

The origins of the French beet sugar industry (1806–1815)

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Abstract. *This paper presents the beginnings of the French beet sugar industry at the beginning of the 19th century. It mentions the external factors that introduced sugar beet into France, the history of the first experiments with the extraction of sugar crystals and the efforts to imitate these methods in France. The paper also describes the state interventions and the form of various subsidies for the emerging industry, their application, impacts and consequences in response to the fall of the Napoleonic regime.*

Keywords

19th century, France, sugar, beet sugar industry, Franz Karl Achard, Benjamin Delessert

1. Introduction

The beginnings and methods of growing sugar cane in the world have been known since ancient times, but in the 18th century, cane was confronted by a strong rival – sugar beet. It, too, was grown in Europe for several centuries before it became the main source of sugar during the shortage of cane imports as a result of the trade war between France and Great Britain. In the middle of the 18th century, the ground-breaking discovery of sugar crystals on the roots of various plants was made by Andreas Marggraf. Marggraf's methods were developed by Franz Achard, who improved the process of the extraction of crystals from white beet roots.

The school, founded by Achard, taught the basics of the new technology for free which then spread to several European countries. As a result of the culmination of disputes between France and the British Isles, the latter cut off imports of sugar cane to the European continent which had to start looking for a suitable alternative. France took the lead, and she very soon began to

apply the methods of new industry on her territory, setting up new experimental schools, sugar factories and significantly intervening in the economy. Whether they had positive or negative effects, initial efforts were a prerequisite for the growth of the industry in the 1830s and 1840s.

The work was based on the beneficial monographs of D. Cooke¹ and Sergey Gudoshnikov,² who presented in an engaging and detailed form not only the development of beet cultivation, but also the characteristics of this crop. The articles of Leonard J. Arrington³ and H. D. Clout,⁴ who presented in detail the content of the decrees, the economic consequences of government interventions and the results of their application, were also a welcome support for the work.

2. A new industry is afoot

The beginnings of sugar beet cultivation in Europe are associated with two political events with economic overlap. The first one, the French revolution, prompted changes in the social status of slaves in the French colony of Saint Domingue, the most profitable sugar cane producer in the New World at the end of the 18th century. After the planters refused to grant the slaves freedom under the Declaration of the Rights, an uprising broke out which was to be crushed by an army. To the displeasure of the royalist planters, the Republican military called for the support of slaves, leading to the fact that “*those whites, who did not escape to the ships, were massacred*”⁵ along with the sugar cane plantations that were found on the island.⁶

The second was the French trade war with Great Britain that began with the proclamation of a continental blockade in October 1806. With the intention of destroying British export trade lines, Emperor Napoleon Bonaparte (1769–1821) forbade all imports of British goods into Europe, on the basis of which Great Britain responded by cutting off France from her colonies. These measures quickly took effect and the price of sugar increased enormously, leading to the disappearance of cane sugar and prompting the French government to find an alternative.⁷

¹ COOKE, D. A. and R. K. SCOTT. *The Sugar Beet Crop. Science into Practice*. London: Chapman & Hall, 1993.

² GUDOSHNIKOV, S., L. JOLLY a D. SPENCE. *The World Sugar Market*. Boca Raton: CRC Press, 2004.

³ ARRINGTON, L. J. „Science, Government, and Enterprise in Economic Development: The Western Beet Sugar Industry.“ *Agricultural History*. 1967, vol. 41, no. 1, pp. 1–18.

⁴ CLOUT, H. D. a A. D. M. PHILLIPS. „Sugar-Beet Production in the Nord Département of France during the Nineteenth Century.“ *Erdkunde*. 1973, vol. 27, no. 2, pp. 105–119.

⁵ MACINNIS, P. *Bittersweet. The Story of Sugar*. Crows Nest: Allen & Unwin, 2002, p. 71.

⁶ Macinnis, *Bittersweet*, pp. 71–74.

⁷ Cooke, *The Sugar Beet Crop*, pp. 15–16 and SMITH, A. F. (ed.). *Sugar. A Global History*. London: Reaktion Books, 2015, p. 41.

Coincidentally, Prussian chemists studied the sugar content of parsnip, skirret and beet roots in the mid-18th century. In 1747, the most significant discovery was made by Andreas Sigismund Marggraf (1709–1782) who experimented with dissolving crushed beet roots in spirits, pressing them out through a linen bag and letting the consistence dry out, upon which he obtained “*the sweet-tasting crystals that were of exactly the same nature as cane sugar*”.⁸ Although the sugar content found in the roots of both red and white forms of beet was low, the discovery of a plant that provides sugar and could be grown in temperate climate meant reassessing the role of beet.⁹

Franz Karl Achard (1753–1821), Marggraf’s disciple, continued his teacher’s experiments: he started growing corn and forage beet in his garden near Berlin and after testing many types of beets, he found out that “*roots with white skin, white flesh and a conical shape were richest in sugar and of pure, sweet juice*”.¹⁰ In 1799, he presented his method to the Institute of France, two years later constructed the first beet sugar factory and in 1810 established a school of beet sugar production. Thanks to all of this he is considered the father of the beet sugar industry.¹¹

3. Adoption, adaptation and application of new technology

Thanks to his free access to schools, Achard’s ideas spread throughout almost Europe, and the French Institute, to which his method was introduced, had an answer to the country’s sugar shortages. In 1809, a commission consisting of chemists Jean-Antoine Chaptal (1756–1832), Antoine-François Fourcroy (1755–1809) or Nicolas Deyuex (1745–1837), among others, tested and confirmed Achard’s experiments, on the basis of which the first French factory for the extraction of beet sugar was founded in Lille in 1810 by Louis Crespel-Dellisse (1789–1865).¹²

In 1811, together with the construction of a new machine perfected for cutting and pulping beet and extracting its juice,¹³ the government decided to act. Emperor Bonaparte issued the expected decree on 25 April 1811 which introduced beet cultivation in France. It set aside large tracts of land for the production of beets, established six special experimental schools to which

⁸ **Cooke**, *The Sugar Beet Crop*, p. 7.

⁹ **Cooke**, *The Sugar Beet Crop*, pp. 7–8, **Gudoshnikov**, *The World Sugar Market*, p. 6, **Macinnis**, *Bittersweet*, p. 132–134 and **Smith**, *Sugar*, pp. 39–40.

¹⁰ **Cooke**, *The Sugar Beet Crop*, p. 9.

¹¹ **Arrington**, „Science, Government, and Enterprise,“ p. 1, **Cooke**, *The Sugar Beet Crop*, pp. 10–13, **Gudoshnikov**, *The World Sugar Market*, p. 6 and **Smith**, *Sugar*, p. 40.

¹² „Rise and Progress of the Beet Sugar Industry in France.“ *Scientific American*. 1877, p. 169.

¹³ **Clout**, „Sugar-Beet Production,“ p. 106.

100 students were given scholarships, directed the construction of processing factories and appropriated rewards to encourage the growing of beets.¹⁴

Overall, however, the experiment of 1811 was a failure: only a fifth of the intended area was sown, the government was unprepared, had insufficient or even no seed supplies, poor transport accessibility and rotten, unprocessed beets, there were distant sugar factories and defective machines with unskilled workers.¹⁵ Last but not least, the serious problem posed the late promulgation of the decree, as beets must be sown in March or early April,¹⁶ leading to a decrease from the optimistic plan of sowing 32,000 ha of fields to only 7,000 ha.¹⁷

In 1812, Benjamin Delessert (1773–1847), the owner of a refinery in Passy, near Paris, achieved significant success in imitating Achard's beet sugar extraction. After two loaves of sugar were given to Napoleon in January 1812, the emperor awarded Delessert the Order of the Legion of Honour, made him baron,¹⁸ and issued an extension decree opening five more sugar factories with declaring that 100,000 ha of beet should be planted. Nevertheless, out of 500 licenses planned to motivate farmers, 334 were awarded and a mere 158 were actually used, resulting in the production of only 1.1 million kg of sugar, a third of the intended proposal.¹⁹

The regions in the north of the country were, thanks to their proximity to the Belgian departments that already knew beet growing, ahead of the rest of France and proved to be the most successful. From four factories in 1811, around forty in 1812 to three hundred in 1813, the most of them were found in the north, and the areas with the largest harvest, from 377 ha in 1811 to 7,000 ha in 1814, were generally around the cities of Lille, Douai and Valenciennes.²⁰

¹⁴ **Arrington**, „Science, Government, and Enterprise,” pp. 1–2, **Clout**, „Sugar-Beet Production,” p. 106, **COONS**, G. H. „The Sugar Beet: Product of Science.” *The Scientific Monthly*. 1949, vol. 68, no. 3, pp. 149–164, p. 153. „Rise and Progress of the Beet Sugar Industry in France,” p. 169 and **SMITH-PETER**, S. „Sweet development: The sugar beet industry, agricultural societies and agrarian transformations in the Russian empire 1818–1913.” *Cahiers du Monde russe*. 2016, vol. 57, no. 1, pp. 101–124, p. 106.

¹⁵ **Clout**, „Sugar-Beet Production,” p. 107–108.

¹⁶ **Gudoshnikov**, *The World Sugar Market*, p. 19.

¹⁷ **Clout**, „Sugar-Beet Production,” p. 106 and **Cooke**, *The Sugar Beet Crop*, p. 16.

¹⁸ **Arrington**, „Science, Government, and Enterprise,” p. 1 and **MACHKOVÁ**, H. „Cukrovarnický průmysl ve Francii.” *Listy cukrovarnické a řepářské*. 2013, vol. 129, no. 11, pp. 356–358, p. 356.

¹⁹ **Cooke**, *The Sugar Beet Crop*, p. 17, **Clout**, „Sugar-Beet Production,” p. 108, **Machková**, „Cukrovarnický průmysl,” p. 356 and „Rise and Progress of the Beet Sugar Industry in France,” p. 169.

²⁰ **Clout**, „Sugar-Beet Production,” p. 108, **Cooke**, *The Sugar Beet Crop*, p. 17, **Gudoshnikov**, *The World Sugar Market*, p. 6 and **Smith-Peter**, „Sweet development,” p. 106.

4. The decline of the industry

The temporary increase in sugar beet production came to a halt in 1814–1815, when Bonaparte was deposed and the Treaty of Paris of 1814 reopened French ports to colonial sugar, causing the collapse of the beet sugar industry throughout most of Europe.²¹ Crespel-Dellisse survived the crisis with his refinery in Arras where he continued processing both beets and cane, whose price fell by “two-thirds to one franc and 40 centimes per kilogram”.²² Nevertheless, the beet sugar industry revived in the 1820s, when more than one hundred new factories were built, many industrialists issued manuals on how to process beets, and a large number of farmers gave the beets a chance and began cultivating it.²³

However, the adoption of Achard’s methods cannot be considered a complete disaster. As part of the trade war with Great Britain, the French central government tried to make up for the shortage of cane sugar, and these initial failures of the early 19th century were brought by future governments to successful results – all the processes, technologies, tools and experience developed in separate sugar factories during the downturn of the beet sugar industry showed full force after a few years, pushed sugar cane supplies out of the European continent and manifested the new industry in full force.

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²¹ Cooke, *The Sugar Beet Crop*, p. 18, Gudoshnikov, *The World Sugar Market*, p. 6, Machková, “Cukrovarnický průmysl,” p. 356 and Smith, *Sugar*, p. 41.

²² „Rise and Progress of the Beet Sugar Industry in France,“ p. 169.

²³ Arrington, „Science, Government, and Enterprise,“ p. 2 and Gudoshnikov, *The World Sugar Market*, pp. 6–7.

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