

ADVANTA: WORLDWIDE CHALLENGES

Jos Bijman¹

Advanta, headquartered in the Netherlands, is the sixth largest seed company in the world. It sells seeds for a broad range of field crops in many different regions. While the company is committed to applying biotechnology in plant breeding, it is faced with many uncertainties due to political reluctance on regulatory decisions and to low public acceptance in Europe.

Key Words: innovation; plant biotechnology; seeds; strategy.

Advanta, headquartered in Kapelle, in the Netherlands, is one of the largest seed companies in the world. It was formed in 1996 by the merger of the Dutch company Royal VanderHave Group and the British company Zeneca Seeds. Advanta is a joint venture—50 percent owned by a Dutch farmer-owned co-operative called Cosun U.A. and 50 percent owned by the Swedish/British AstraZeneca Ltd. Cosun's core activities lie in sugar beet processing (60% of Dutch sugar beets are processed by it), but it is expanding its activities in the food industry. AstraZeneca is one of the largest pharmaceutical companies of the world.¹

After its formation, the company has made the strategic choice to focus on field crops, both food crops like sugar beet, canola, soybeans, and sunflower, as well as fodder crops like maize, sorghum, and grasses. In Europe it has a particularly strong position in sugar beet and grasses; in Argentina and Australia it is the largest supplier of sunflower seed; in Canada the focus is on canola; and for its American subsidiaries maize and grasses are the main crops. Other crops in Advanta's portfolio are soybeans, wheat, sorghum, onions, and rice. Overall, maize is the most important crop, accounting for one-third of turnover.

In 1998, total turnover was 374 million Euros (see table 1). Europe is Advanta's main area of operation, with North America being a good second. Growth of the company is mainly taking place outside of Europe, particularly in North America, where several seed companies have been acquired since the 1996 merger.

Global Presence, Local Varieties

The 1996 merger between VanderHave and Zeneca Seeds was inspired by the ability to obtain economies of scale both in marketing and in research and development (R&D). Critical mass in production and sales was needed to be able to continue substantial R&D investment, particularly in plant biotechnology. Although both companies had invested in biotechnology research, they considered themselves too small to be able to successfully compete in the long run. Global presence has become very important in the seed market for the main field crops like maize, sunflower, sugar beet and oilseed rape. The crops and geographical presence of VanderHave and

¹Jos Bijman is a Senior Researcher at the Agricultural Economics Research Institute (LEI), in the Netherlands. This article is based on a company monograph written as part of the PITA project.
© 2001 AgBioForum.

Zeneca Seeds were complementary—Zeneca Seeds being more international, with a strong position in North America and Australia, and VanderHave being a more European company.

Table 1: Turnover by Region (Million Euro).

	1997	1998
Europe	177	168
North America	146	150
South America	31	30
Australia, Asia, Africa	30	26
Total	384	374

Note. From “Advanta Key Figures and Addresses 1997,” by Advanta, 1997. Kapelle, the Netherlands: Advanta; and “Advanta Key Figures and Addresses 1998,” by Advanta, 1998. Kapelle, the Netherlands: Advanta.

According to Advanta’s intellectual property rights (IPR) manager, Kees Noome, a good base in germplasm combined with a marketing position in many countries around the world provides for a strong negotiating position in acquiring access to genes and techniques patented by other seed and biotechnology companies. For VanderHave, with its commitment to biotechnology research, it was important to obtain a stronger base in the North American market, the most important market for transgenic varieties.

Since the merger, two subsidiaries have been divested, and further acquisitions have been made. Two vegetable seed companies, Leen de Mos in the Netherlands and Shamrock in the United States (US), were sold. These divestments emphasize Advanta’s strategic focus on field crops. In 1998, further acquisitions were made in the US. AgriPro Seeds, of Shawnee Mission, Kansas, was acquired to strengthen Advanta’s position in maize, wheat, sorghum, and soybeans. AgriPro was integrated into Garst, Advanta’s main subsidiary in the US. In addition, the sunflower breeding program of Eureka Seeds, of Woodland, California, was bought. The latter shows Advanta’s strategy to strengthen its leading position in the world sunflower seed market.

Advanta uses a rather decentralized organizational structure. It is organized as a kind of holding company, with subsidiaries receiving financial targets. Subsidiaries have significant freedom in making their own commercial and innovation decisions. Table 2 presents the main operational companies that have their own breeding programs (subsidiaries that are only sales offices are left out). This organization of stand-alone companies was taken from Zeneca Seeds. Although the headquarters is located in Kapelle, the Netherlands, the structure of the company is more Anglo-Saxon than continental European. The current board of directors also mirrors this influence, with four out of five members coming from the former Zeneca organization.

Biotechnology Strategy

Advanta spends about 55 million Euros per year on R&D. This is 15% of turnover, which is the average among agricultural seed companies. About one quarter of the R&D budget is spent in the Netherlands, at the Rilland-Bath research station. The total employment in R&D is about 600 people.

Although the company is committed to biotechnology—in the Netherlands it has long been the largest investor in plant biotechnology—most of the R&D budget is still spent on conventional breeding. Out of the R&D budget of Advanta VanderHave, about 80% is spend on classical plant breeding, 10% on genetic marker technology and 10% on transformation technology. While genetic engineering is the most spectacular (and most controversial) application of biotechnology, the company sees real growth in applying biotechnology techniques in marker-assisted selection.

Table 2: Major Subsidiaries and Crops.

Subsidiary	Location	(Main) Crops
Advanta Seeds (formerly Zeneca Seeds)	Winnipeg, Canada	Canola , maize, sunflower
Advanta Seeds Pacific	Albany, Oregon, USA	Grasses
Advanta Seeds UK	Lincolnshire, UK	Maize, cereals, oil seed rape, peas and grasses
Advanta VanderHave	Kapelle, NL	Maize, sugar beet, grasses, onions
Garst Seed Company (incl. AgriPro and Interstate)	Slater, Iowa, USA	Maize , soybeans, sorghum, wheat, alfalfa
Pacific Seeds	Toowoomba, Australia	Sorghum , sunflower, maize, soybeans, canola
SES Europe	Tienen, Belgium	Sugar beet

Note. From “Advanta Company Monograph,” by J. Bijman and M.J. Bogaardt, 2000. The Netherlands: Agriculture Economics Research Institute. Available on the World Wide Web: <http://technology.open.ac.uk/cts/pita/AnnC3-mono-advanta.pdf>.

Advanta managers emphasize that classical breeding is still the starting point in developing new crop varieties. If there is a demand from a customer that cannot be met by classical breeding methods, the biotechnology experts are asked to find a solution. This solution can be a license from another company to apply a certain technique or to insert a gene, or it can be in-house biotechnology research to find the proper solution. The commercial prospect of a new variety with the desired trait determines whether and how much investment in biotechnology research will be done. Thus, biotechnology is considered as a set of enabling tools for plant breeding. Plant breeders, and other employees who have direct contact with clients and food processors, are directing those engaged in biotechnology.

Advanta strongly believes in the benefits of biotechnology. It is already using genetic marker technology in most its breeding programs. However, due to the low public acceptance of biotechnology in Europe, it expects that it will take several years before transgenic varieties can be introduced in the European market. For decisions on what varieties to develop and produce, the current legislative and market situation in Europe leads to great uncertainty for the company. As R&D decisions in a seed company are taken with a long-term perspective, the current uncertain regulatory situation makes innovation decision making extremely difficult.

Main Crops And Breeding Goals

Maize is Advanta’s most import crop. Advanta’s maize varieties are for animal feed (fodder maize and grain maize) and for processing into starch products (grain maize). Maize breeding and research takes place in the Netherlands, US, Brazil, France, Chile, Thailand, and Germany. The breeding programs at Rilland (NL) are focused on agronomic traits like early maturing, herbicide resistance, and improved nutrient efficiency. The latter trait is a reaction to stricter environmental policies in the Netherlands. Developing genetic markers is an important part of biotechnology research on maize. Garst (US) has a strong position in using RFLPs in maize research, while Advanta VanderHave uses the AFLP technology of Keygene.

In 1998, Garst has commercially introduced transgenic maize varieties in the US market. One of these varieties is a Liberty Link (LL) herbicide-resistant variety. Another is Star Link insect-

resistant maize (Bt-maize). For Europe, Advanta VanderHave has developed herbicide-resistant maize varieties, but has not yet been able to commercialize them. One these varieties was Chardon LL, resistant to the broad-spectrum herbicide Liberty (produced by Aventis CropScience, that is also the patent holder for the glufosinate-resistance gene). Chardon LL was the first transgenic maize variety in the Dutch national list of field crop varieties; it had entered the list by January 2000. In May 2000, Advanta VanderHave sold the breeders rights of its Chardon LL (Liberty Link) maize variety to Aventis CropScience. Due to low public acceptance of biotechnology prospects for its commercial success are too low. Aventis is using it primarily in further field trials at this time.

Advanta sells both fodder grasses and amenity grasses, each account for about 50% of grass turnover. Two third of all research takes place at Advanta VanderHave (NL), and one-third at Advanta Pacific Seeds (Oregon, US). The main breeding goals in the Dutch program are disease resistance (particularly crown rust) and nitrogen efficiency. Improved nitrogen efficiency is important because of Dutch environmental policy to reduce undesirable nitrogen emissions from extensive fertilizer use. Advanta VanderHave is developing fodder grass varieties that have the same yield and disease resistance as other varieties but need fewer fertilizers.

Advanta is one of the three largest sugar beet seed companies, with approximately 25% of the world market. Its main competitors are Syngenta (Hilleshög brand) and KWS. In the United States, Advanta has a market share of 23 percent. In Europe, the company has two sugar beet breeding programs, one in the Netherlands (the old VanderHave program) and one in Belgium (the former SES program). Advanta has chosen not to integrate these two programs, because each breeding program has its own characteristics. Thus, diversity in germplasm is maintained and risk is shared.

Breeding goals for sugar beet continue to be yield, particularly the content of easily recoverable sugar, and pest resistance (Rhizomania resistance, Cercospora resistance, and nematode resistance). In recent years, Rhizomania (a viral disease) has become more problematic for sugar beet growers in Europe, which has led to greater attention to resistance in the breeding programs. As sugar beet cultivation requires substantial amounts of herbicides, and environmental policies press farmers to diminish pesticide use, the development of herbicide-resistant varieties has received a great deal of attention in Advanta's breeding activities. The company could have the first transgenic herbicide resistant (Liberty Link) sugar beet varieties in Europe available in 2002, if regulatory approval is obtained.

Advanta is a world market leader in sunflower seed production. In Argentina, Advanta has approximately 60% of the market. Research is carried out in the Netherlands, Argentina, and the US. Recently, Advanta has experienced how the introduction of genetically modified (GM) crops can completely change the seed market for other crops. When Monsanto's herbicide-resistant soybeans became available in Argentina, farmers shifted from growing sunflowers to soybeans. Being the main supplier of sunflower seeds, Advanta saw its market decline by 70% in just two years.

Advanta's canola activities are concentrated in Canada. The canola-breeding program is located in the province of Manitoba, while production of canola seed is based in the province of Alberta. The focus of the breeding activities is on developing hybrid canola varieties. Advanta Seeds has introduced transgenic herbicide-resistant canola in Canada.

Wheat is more important in the US than in Europe. With the acquisition of AgriPro, Garst has strengthened its wheat activities. In Europe, Advanta does only the breeding work, and then sells the varieties to other seed companies who multiply them and sell the seed to farmers. Advanta receives royalties from these seed sales. Advanta collaborates with Zeneca Plant Sciences (one of the plant biotechnology units of Syngenta) to develop better wheat varieties.

Table 3 summarizes Advanta’s main research aims for each crop. While there is much discussion about developing crop varieties with quality (or output) traits, Advanta’s main focus in crop breeding is still on agronomic traits. Advanta considers the farmer as its main customer. High yield and good disease resistance continue to be the most important targets in variety breeding, but since the early 1990s, relatively more emphasis has been given to disease resistance and less on yield. Pest resistance has become more important because of stricter environmental policies.

Table 3: Main Research Aims.

	Fungus Resistance	Virus Resistance	Insect Resistance	Flowering/ Hybrids	Herbicide Resistance	Product Quality
Maize	X		X	X	X	X
Sugar beet	X	X		X	X	X
Oil Seed Rape	X		X	X	X	X
Sunflower	X					X
Grasses	X		X	X	X	
Cereals	X			X	X	X
Onion	X		X		X	X

Note. From “Towards a Sustainable Agriculture,” by Advanta. Kapelle, the Netherlands: Advanta.

Biotechnology Brings Increasing Uncertainty

Both VanderHave and Zeneca Seeds, the constituents of the 1996 merger, had invested in biotechnology research. Advanta has continued along this route. Biotechnology is seen as an important tool in crop breeding, even when more than 80 percent of R&D funds are still spent on conventional breeding activities. In the North American market, Advanta’s subsidiaries are already selling transgenic varieties of maize and canola (with herbicide resistance and insect resistance). Also, for Europe and other parts of the world, Advanta strongly believes in the advantages of applying biotechnology. It is already using genetic marker technology in most of its breeding programs. However, due to the low public acceptance of biotechnology in Europe, the company expects that it will take several years before transgenic varieties can be introduced in the European market.

The current legislative and market situation in Europe (and even in other parts of the world) leads to great uncertainty about what varieties to develop. As R&D decisions in any seed company are taken with a long-term perspective, the current uncertain regulatory situation makes innovation decision making extremely difficult. Even when the regulatory hurdles are overcome in the near future, and the *de facto* moratorium on introduction of GM crops is lifted, public attitudes may continue to be negative.

With all the discussion and anxiety about GM food in Europe, food processors have become very reluctant to accept genetically modified ingredients. Even for fodder crops like maize and grasses, food processors have voiced their concern about GM varieties. For instance, Dutch dairy processors have told seed companies, among them Advanta, that GM maize is only acceptable for dairy cows if the dairy companies give their approval (which is not likely with the current negative public attitude towards GM food). Once food processors have chosen a non-GM strategy, they will not easily change their position. Thus, we can conclude that prospects for seeds of GM crops in Europe are not very bright.

International trade in seeds and agricultural products makes life for a seed company with production and commercial activities in several places of the world rather difficult. For instance, European refusal to accept GM products influenced farmer-planting decisions in North America in 1999. As a result, Advanta's North American subsidiary, Garst, sold less of its transgenic seed it had in stock, and had to find other (more expensive) seed to supply its customers. In April 2000, it was found that canola seed sold by Advanta in several European countries was contaminated (0.4%) with seeds from genetically modified plants. As these plants were not approved in Europe, farmers could not use the seeds supplied to them by Advanta. Although the seed was from a non-GM variety, the seed was produced in Canada where it was contaminated by pollen from GM varieties grown nearby. Advanta had to pay millions in compensation to the farmers affected.

In conclusion, while Advanta is convinced that biotechnology has the future in plant breeding, it is struggling with the uncertainties that this new technology has brought to seed companies. While biotechnology has greatly expanded options in developing improved crop varieties, it has introduced more uncertainties in the commercialization of these new varieties. For Advanta the largest challenge lies in decision making on innovation: whether to go for GM crops in Europe or not.

Endnotes

¹ In November 2000, when AstraZeneca merged its Agrochemicals Division with Novartis Agribusiness into Syngenta, Advanta was left out.

References

Bijman, J. and Bogaardt, M.J. (2000). Advanta Monograph. The Netherlands: Agricultural Economics Research Institute. Available on the World Wide Web: <http://technology.open.ac.uk/cts/pita/AnnC3-mono-advanta.pdf>.