

## *Ag Alumni Seed: A Look to the Future<sup>1</sup>*

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<sup>2</sup> This case was developed by Cole Ehmke (Research Associate, Center for Food and Agricultural Business, Purdue University) and Jay Akridge (Director, Center for Food and Agricultural Business and Director, Executive MBA in Food and Agricultural Business). The authors would like to thank Jerry Conner, Jane Lewis and Max Robbins for permission to develop this case around issues facing their organization and their generous contributions of information and time. Thank you also to Ken Harling, Betty Ottinger and Larry Lad for their comments.

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## *Ag Alumni Seed: A Look to the Future*

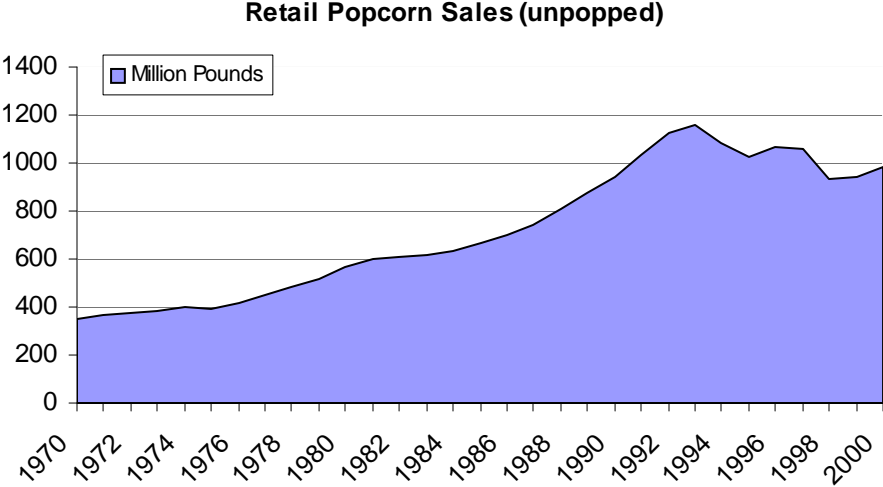
Jerry Conner turned his thoughts away from the window and to the month that lay ahead. Before the next board meeting of Ag Alumni Seed Company he had to develop strategic recommendations that would set the tone of the company for years to come. As president of Ag Alumni Seed he wanted to maximize returns, but the opportunities were limited.

To him popcorn seed wasn't a large market – there were only seven companies he competed against – and the domestic demand for popcorn was stable with little increased market for seed. The foreign markets held some potential, but any growth there would probably be overtaken by the consolidation trends in the industry. Jerry was looking for options. Anything from partnerships with competitors to selling the business would be considered if it made sense. He needed to get started on a plan so he and his staff could start exploring it in depth in the next few weeks.

### **Popcorn**

Americans consume some 4.3 billion gallons of popped popcorn each year. The target market for popcorn sales is women 18-54 with children in the home. Market research conducted annually by the Popcorn Board, the non-profit organization charged with promoting popcorn, has found that the number of people eating popcorn in the home increased 6% from mid 2000 to mid 2001. Still, the last couple of years for which data are available have seen an overall decrease in popcorn consumption in the U.S. (see Figure 1. Source data can be found in Exhibit 2).

Figure 1. Total popcorn sales at the retail level



Source: The Popcorn Board

The worldwide retail market for popcorn is about 1.4 billion pounds. Of that total, about 900 million pounds are consumed in the U.S. The U.S. market for popcorn is currently stable – and is not expected to grow or shrink substantially in coming years. Any growth potential for popcorn (and popcorn seed) would be abroad. The USDA reports that U.S. exports of retail popcorn totaled

1 111,261 metric tons in 2000 with a value of \$65 million. The largest export markets are Mexico  
2 (15%) and Canada (10%). Production outside the U.S. is increasing. For instance, Argentina went  
3 from about 1,000 acres of popcorn in the early 1990s to more than 100,000 in 1997.

4  
5 In the U.S., popcorn is primarily produced in Nebraska, Indiana, Illinois, Ohio and Missouri.  
6 Nebraska and Indiana account for about half of the U.S. production (Indiana planted about 77,000  
7 acres of popcorn in 2001). Total U.S. production is about 345,000 acres. Worldwide production is  
8 about 600,000 acres. The average price to processors of Ag Alumni seed is about \$2.75 per pound.  
9 Processors then pass the seed on to contract growers who actually produce the popcorn crop. About 3  
10 million pounds of seed would satisfy the needs of the American popcorn market.

11  
12 While most popcorn is produced and consumed in the U.S., it is also grown and consumed around the  
13 world. For instance, popcorn is a snack in both Europe and Latin America. However, much of the  
14 South American production goes to Europe. Latin America in general has not been a big popcorn  
15 consumer, with the exception of Brazil where there is a familiarity with popcorn as a cheap snack  
16 sold by street vendors. In fact, most of the Argentine crop is exported to Brazil. Ag Alumni exports to  
17 more than 15 countries and is continually receiving inquiries as the knowledge of popcorn increases.  
18 Foreign sales are becoming increasingly important in the popcorn seed business, and Ag Alumni has  
19 been working to develop international contacts to take advantage of any foreign trend in popcorn  
20 consumption.

21  
22 Popcorn is not a product with universal recognition and so consumption has been somewhat limited  
23 around the world. Knowledge and consumption of popcorn seems to be spread by foreigners who  
24 came to the U.S. and became acquainted with popcorn while traveling, then brought their desire for  
25 popcorn home. Promotion programs abroad by the Popcorn Board have targeted in some countries,  
26 but Jerry didn't know if they were effective. In some cases consumption was limited by factors other  
27 than non-familiarity with the product. For instance, if electricity was unavailable, or irregularly  
28 available, then popcorn in the ubiquitous microwavable bags would be useless.

## 29 **Company Background**

30 Ag Alumni Seed was incorporated in 1938 by four alumni of Purdue University, the agricultural  
31 university in the state of Indiana. The original purpose of Ag Alumni was to produce foundation seed  
32 for public use in Indiana. The firm grew over time and eventually moved to its present headquarters  
33 in Romney, Indiana, 10 miles south of the Purdue University.

34  
35 By 2001 Ag Alumni had become a major grower and supplier of foundation seed for the popcorn  
36 industry. It raised and sold popcorn seed to popcorn processing companies. These processors then  
37 distributed this seed to their growers. Popcorn seed companies rarely sold directly to the farmers  
38 growing the popcorn crop.

39  
40 Popcorn wasn't always the company's primary product. The late 1930s was the beginning of the real  
41 hybrid seed corn revolution. Like other seed companies in the Midwest, Ag Alumni's early focus was  
42 on producing dent seed corn. The firm also researched and developed oats, soybeans, wheat and  
43 popcorn seed products. As private companies began to take on the research and development of seed  
44 corn and public investment in breeding programs waned, Ag Alumni began to focus on other  
45 products.

46  
47 The company and the seed market were undergoing significant changes when Jerry was hired as  
48 president in 1989 to help steer the firm through these changes. Jerry was no stranger to the seed  
49 industry and brought a long career in the seed business to Ag Alumni. Originally a vice president of

1 sales and marketing for Trojan at Pfizer, he moved to vice president of sales with the merger of  
2 Dekalb and Pfizer, and then to vice president of sales and marketing. He left Dekalb in 1987 to  
3 consult and work on private business. As part of a consulting job, he became acquainted with Ag  
4 Alumni and was hired.

5  
6 Jerry aggressively moved to develop Ag Alumni's specialty in popcorn, closed a seed operation in  
7 Florida, and invested in capital improvements through the 1990s. Modern grain storage facilities and  
8 machine and maintenance shops as well as warehouses (some refrigerated) to store and distribute a  
9 finished product were added, and the conditioning tower was refurbished. He also merged a separate  
10 Purdue University research program on popcorn into Ag Alumni and hired Dr. Bruce Ashman, a key  
11 popcorn hybrid researcher, as a consultant. With the two programs merged, Ag Alumni developed a  
12 store of genetics in popcorn. This unique gene pool gave the company more than 50% share of the  
13 seed used to plant 345,000 acres of popcorn grown in the U.S. in 2001.

14  
15 In 2001 more than half of Ag Alumni revenues came from popcorn. The rest of sales consisted of  
16 wheat and soybean seed sales, contract seed production, and other operations. Seven varieties of seed  
17 accounted for most popcorn sales, which is the focus of the research program. Little research was  
18 needed for oats and wheat. Ag Alumni had a good income source from royalties off of its wheat  
19 varieties despite wheat acreages being down in recent years. Another revenue stream was contract  
20 seed production. Producing seed on contract helped utilize the firm's production capacity not  
21 dedicated to popcorn. Many of Ag Alumni's acres are irrigated, a competitive advantage in the  
22 contracting market.

23  
24 Jerry managed 17 full-time employees. The managerial staff was comprised of six people: Jerry  
25 Conner, president; Jane Lewis, popcorn sales manager; an accountant; a secretary; a marketer for the  
26 other crops; and a production manager. Dr. Max Robbins runs the research arm of Ag Alumni.  
27 Relative to other popcorn seed companies, the fact that Ag Alumni employees two full-time Ph.D.'s  
28 translates to a large popcorn breeding program that provides a strong advantage for the firm.

## 29 **Popcorn Seed Research and Marketing**

30 Research is carried out by both seed companies and by processors. A research program usually has  
31 one or two researchers. There are only a few seed breeders in the marketplace – about six of  
32 consequence. Some of these breeders specialize exclusively in popcorn, such as McHone Seed.  
33 Others are somewhat diversified with research into other crops, for example Crookham Company  
34 works with sweet corn, onions and carrots and Schlessman Seed works with dent corn and soybeans.  
35 Most of these companies are important, but relatively small competitors. Ag Alumni is by far the  
36 largest of the popcorn seed firms.

37  
38 Large processors also carry out research into popcorn varieties in addition to selling a retail popcorn  
39 product. The largest two, ConAgra and Weaver Popcorn, dominate the market at the retail level. Their  
40 vertical integration from raw genetics to finished product and their sheer size in this low-margin  
41 packaged food business give them an advantage in marketing. About two-thirds of the popcorn crop  
42 is produced by ConAgra and Weaver. In fact, Jerry has heard that 60% of the popcorn sold in the U.S.  
43 is sold through Wal Mart – and probably are ConAgra and Weaver brands.

44  
45 The seed market is a sort of three-legged stool. The legs are made up of ConAgra, Weaver and Ag  
46 Alumni. The twist is that ConAgra and Weaver each satisfy most of their own seed demands while  
47 Ag Alumni satisfies most of the other processors' seed requirements. There is some trade between Ag  
48 Alumni and the two largest processors, but it occurs irregularly.

1 Processors contract with farmers to produce specific varieties. For instance, a processor might specify  
2 an Ag Alumni variety or two and a Schlessman variety as the only varieties their farmers can grow.  
3 Or Weaver Popcorn would specify Weaver seed to Weaver contractors. This specification increases  
4 the likelihood of a consistent product at retail.

5  
6 When Ag Alumni fills a seed order the seed would either be shipped to the processor in bags or the  
7 processor would come to Ag Alumni to pick up the seed. Jerry particularly likes it when customers  
8 come to Ag Alumni to pick-up seed because it gives his team a chance to interact with them in person  
9 and show them their modern and professional resources. Jerry, along with Jane Lewis and Max  
10 Robbins are often on the road to see customers and attend field days. Jane, in her role as popcorn  
11 sales manager, builds relationships with current and potential customers by continually staying in  
12 contact via e-mail and phone. She knows her customers well enough to remember birthdays and  
13 regularly has conversations with people about crop conditions, weather and their families. Apart from  
14 fielding questions about the characteristics of the hybrids she also is a friendly, general resource for  
15 any question that a customer might have. "It's about building trust," says Jerry as he reflects on Jane's  
16 ability to nurture relationships.

17  
18 Jane says, "E-mail has been a wonderful tool in our business. They'll ask me a question and I'll  
19 respond and this will go on. I think one key to our customers' friendship is that we answer  
20 immediately. We basically become pen pals. Our customers know they can ask about what is going  
21 on in the U.S. market, or advice on anything, anytime of the day or night, and we will always respond  
22 rapidly and honestly."

23  
24 A relationship with a new customer might begin with a referral from a broker, like a prospect Jane  
25 was working with in Europe recently. Brokers play a key role of matching up buyers and sellers  
26 around the world. Brokers, especially larger ones, have contacts in many countries, and cover all  
27 types of grains. They are often the first point of contact for someone wanting to buy seed. After  
28 hearing the Ag Alumni name from the broker the contact would probably get contact details and some  
29 current yield data from the Ag Alumni website and send Jane an e-mail. Jane explained the initial  
30 contact:

31  
32 They will start out by giving me information about their desires and asking if we would sell  
33 to them. If they don't give me acres/hectares, I ask. I also ask what maturity they plant of  
34 regular field corn. If they don't know, I look on the map and tell them what would work best  
35 in their area. You have sophisticated buyers, and then not-so-sophisticated buyers. I basically  
36 talk with them about everything from soup to nuts. We talk about kernel size and what  
37 avenue they are going to use to sell the end product. I ask if they need mushroom or butterfly  
38 [the two primary types of popcorn]. Most of the time they don't know the difference until you  
39 explain it to them.

40  
41 After recommending a few varieties for the particular growing conditions and for what kernel  
42 characteristics would be desired, an initial order would be placed and a crop would be planted.  
43 Before, during and after the growing season Ag Alumni would be available for advice on the growth  
44 stages and handling characteristics.

45  
46 If a number of processors in a country or region grow, then Ag Alumni will send someone every  
47 couple of years or a couple times a year for the biggest customers for things like field days and sales  
48 calls. The purpose of the trip would be assess in person the appropriateness of varieties to the growing  
49 area, recommend ways to deal with problems such as when and what chemicals could be used on  
50 diseases or insects.

51

1 The personal approach to marketing has been successful. In the past, companies have come directly to  
2 Ag Alumni because of the reputation for service, and a quality product, that Ag Alumni has built.  
3 Much of Jane's time has been spent developing relationships abroad where there is a higher  
4 likelihood of new customers. Several startup popcorn processors have recently entered the European  
5 market where there is an upward trend in demand. Other countries that have been demanding seed  
6 have been South Africa and Brazil, both of which have tripled their purchases of Ag Alumni seed.  
7 Jane Lewis had this to say about Ag Alumni's ability to work abroad:

8  
9       Some firms may be afraid of doing business internationally and think it will be more hassle  
10 than it is worth. Yes, it certainly is a lot harder work than selling to someone in the U.S. that  
11 has grown popcorn before, and the paperwork is horrendous – each country has its own set of  
12 regulations – but the rewards are worth it when they come back to you the following year  
13 doubling their previous order.

14  
15 The marketing program that has been set up focuses on maintaining an advertising presence in most  
16 major seed trade magazines with a global audience. "I advertise under the heading Popcorn Seed.  
17 We're usually the only ones listed" Jane said. The advertisements, the website and referrals account  
18 for most of the contacts. Going to trade shows has proven to be ineffective because the focus there is  
19 on finished food products, not genetics. One possible way to expand the coverage is to hire a broker  
20 to travel around the world promoting the product. This potential access to customers would be good,  
21 except that Ag Alumni uses its genetic strengths as its leverage. Finding a broker that could convey a  
22 detailed knowledge of their product would be difficult, especially since popcorn seed would have an  
23 extremely small potential audience. This has led Jerry to note that marketing themselves will be a  
24 process of doing what they've always done. They'll continue the annual trips to regions with a high  
25 volume of sales and count on the individual who has come to the U.S., learned about popcorn and  
26 takes his knowledge home with him.

27  
28 Another reason Ag Alumni competes very well abroad is that its hybrids are well suited to foreign  
29 growing conditions. Ag Alumni's seed is bred in a region with more disease pressure than in western  
30 states like Nebraska. This produces natural disease resistance which is an advantage in markets like  
31 South Africa and South America where crop diseases are a problem. "But that's not the end of the  
32 story", noted Max Robbins, research director, "Even should a foreign breeder have a disease resistant  
33 stock, they wouldn't have the germplasm that nearly approaches Ag Alumni's popping expansion and  
34 other quality traits." These things help build Ag Alumni's reputation as a provider of quality genetics  
35 – something which then helps bring in more new customers.

36  
37 As Jerry, Jane and Max travel around the country and around the world they stress the quality product  
38 they have. The genetic potential must be in place to provide a processor with a hybrid with high  
39 expansion, good kernel size, strong stalk strength, and with yields that are good enough that the  
40 processor can get it grown.

41  
42 Processors can use many technologies – screen cleaners, gravity separators, polishers, and sometimes  
43 color separators – to improve kernel quality and provide a good retail product. However, they can't  
44 surpass the level made possible by hybrid genetics. Because of Ag Alumni's long involvement in  
45 popcorn and the acquisition of the Purdue University stock of genetics, Ag Alumni has one of the  
46 very best collections of genetics in the world.

47  
48 Most popcorn processors can't afford to have their own breeder, so they rely on companies like Ag  
49 Alumni to breed seed for them. There is a natural uneasiness in response to changes in an industry  
50 composed of two very large companies, ConAgra and Weaver, which are both processors and  
51 breeders, and the seed companies.

1  
2 Processors that have their own research programs have not traditionally sold seed outside of their  
3 contracting systems. However, that may be changing. Recently McHone Seed started selling seed for  
4 ConAgra, though the ConAgra name is not advertised. Competing processors would likely be hesitant  
5 about buying seed from a company if they knew that they were relying on a competitor for production  
6 inputs.

7  
8 Another shift that has occurred is in the sourcing of popcorn seed over recent years. At one time  
9 Weaver and ConAgra bought between one-third and one-quarter of Ag Alumni's production. Now it  
10 is more a token amount since both have grown their own research programs. These processors are  
11 more self sufficient in their seed supply than they were in earlier years. This trend is one that concerns  
12 Jerry, given the dominant position these two processors hold in the market.

### 13 **Popcorn Processing**

14 Processors perform most of the coordinating tasks in the popcorn chain. They select popcorn varieties  
15 to grow; contract with farmers to produce them; dry, clean, store and package a finished product; and  
16 market it at the retail level. Their chain begins at the field because nearly every pound of popcorn  
17 planted is under a contract.

18  
19 Popcorn production is contracted from the processor to the farmer at about nine or 10 cents a pound.  
20 A farmer planting 100 acres would produce 3,300 pounds of popcorn per acre, or 330,000 pounds  
21 total. To produce this amount, the farmer would plant between 8 ½ to 9 pounds of seed per acre. This  
22 seed was purchased directly from the processor, with very little markup over the \$2.75/pound the  
23 processor paid. If the processor used Ag Alumni seed it was delivered to the grower in Ag Alumni  
24 bags. Farmers accustomed to growing popcorn usually recognize the Ag Alumni name as quality  
25 seed.

26  
27 There are between 30 and 40 processors of popcorn. The USDA assesses a fee per pound of popcorn  
28 sold over 4 million pounds for its popcorn promotion organization, the Popcorn Board. Of the  
29 popcorn processors only 21 are large enough to be assessed this fee. The rest are small, regional  
30 companies. As indicated earlier, the processing sector is dominated by two giants: Weaver and  
31 ConAgra.

32  
33 Jane Lewis describes the processors as being in four tiers. Below the top tier of ConAgra and Weaver  
34 there is a pack of five to six processors that process 50 to 75 million pounds of popcorn annually per  
35 firm. Another 15 to 20 processors are in the next lower level that process more than 4 million pounds  
36 annually per firm. In the bottom tier are the 10 or so processors that process less than 4 million pounds  
37 annually per firm. 10 years ago Ag Alumni sold to 100 popcorn processors around the world. Today  
38 that number is near 70.

39  
40 Successful processors either have a widely recognized national presence, as ConAgra does with its  
41 popular Redenbacher and Act II brands, or the company found and protected a niche. There are very  
42 few players in the popcorn processing business that have been able to create a national brand. To  
43 create a national presence a processor would need, aside from some specialized production  
44 equipment, a multimillion-dollar advertising campaign – no small barrier for a mom and pop  
45 processor. Most processors sold regionally known brands.

46  
47 One veteran popcorn breeder characterized the market situation as having two sorts of businesses,  
48 those that like to do business and those that like the business. A company like ConAgra would be an  
49 example of the sort that like to do business. They're in the game to gain market share and grow larger.

1 A lot of the smaller companies are those that like the business and aren't in the business to be the  
2 dominant force. Jerry wondered what the processor landscape would look like down the road as the  
3 two business types developed. These processing companies would probably not be willing to go to  
4 buy their seed from a competitor like ConAgra or Weaver; but if Ag Alumni were bought by a larger  
5 company or even a processor, then the smaller processors would have no choice.

6  
7 ConAgra is the largest company involved in the popcorn processing industry and clearly the most  
8 provocative because of its actions on both the popcorn seed and processing sides. Within the last  
9 several years ConAgra has bought two popcorn seed companies. What frustrates seed breeders is that  
10 ConAgra is selling the seed on the market – not using it for its captive supply as has been done in the  
11 past by the processors who run their own breeding programs. For processors competing in the seed  
12 market this has not been the practice, and it is not welcome among breeders.

13  
14 With total annual sales of about \$25 billion ConAgra is one of the world's largest food companies. It  
15 competes in multiple segments of the food business including the retail food, foodservice, and  
16 agricultural product (crop protection and food ingredient) areas. Popcorn is in ConAgra's packaged  
17 food division. At one time the different brands, such as Orville Redenbacher, had been run separately  
18 because they were acquisitions, but are now under central authority.

19  
20 Weaver Popcorn, as the other main, but slightly smaller, popcorn processor, is also a primary force in  
21 the popcorn seed industry. Headquartered in Van Buren, Indiana, Weaver is a closely held, family-run  
22 business. In recent years they have expanded sales of bulk popcorn and private label processing. In  
23 addition to their processing plant in Indiana they also have a new facility in Argentina. It also has  
24 been growing its research program, though not through acquisition. At this point it didn't seem that  
25 Weaver was interested yet in selling seed to other processors.

## 26 **Seed Production**

27 One of the challenges in popcorn seed production is inventory management. By producing seed in the  
28 off-season in South America, a seed company may be able to better manage seed stocks. Five years  
29 ago Ag Alumni entered the Argentine market with production capabilities and limited hybrid  
30 development. To Jerry, the idea of production in Argentina made sense:

31  
32 When harvest begins in Indiana in early autumn, planting is about to begin in Argentina in  
33 their spring. By then we would have a very good idea of what its production for the year was  
34 and would also have received early sales orders from customers. These combined would give  
35 an idea of the supply that would be needed. If there was a shortage, then more of certain  
36 varieties could be produced in Argentina. The shipments north could account for as much as  
37 30% of demand. They would be delivered in April, after a three-week travel time.

38  
39 Ag Alumni's South American production is licensed for a royalty fee. The licensing reduces the risk,  
40 but the income is reduced as well. It also saves them the considerable trouble and expense of having  
41 to manage foreign operations. Ag Alumni does have good relations in Argentina, and is the popcorn  
42 of choice. Eventually, another concern relating to long-term demand for Ag Alumni's products was  
43 the wisdom that every country would want to do all their own production (rather than importing  
44 seed). Current export volumes of popcorn were already reflecting that this was occurring. Data  
45 collected by the USDA (Exhibit 3) indicates exports well below the heights reached in the early  
46 1990s. Much of this could be a consequence of expanded foreign production replacing sales made by  
47 U.S. based processors. However, that won't prohibit Ag Alumni from exploring ways to create and  
48 capture value in the South American market. In fact, on a recent trip to the country Jerry had spent  
49 several hours meeting with food processors and retailers discussing possible relationships.



1  
2 Protecting the genetics is a difficult aspect of working with contract growers. When involved in  
3 hybrid production overseas, Ag Alumni must send the pure line to the contractor. This is relatively  
4 risky since the pure line, or inbred, is the source material for a crop. When two unrelated inbred lines  
5 are crossed a plant superior to the parents results. The seed produced by these superior hybrids cannot  
6 be planted again without a significant loss in quality, so growers must have a new supply of hybrid  
7 seed every year. If control of the original pure line was lost, then someone could bypass the function  
8 provided by the seed company.  
9

10 Prior to shipping any parent seed, Ag Alumni requires a license agreement to be signed. This provides  
11 some legal protection because it is a contract stating what may or may not be done with the seed. As  
12 an added measure Ag Alumni usually doesn't license its newest germplasm. In the case of Argentina,  
13 where seed has been produced under contract for use in the U.S., they have registered all parent seed  
14 used with the Argentina equivalent of U.S.'s Plant Variety Protection Act (PVP). This is a description  
15 of the inbred and claimed legal ownership of that material. Thirdly, and at least as important as any of  
16 the other two, is that Ag Alumni knows and has built a relationship based on trust with people that  
17 have either licensed product, or produced for Ag Alumni directly under contract.  
18

## 19 **Ag Alumni today**

20 Jerry summarized some thoughts for the upcoming board meeting about what direction the company  
21 could head:

- 22 • The big processors have their own seed source and so they're less reliant on us and the small  
23 processors aren't getting any more numerous here in the U.S. – the domestic market is  
24 eroding
- 25 • We have some of the best genetics in the marketplace and an excellent facility and staff that  
26 do a pretty good job of marketing through our advertising, domestic and foreign travel.
- 27 • Our marketing relies on our reputation as a source of quality genetics.
- 28 • We're doing some work in South America and Europe and have some prospects in other  
29 countries too. Our European contacts are also paying off with a few leads, but serious  
30 purchases of seed may take a while, and may eventually be replaced with a locally grown  
31 product.
- 32 • We have a complicated, competitive environment ahead of us. The company has to find a  
33 niche in a niche market

34  
35 He was left with the feeling that the bottom line was that Ag Alumni probably can't continue this way  
36 for the long-term. "We really need to think about our options for the future," he thought.  
37

## Exhibit 1. Popcorn Background

Popcorn is a very old food with roots tracing back to Mexico. Popcorn ears found in caves in New Mexico date back 5,600 years. The folklore of some Native American tribes told of spirits who lived inside each kernel of popcorn. The spirits were quiet and content to live on their own, but grew angry if their houses were heated. The hotter their homes became, the angrier they would become, shaking the kernels until the heat was too much. Finally, they would burst out of their homes and into the air as a puff of steam.

Always a popular and healthy snack, popcorn is inexpensive and easy to prepare, so it was an affordable luxury among down-and-out families in the Depression. Popcorn sales surged when people began eating it at home in front of the television in the 1950s. They surged again in the 1980s when the microwave emerged as a highly popular method of popcorn preparation.

In the early stages of popcorn marketing Orville Redenbacher was the face that people associated with popcorn. Before him, popcorn in the retail consumer market was highly price sensitive and had low brand differentiation. The Redenbacher idea was to market a premium popcorn and sell it at high margins. His product was sold in glass jars and bags that showed off a very uniform, gold colored kernel. Times have changed. The breeder these days is mainly concerned with the volume of popped corn, i.e. the amount of fluffiness, than the look of the kernel since most popcorn sold is microwavable and consumers would not see what the kernels look like. Consumers buy popcorn that has a high expansion ratio, so breeders breed for it. Popcorn will often expand between 42 and 45 times its original size.

A popcorn kernel contains a small amount of water stored inside a circle of soft starch. Maintaining this moisture – about 14% moisture – is an important part of the handling, storage and packaging process. The soft starch is surrounded by the kernel's hard outer surface. As the kernel heats up, the water expands, building pressure against the hard starch surface. Eventually, this outer layer gives way, causing the popcorn to explode. As it explodes, the soft starch inside the popcorn bursts, turning the kernel inside out. The steam inside the kernel is released, and the popcorn is popped. Popcorn is often served with salt and butter. Another way to serve it is with cream and sugar as a breakfast cereal.

Nutritionally it has 67% as much protein, 110% as much iron and as much calcium as an equal amount (by weight) of beef. Additionally it is good for the teeth and the hull is a good source of roughage (on par with bran flakes and whole wheat toast).

The characteristics that consumers expect vary from country to country. For instance, in Japan people are said to pay extra for popcorn that is extra white because it is more tender. Other customers prefer mushroom popcorn because it is used as a base for caramel corn. It pops into a spherical shape with no pieces to break off while processing. The most common type is butterfly or yellow popcorn and is the type people would get at the movies.

The retail market for popcorn has three primary segments: microwave, ready-to-eat and unpopped. Microwave (popcorn packaged in microwavable bags) is by far the largest with 1999 sales of \$1,157 million (a sales volume of 435 million pounds). Ready to eat (popcorn that is already popped and either sold plain or flavored) sales were about \$492 million and unpopped (packaged in moisture-proof containers from plastic bags to glass jars to containers for conventional cooking) sales were \$81 million. As a comparison, sales of the top selling snack food, potato chips, were \$4,688 million. Total snack sales are about \$19,374 million. A wide variety of substitutes exist for popcorn (cookies, potato

1 chips, pretzels, nuts) in the snack food category. However, unlike other snacks, there is a large and  
2 extremely loyal consumer segment that eats popcorn two or more times every week. Through the last  
3 decade, this segment has devoted its savory snack consumption to popcorn. The preferred substitute  
4 for this group of consumers is in fact fruit, not some other dry and salty snack.

1 **Exhibit 2. U.S. Retail Popcorn Sales (unpopped)**

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<b>Year</b>	<b>Million Pounds</b>
2000	981.7
1999	938.1
1998	934.1
1997	1059.1
1996	1068.3
1995	1025.0
1994	1080.8
1993	1158.0
1992	1124.6
1991	1031.8
1990	938.0
1989	872.0
1988	807.0
1987	741.0
1986	700.0
1985	670.0
1984	630.0
1983	618.0
1982	611.0
1981	600.0
1980	568.0
1979	520.0
1978	486.0
1977	450.0
1976	415.0
1975	393.0
1974	401.0
1973	383.0
1972	372.0
1971	363.0
1970	353.0

Source: The Popcorn Board

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**Exhibit 3. U.S. Popcorn Exported to the World**

	<b>Quantity Exported (metric tons)</b>	<b>Value (US \$)</b>
2000	111,261	\$65,116,346
1999	93,422	\$57,995,068
1998	99,419	\$65,571,111
1997	96,379	\$75,124,440
1996	121,904	\$75,717,707
1995	131,387	\$64,693,784
1994	125,961	\$70,158,496
1993	130,211	\$74,480,484
1992	115,858	\$64,051,692
1991	92,546	\$50,997,415
1990	72,773	\$41,295,922
1989	73,110	\$41,038,458

Source: USDA

## Exhibit 5. Summary of Ag Alumni Seed Popcorn Varieties

### Hybrid Descriptions

**P225** 61 K/10g

This large kernel, high expansion hybrid has super yield potential. It is an early hybrid that is popular for microwave use.

**Exp52151** 59 K/10g

An early, large-kernel yellow hybrid with high expansion. Yields averaging fifteen percent (15%) higher than P225 and has a brighter color.

**Exp92233** 72 K/10g

An early, medium kernel hybrid, with excellent expansion. The tender flakes and beautiful kernel color makes a great package corn.

**P415** 62 K/10g

A large kernel hybrid with expansion and yield better than P612, and earlier too! This hybrid does well as an early in full-season areas.

**AP416** 63 K/10g

A mid-season hybrid which compares favorably to P415 with improved expansion. Good kernel size and color. This hybrid will perform very well in the northern and western corn belts.

**AG22217** 54 K/10g

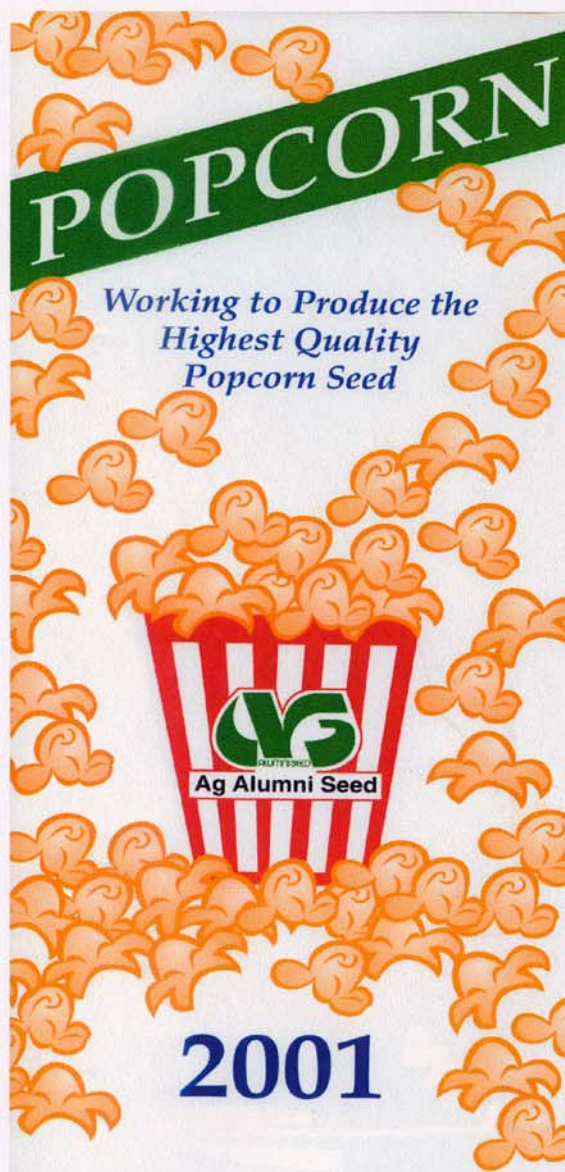
A high yielding, mid-season, extra large kernel hybrid that produces large P410, butterfly-type flakes. Popping expansion is 1.5-2.0 cc/g less than P612 with higher yield potential.

**P612** 62 K/10g

A popular large-grain hybrid that has a faithful following.

**P622(Exp12192Ht)** 60 K/10g

A significantly higher yielding P612-type hybrid with 0.5-1.0 cc/g better expansion. Kernel size is similar to P618, and it has P612 maturity.



### Hybrid Descriptions

**P620** 61 K/10g

P620 will fit into most grower programs. It is only slightly fuller season than P612 with better yields and expansion.

**P615** 65 K/10g

This hybrid remains in our lineup because of consistent, quality grain and good standability. Plain and simple!

**P618** 57 K/10g

This hybrid has high expansion, high yields and large grain. It is a pretty corn that is grown in full season areas.

**P621** 61 K/10g

Similar to P618 in all aspects but has slightly better tip cover and root system. Plant some and compare.

**P625** 60 K/10g

Maintains the stalk and grain qualities of P615, with significantly higher yield potential. Full season, large kernel.

**AP214 - Mushroom** 60 K/10g

A very EARLY mushroom. This hybrid is earlier than P225 with yield and kernel size similar to P614. It is an exceptionally high percentage of ball-type flakes. This is our earliest and highest mushroom-type hybrid.

**AP414 - Mushroom** 56 K/10g

This mushroom hybrid is of P612 maturity. It has improvements in yield, expansion, and percent mushroom compared to P614.

**AG87145C** 56 K/10g

A very promising experimental hybrid. In initial tests it is high yielding, mid-season, very large kernalled with excellent expansion. Look for data on this, and our other new experimentals in our performance bulletin this winter!