**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

On May 25, 1995, Monsanto received regulatory approval to begin selling a soybean

Seed that was genetically altered to resist the effects of Roundup®, Monsanto’s best-selling

Herbicide.1 Two seed companies, as grow and Jacob Hartz, were selected to manufacture and

Distribute these new Roundup Ready® soybean seeds for the 1996 planting season, but the

Specific details of Monsanto’s own launch plan needed to be finalized. First, how many

Manufacturers should Monsanto license for production of the new seeds, and what should

Monsanto require of those licensees? Second, what premium should farmers pay for the new?

Seeds? Third, what kind of sales force effort should Monsanto exert to support the efforts of

Asgrow and Jacob Hartz? Fourth, what kind of communication program was needed to assure

widespread adoption of the new seed?

**Soybean Farming Practices**

According to the most recent Census of Agriculture, in 1992 almost 400,000 farms

devoted some acreage to soybeans. **Exhibit 1** presents the geographic dispersion and size

distribution of soybean farms. **Exhibit 2** contains per-acre costs in four different soybean growing regions: the Northern Plains, the North Central Region, the Southeast, and the Delta.

As **Exhibit 3** reveals, in 1994 about half of domestic soybean acreage was cultivated

using some form of conservation tillage—farming practices that embraced a variety of

techniques designed to limit soil damage caused by wind and rain erosion. Early examples

included contour plowing and terracing techniques. More recently, the development of effective

herbicides spurred the popularity of no-till techniques, which were “based on the premise that

last year’s crop residue will retain the precious topsoil that could be washed or blown away due

to repeated plowing.” An additional benefit of no-till techniques was the retardation of new

weeds in the spring planting season.

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The increased use of conservation tillage techniques reflected in part the effects of the

1985 Farm Bill, which targeted 150 million acres of highly erodible land (HEL). To remain

eligible for USDA benefits, those farming HEL were required to submit and implement a soil

conservation plan.3 By 1995, about three-fourths of all HEL acreage was in compliance with the

1985 Farm Bill. Many expected still wider adoption of no-till farming techniques, because they

produced yields comparable to those obtained from conventional techniques, but at a cost

savings of 7% to 8%. In part, these savings reflected reductions in required tractor size and peracre

fuel consumption (a result of smaller tractor engines and the smaller number of required

plowings). In addition, no-till farming reduced field preparation and planting times, advantages

especially important during planting seasons truncated by wet weather. The reduced time

requirements also permitted cultivation of additional acreage and increased the practicality of

double cropping.4

Despite these benefits, the potential diffusion of no-till techniques was limited by at least

three factors. First, some farmers were simply reluctant to try new methods. Second, the benefits

of no-till techniques appeared greatest on less fertile ground, but fertile soil was plentiful through

much of the United States. Third, the cost savings were not guaranteed, but required education

and aggressive management.5

**The Soybean Herbicide Industry**

Herbicides are chemical agents that destroy or inhibit plant growth.6 In recent years,

approximately 95% of soybean acreage was treated annually with some kind of herbicide.7 As

**Exhibit 4** reveals, soybean herbicide expenditures totaled $1.34 billion in 1994. A market

observer summarized the top five herbicide competitors as follows:

DuPont has the best research and development. Ciba-Geigy has the best all-around

balance; they’re strong everywhere from R&D to herbicides and fungicides.

American Cyanamid dominates the soybean herbicide and corn insecticide markets.

Monsanto is herbicides; that’s essentially all they’ve got. But sales for Roundup,

their No. 1 product, are huge. Dow Elanco is really strong in the no crop area: home

and garden, and railroad and highway right-of-way products.8

In 1993, pre-crop-emergent herbicides (herbicides applied before the crop emerged from

the ground) accounted for an estimated 44% of soybean herbicide expenditures, and post-crop emergent herbicides (herbicides applied after the crop emerged from the ground) constituted the remainder.

**Exhibits 5** and **6** report market shares and grower costs for the leading post-cropemergent

broadleaf soybean herbicides. Pursuit, the leading post-crop-emergent soybean

herbicide, was registered for broadleaf weed control (as opposed to grass control), but was often

used as a stand-alone herbicide (i.e., without a supporting grass herbicide). Some observers

estimated that post-crop-emergent applications accounted for 95% of Pursuit sales.10 Recently

one competitive herbicide, DuPont’s Synchrony, had benefited from the 1993 introduction of

Synchrony-resistant soybeans, bred from mutant soybean seeds. Some predicted that farmers

would plant Synchrony-resistant crops on as many as five million acres in 1996.11

In the United States, herbicides and other pesticides were distributed directly to growers

and indirectly through agents or distributors. According to one study:

Promotions tend to be price-related and are aimed at both growers and

distributors, emphasizing trial and discounts. Applicator kits may be loaned and

training is often offered. Pricing is difficult, because demand is highly elastic. The

key factors are usage rates and competitors’ prices. Many firms use margin

maintenance, which means allowing distributors sufficient profits while still

matching rivals’ prices.

New herbicide products were introduced to farmers in a variety of ways, including calls

by manufacturer and distributor sales reps, grower meetings, agricultural trade shows,

advertising, and direct mail.

**Monsanto**

In 1994, Monsanto’s net income totaled $622 million on revenues of $8.3 billion.

**Exhibit 7** summarizes Monsanto’s financial performance from 1990 to 1994. Salomon Brothers

estimated that 1994 operating income from the Agricultural Group (home of Monsanto’s

herbicide business) totaled $492 million:13

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**Agricultural Group 1993**

**(millions)**

**1994**

**(millions)**

Crop inputs sales $1,936 $2,123

Animal sciences sales 31 101

Total sales 1,967 2,224

Depreciation (129) (138)

Research and development (152) (141)

Other cost of sales (1,283) (1,453)

Operating income $403 $492

Note: Operating income excludes non-operating items.

The Agricultural Group’s most successful product line was Roundup, a family of

glyphosphate herbicides introduced in 1976. Roundup was a foliar herbicide, meaning it killed

on contact with the leaves of a plant.14 Roundup differed from most other herbicides, which

typically did not kill target crops but killed only some kinds of weeds.15 Roundup’s effectiveness

was often summarized in simple terms: “if it’s green, Roundup kills it.”16 As a result, Roundup

was used as a post-weed-emergent, pre-crop-emergent herbicide; post-crop-emergent weed

control required the use of selective herbicides that killed targeted weeds without killing the

crop.17 Roundup was used on a number of different crops, with no single crop accounting for

more than 10% of the herbicide’s volume. In fact, over 40% of Roundup’s volume came from

industrial and lawn-and-garden markets.18

According to some industry observers, Roundup had “one of the most favorable toxicity

profiles in the herbicide industry.”19 The herbicide was “environmentally friendly” because it

broke down “primarily into carbon dioxide and nitrogen,” and it had a 60-day half-life (which

reduced “the possibility of groundwater contamination”).20 Roundup’s limited residual effects

meant that farmers could quickly follow its application with planting.21

Worldwide, Roundup outsold other herbicides by more than two to one.22 In 1994,

industry observers offered estimates of Roundup revenues ranging from $1 billion to $1.4

billion.23 Roundup’s market share averaged 90% in foreign markets, which accounted for over

half of the herbicide’s sales.24 Some observers estimated that Roundup operating margins

exceeded 60%.25

1

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**Education and product customization**

In part, Roundup’s performance reflected Monsanto’s success in educating growers and

customizing Roundup’s glyphosphate formula by crop and by geographic region.26 The success

of Monsanto’s customization program was evidenced by grower reluctance in Europe and Asia

to adopt generic glyphosphate formulations. In fact, the lack of success of generic alternatives in

overseas markets led some to suggest that “we could continue to see Monsanto’s glyphosphate

unit volumes climb after expiration of the patent in the United States.”27

**Roundup pricing**

Roundup’s performance also reflected the success of Monsanto’s pricing strategy. Until

1987, when Roundup began to lose some of its patent protection, Monsanto followed a premium

pricing strategy. As its patents expired, Monsanto began cutting non-U.S. Roundup prices to

stimulate demand. The new strategy permitted Monsanto to penetrate price-sensitive markets,

resulting in “a surge in profit growth (despite lower margins), a dramatic reduction in

manufacturing costs, and the successful emergence of cost-related barriers to entry for generic

competitors.” In the United States, Monsanto began cutting Roundup prices in 1987, although at

a slower rate than outside the country. The result was an estimated annual volume growth of

15% to 20%, with profit growth ranging 12% to 15%.28

The following table summarizes changes in Roundup volume, price, and cost between

1985 and 1995:

**Roundup Performance: 1985–1995**

**Year 1985 1995 CAGR\***

Volume 100 663 21%

Price 100 48 (7)

Cost 100 58 (5)

Operating income 100 258 10

Market share 100 92 < (1%)

\* CAGR denotes Compound Annual Growth Rate.

Source: Groh, D.B., et al., *Monsanto—Company Report*, Merrill Lynch Capital Markets, August 22, 1995.

In the near future, costs were expected to decline more rapidly than price.29 As of 1995,

almost all non-U.S. sales lacked patent protection. Moreover, the herbicide’s domestic-use

patents had also expired, but composition-of-matter patent protection remained in effect until the

year 2000.

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**Exploiting trends toward conservation tillage**

With the increasing popularity of conservation tillage techniques, glyphosphate volume

and profitability growth rates increased to over 20% per year in the early 1990s. As Salomon

Brothers explained:

…farmers can now leave the stubble from the previous year’s crop, use

glyphosphate to kill weeds and then plant into the stubble. Because glyphosphates

are effective against virtually all weeds and break down quickly in the soil, they

have been an ideal product for farmers practicing this technique.31

The result was a doubling in Roundup volume from 1990 to 1994. (During the same

period, domestic prices fell about 8% a year.)32

By 1995, growers were using conservation tillage techniques on a third of U.S. farm

acreage. Thus, some observers predicted that Roundup domestic sales growth rates would

decline to somewhere between 12% and 15%.33 Nevertheless, Monsanto predicted that overall

Roundup growth rates would continue to exceed 20%, because conservation tillage techniques

had penetrated less than 10% of their potential markets outside the United States.34

**Roundup Ready (RR) Soybeans**

By 1995 Monsanto had spent close to $1.5 billion on ag-biotech research.35 In 1994,

Monsanto’s investment totaled $57 million, more than twice the $20 million spent by numbertwo

DuPont.36 A significant portion of Monsanto’s research budget was devoted to herbicide

tolerance. Ten years of research and $500 million dollars yielded a new line of Roundup Ready

products that were immune to the effects of Roundup.37 On May 25, 1995, Monsanto received

regulatory approval to begin selling Roundup Ready (RR) soybeans.38 The new soybeans

contained “gene sequences from a cauliflower mosaic virus, a petunia, and Agrobacterium sp.”39

Other RR products expected in the next five years included RR canola, cotton, corn, sugar beets,

and oilseed rape.

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RR soybeans offered several advantages for farmers. First, with the new soybeans, the

farmer could use a single herbicide (Roundup) instead of several selective post-crop-emergent

herbicides. Second, Roundup’s performance was less subject to changes in weather:

Some post-emergent herbicides need rain and others do not. As some Midwestern

growers told us, “You spray and then pray.” In contrast, Roundup does not exhibit

these limitations. Growers know with almost absolute certainty that if Roundup

touches a weed it is effectively eliminated.40

Third, the use of RR soybeans reduced the cost of the farmer’s post-crop-emergent weed

management program:

Assuming it costs $8 to $10 per Roundup application, costs would be as little as

one-half that of Pursuit/Scepter applications. It would be much closer in cost if

two applications of Roundup were required. The use of smaller soybean rows,

fifteen inches to as little as seven to eight inches (versus more traditional thirtyinch

rows) adds to the potential for Roundup use. That means a soybean canopy

forms even faster (choking off weeds sooner).41

If weather conditions forced multiple applications of conventional herbicides, the savings

from RR soybeans increased.42 The benefits could be particularly high in southern states where

growers faced greater weed- and grass-control problems. For example, in Arkansas, test-plot

herbicide costs for RR soybeans ranged from $30 to $48.35 (depending on weed and grass

density), while conventional seeds often required per-acre herbicide applications costing $60 or

more.43 Additional advantages of the RR soybeans included “a wider application window,” “no

herbicide carryover to contaminate groundwater,” and higher yields (as predicted by yield

studies).

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**Seed companies**

Asgrow Seed Company was expected to handle 80% of the 1995 orders for RR

soybeans.45 In 1994, Asgrow had a 10% share of the North American soybean market.46 In

developing Asgrow’s RR soybean seeds, Asgrow scientists screened 4,000 varieties of soybeans

before narrowing their focus to about 10 candidate varieties that satisfied requirements for yield

and resistance to both root and dry stem rot.47 These candidate varieties were the focus of

Asgrow’s initial efforts to apply Monsanto’s new seed technology.

In a December 1994 meeting of the North Central Weed Science Society, a Southern

Illinois University agronomist, who spent three years field-testing Asgrow’s RR soybeans, stated

that farmers could apply double their normal application of Roundup without hurting Asgrow’s

new soybeans. He added, “I don’t think there is any question that farmers can rely on [Roundup]

not to injure their beans.” The agronomist also noted that Roundup was “absolutely outstanding

in controlling annual grasses—as good as anything else on the market.” He also noted that

Roundup controlled “a fairly high number of broadleaf weeds,” adding, “There’s simply no postemergent

herbicide today that offers such a combination.”48

A second licensed seed company was Monsanto’s own Jacob Hartz Seed Co., a regional

soybean supplier based in Arkansas. Hartz planned to harvest about 15,000 acres of RR soybeans

in the fall of 1995, thereby obtaining enough seed for 500,000 50-pound bags of seed (where one

bag would seed about 1.2 acres).49

Other seed companies such as Pioneer Hi-Bred International were planning to market RR

soybeans in 1996. **Exhibit 8** summarizes the financial performance of Pioneer between 1991 and

1994, which was the largest supplier of soybeans in North America with a 16% share. In 1994

Pioneer soybean-seed sales totaled $127.5 million, but some observers estimated that typical

soybean-seed margins ranged from $0.50 to $1 per 50-pound bag.50 In the past, Pioneer had

charged one dollar for every $3 increase in grower productivity.51

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**Pricing proposals**

Monsanto planned to limit the purchase of RR soybeans to farmers who purchased a

license from Monsanto.52 Under one pricing proposal, farmers would pay a per-bag license fee of

$5 and a $5 premium for a 50-pound bag of RR soybean seeds. Thus, farmers would pay a total

premium of $10 per acre.53

A more conservative pricing proposal assumed a total premium of 10%, with Monsanto

receiving at least half of that premium. As **Exhibit 9** reveals, under this assumption, one

investment firm forecasted that Monsanto would receive $6.3 million in RR soybean revenues in

1996, rising to $27.3 million in 1999. This forecast assumed: (1) there were 60 million domestic

acres of soybeans; (2) there was a per-acre cost of $14 for conventional soybean seed; and (3)

there would be a 50% penetration of domestic soybean acreage by 1998.54

**Health and Environmental Concerns**

Although Monsanto conducted almost 1,800 tests to evaluate the safety of RR soybeans,

some scientists were concerned about the transmission of resistance to weeds through crossbreeding.

In addition, consumer groups complained about the potential absence of labels that

identified foods containing genetically engineered products, arguing that consumers had the right

to choose whether or not they would eat such products.

The reaction of European consumers merited special concern. According to the American

Soybean Association, the European Union imported $2.1 billion worth of soybeans in 1994,

about twice as much as the second-largest importer—Japan.55 To increase the probability of

regulatory approval and consumer acceptance in Europe, Monsanto executives were considering

an educational campaign. Possible elements included the distribution of videotapes and

brochures, the formation of coalitions with grower and food-manufacturing associations, and the

sponsorship of press conferences.

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Exhibit 1

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Numbers of Soybean Farms in 1992 by Size and in Key States

**Area Total Farms**

**Number of Farms Harvesting the Specified Acreage**

**1-24 25-99 100-249 250-499 500+**

**U.S.**

381,000

71,027 145,282 98,169 45,967

20,555

***North Central***

Illinois

52,339

7,730 17,836 14,946 8,831

3,347

Indiana

33,568

7,245 12,604 7,777 4,136

1,806

Iowa

59,945

7,334 23,407 19,906 7,579

1,719

Michigan

13,175

3,209 6,066 2,626 921

353

Minnesota

33,581

3,978 12,635 10,801 4,796

1,371

Missouri

26,600

5,138 10,143 6,197 3,257

1,865

Ohio

31,635

7,418 13,227 6,858 2,892

1,240

***Northern Plains***

Kansas

14,743

3,328 6,524 3,138 1,226

527

Nebraska

20,687

3,646 9,161 5,747 1,718

415

North Dakota

2,849

149 878 973 551

398

South Dakota

11,502

775 4,162 4,022 1,846

697

***Southeast***

Alabama

2,065

439 792 507 206

121

Georgia

4,193

815 1,825 991 383

179

Kentucky

7,185

1,866 2,845 1,341 630

503

North Carolina

13,080

5,158 4,470 2,163 827

462

South Carolina

4,015

1,057 1,536 815 364

243

Tennessee

5,232

1,204 1,896 1,047 599

486

***Delta***

Arkansas

7,604

458 1,515 1,689 1,764

2,178

Louisiana

3,903

403 1,025 976 830

669

Mississippi

4,644

541 1,254 1,062 778

1,009

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Exhibit 2

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Per Acre Soybean Production Cash Costs and Returns (1994)

(All figures except yields are in dollars)

**Item**

**U.S.**

**North**

**Central**

**Northern**

**Plains**

**Southeast**

**Delta**

Harvest-period price $5.32 $5.34 $5.01

$5.40 $5.55

Yield (bushels per planted acre) 41.27 43.96 41.16

31.65 31.88

Gross value of production 219.56 234.75 206.21

170.91 176.93

Cash expenses:

Seed 13.84 14.65 13.06

11.81 10.98

Fertilizer, lime, and gypsum 9.25 8.52 2.84

23.73 5.59

Chemicals 24.45 25.63 19.42

23.34 23.61

Customer operations 3.73 4.12 2.45

2.56 3.95

Fuel, lube, and electricity 7.93 6.86 10.58

9.14 11.35

Repairs 10.50 9.72 10.98

12.54 13.54

Hired labor 6.02 4.51 5.09

11.98 12.03

Other variable cash expenses 0.04 0.02 0.21

0.00 0.00

Total variable cash expenses 75.76 74.03 64.63

95.10 81.00

General farm overhead 11.03 12.17 9.30

7.64 8.63

Taxes and insurance 18.69 21.78 14.85

11.05 8.78

Interest 13.17 15.06 12.10

6.11 8.40

Total fixed cash expenses 42.89 49.01 36.25

24.80 25.81

Total cash expenses 118.65 123.04 100.88

119.90 106.81

Gross value of production less

cash expenses

$100.91 $111.71 $105.33

$51.01 $70.12

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Exhibit 3

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

U.S. Conservation Tillage: 1989–1994 (thousands of acres)

**1989 1990 1991 1992**

**1993 1994**

**Soybeans**

Planted acreage

62,749 62,149 62,638 61,243

60,580 62,819

Conservation-till acreage

18,577 16,900 21,171 25,277

29,548 30,166

No-till acreage

4,815 5,992 7,919 11,306

14,977 16,725

**Total Farm Acreage**

Planted acreage

279,654 280,986 281,250 282,909

278,173 283,917

Conservation-till acreage

71,733 71,208 79,152 88,271

97,150 97,475

No-till acreage

14,148 16,862 20,611 28,078

34,825 38,985

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Exhibit 4

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Soybean Herbicide Expenditures

**1987 1988 1989 1990**

**1991**

**1992 1993 1994**

Total herbicide expenditures ($ mil.) 920 935 980 1,020 1,070

1,150 1,196 1,340

Retail herbicide prices (1977 = 1.00) 1.04 1.04 1.09 1.15 1.19

1.20 1.23 1.29

Real growth in herbicide usage (%) (6) 1 0 (1) 1

7 2 7

Total sales growth (%) (9.4) 1.6 4.8 4.1 4.9

7.5 4.0 12.0

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Exhibit 5

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Dollar Market Shares of Leading Post-Crop-Emergent Soybean Herbicides

(Table entries are dollar shares of the entire soybean herbicide market)

**Brand (Manufacturer) 1985 1986 1987 1988**

**1989 1990 1991 1992 1993 1994**

***Broadleaf Herbicides***

Basagran (BASF)

15.0 8.5 8.9 8.9 10.2

8.5 6.9 7.5 5.5 5.6

Blazer (BASF)

5.0 3.0 3.5 2.3 2.4

1.9 1.6 1.5 1.6 1.6

Classic (DuPont)

-- 2.0 1.0 3.0 3.2

4.7 4.0 4.4 5.0 4.0

Cobra (Valent)

-- -- 1.0 0.3 0.2

0.2 0.3 0.5 0.5 0.7

Pinnacle (DuPont)

-- -- -- -- 0.2

1.8 2.1 3.7 4.4 5.0

Pursuit (AHP)

-- -- -- -- 2.0

5.0 9.8 12.8 14.3 16.2

Reflex (Zeneca)

-- -- 0.2 0.3 0.5

0.9 0.8 0.8 0.9 0.9

***G rass Herbicides***

Assure/Assure II (DuPont)

-- -- -- -- 0.4

1.1 1.1 1.7 2.5 2.0

Poast Plus (BASF)

-- -- -- -- --

-- 0.4 2.1 2.3 2.1

Select (Valent)

-- -- -- -- --

-- -- -- 1.0 1.6

Fusilade/Fusilade 2000 (Zeneca)

-- -- 2.8 2.8 2.3

2.3 1.7 1.7 1.7 1.4

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Exhibit 6

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Typical Per-Acre Herbicide Prices to Farmers of Leading Post-Crop-Emergent Soybean Herbicides

**1984 1985 1986 1987 1988**

**1989 1990 1991 1992 1993 1994**

***Broadleaf Herbicides***

Basagran

$15.70

$15.94 $16.13 $10.18 $9.56 $9.80 $11.08 $11.48 $11.81 $12.23 $12.95

Blazer

18.69

19.52 19.71 13.40 12.75 12.79 14.88 15.66 14.43 14.75 15.56

Classic

--

-- 10.55 10.85 7.54 8.00 8.56 8.79 8.75 8.85 9.30

Cobra

--

-- -- 11.81 9.92 9.09 9.50 10.29 10.83 11.38 11.72

Pinnacle

--

-- -- -- -- -- 12.22 13.37 13.50 14.50 15.46

Pursuit

--

-- -- -- -- 17.39 16.56 18.72 18.16 18.74 19.62

Reflex

--

-- -- 10.85 7.75 8.30 9.41 10.83 10.83 11.26 11.55

***Grass Herbicides***

Assure/Assure II

-- -- -- -- -- 12.73 13.75 14.1 8.66 8.75 9.2

Poast Plus

-- -- -- -- -- -- -- 13.41 8.5 8.67 9.28

Select

-- -- -- -- -- -- -- -- -- NA NA

Fusilade/Fusilade 2000

-- 13.87 12.83 15.96 14.46 16.15 17.58 18.43 11.02 11.65 11.84

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Exhibit 7

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Monsanto Revenues, Costs, and Net Income: 1990–94 (in millions)

**Item 1990 1991 1992**

**1993 1994**

Agricultural group (AG) revenues $1,676 $1,711 $1,676

$1,967 $2,224

Chemical group revenues 4,035 3,740 3,705

3,684 3,715

Searle revenues 1,424 1,531 1,503

1,546 1,681

NutraSweet revenues 933 954 879

705 652

Total Monsanto revenues 8,068 7,936 7,763

7,902 8,272

Cost of goods sold (4,787) (4,519) (4,710)

(4,564) (4,774)

Gross profit 3,281 3,417 3,053

3,338 3,498

Marketing expenses (1,113) (1,042) (1,115)

(1,199) (1,191)

Administrative expenses (470) (530) (487)

(548) (589)

Technological expenses (661) (680) (720)

(695) (674)

Amortization (229) (233) (237)

(81) (81)

Restructuring expense -- (457) (436)

(5) (40)

Operating income 808 475 58

810 923

Interest expense (176) (166) (169)

(129) (131)

Interest income 51 64 43

49 81

Other income (expense) 33 (19) (106)

8 22

Pretax income 716 354 (174)

729 895

Taxes (230) (116) (48)

(235) (273)

Net income $486 $238 ($126)

$494 $622

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Exhibit 8

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

Pioneer Hi-Bred International’s Financial Performance: 1991–94

(in millions of dollars)

**Item 1991 1992 1993 1994**

Net sales $1,124.9 $1,261.8 $1,343.4

$1,478.7

Cost of goods sold (489.2) (529.4) (538.0)

(606.0)

Gross profit 635.7 732.4 805.5

872.7

Research & development (8.3) (92.2) (105.2)

(113.7)

SG&A expenses (369.0) (397.2) (421.5)

(457.3)

Operating income $188.4 $243.0 $278.8

$301.7

***Net sales by segment***

Corn $900.5 $1,012.8 $1,077.3

$1,185.3

Soybeans 105.3 109.4 116.6

127.5

Other 119.1 139.6 149.6

165.9

Total sales $1,124.9 $1,261.8 $1,343.5

$1,478.7

***Estimated operating profit by segment***

Corn $257.8 $316.8 $354.5

$383.4

Soybeans 1.6 7.6 7.3

7.5

Other (20.9) (29.8) (24.0)

(21.1)

Total operating profits $238.4 $294.6 $337.8

$369.9

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Exhibit 9

**MONSANTO—THE LAUNCH OF ROUNDUP READY SOYBEANS**

External Forecast for Monsanto Royalties from Roundup Ready Soybeans

**Year Share of Soybean**

**Acreage**

**Millions of Acres planted**

**with RR Soybeans**

**Total**

**RR Royalty**

1996

15% 9 $ 6.3

1997

30 18 12.6

1998

50 30 21.0

1999

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**Glossary of Definitions**

Ag-biotech: agricultural biotechnology, the application of biotechnology to

agriculture (plants and animals)—often refers to the use of

scientific techniques to alter plants’ and animals’ genetic structure.

Agrobacterium sp: a bacterium found in soil

Agronomist: one who specializes in the agricultural dealings with field-crop

production and soil management

Broadleaf: having broad leaves that are not needle-shaped like grasses

Contour plowing: plowing the land in a way designed to minimize soil erosion

Cross-breeding: to interbreed two varieties or breeds within the same species

Cultivate: to loosen or break up soil for use of growing crops

Diffusion: a gradual spreading

Double-cropping: planting more than one type of crop in a given area

Erosion: the removal of land (soil) by natural sources like rain

Foliar herbicide: herbicide that kills on contact with the leaves of a plant

Fungicides: an agent that destroys fungi or inhibits their growth

Genetically engineered: altering of genetic material by intervention in genetic processes

Glyphosphate: generic form of Roundup

Herbicide: an agent used to destroy or inhibit plant growth

Highly erodible land: land highly susceptible to erosion or alterations by natural sources

No-till farming: methods of farming that do not require plowing the land

Pesticide-resistant: not affected by pesticides

Pesticide: an agent used to destroy pests (insects)

Post-crop-emergent: herbicides applied after the crop emerges from the ground

Post-weed-emergent: herbicides applied after weeds emerge from the ground

Pre-crop-emergent: herbicides applied before the crop emerges from the ground

Terracing: leveling of land to reduce natural erosion

Tillage: plowing or turning over soil on farm land

Toxicity: the degree to which something is toxic or poisonous

Truncated: shortened