, and EU and France especially should contribute enhancing competitiveness. Genetic improvement then appears to the French sector to be the key lever to meet future global challenges for a high-quality, safety and sustainable agriculture. Thus, the aim of the AKER project (8 years, 11 partners from public and private sectors) is to double the rate of sugar yield gain per ha, from 2 to 4%/year and to create new varieties higher yielding varieties and with a better fitness (to biotic and abiotic stresses). The AKER project gathers all the French sugar industry partners including growers and factories, represented by ITB (French Technical Institute for Beet), the French breeder Florimond Desprez which is the first world sugar beet breeding company, and public research laboratories and training institute worldwide recognized for their competences and expertise in genetics, genomics, bioinformatics, seed and beet phenotyping or imagery analysis.