

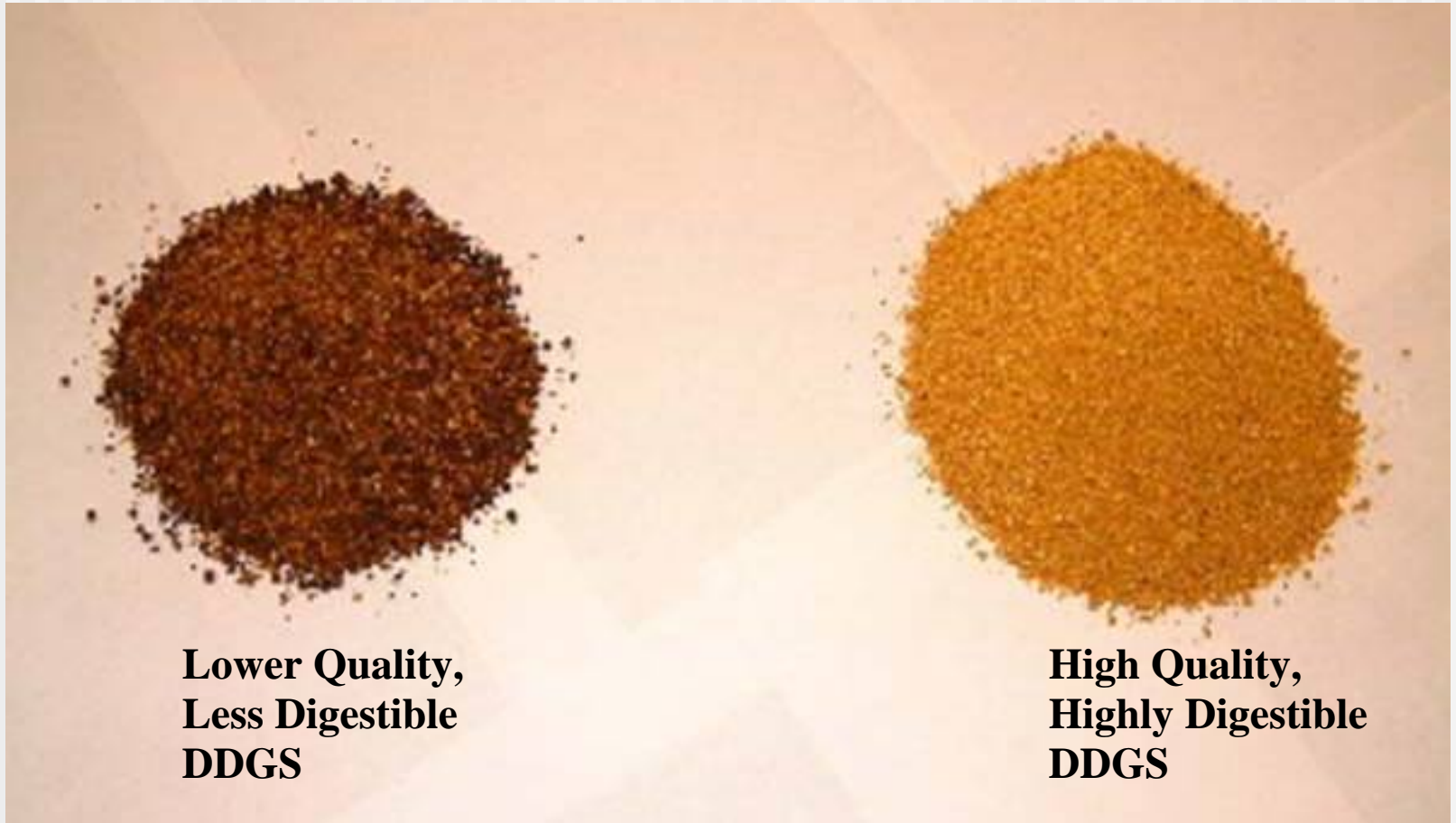
Opportunities for Using DDGS in Livestock and Poultry Feeds in Canada

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“New Generation” vs. “Old Generation” DDGS



**Lower Quality,
Less Digestible
DDGS**

**High Quality,
Highly Digestible
DDGS**

Comparison of Amino Acid Composition of DDGS (88% dry matter basis)

	"New" DDGS	"Old" DDGS	DDGS (NRC, 1998)
Lysine, %	0.75 (17.3)	0.47 (26.5)	0.59
Methionine, %	0.63 (13.6)	0.44 (4.5)	0.48
Threonine, %	0.99 (6.4)	0.86 (7.3)	0.89
Tryptophan, %	0.22 (6.7)	0.17 (19.8)	0.24
Valine, %	1.32 (7.2)	1.22 (2.3)	1.23
Arginine, %	1.06 (9.1)	0.81 (18.7)	1.07
Histidine, %	0.67 (7.8)	0.54 (15.2)	0.65
Leucine, %	3.12 (6.4)	2.61 (12.4)	2.43
Isoleucine, %	0.99 (8.7)	0.88 (9.1)	0.98
Phenylalanine, %	1.29 (6.6)	1.12 (8.1)	1.27

Values in () are CV's among plants

Comparison of Apparent Ileal Digestible Amino Acid Composition of DDGS for Swine (88% dry matter basis)

	"New" DDGS	"Old" DDGS	DDGS (NRC, 1998)
Lysine, %	0.39	0.00	0.27
Methionine, %	0.28	0.21	0.34
Threonine, %	0.55	0.32	0.49
Tryptophan, %	0.13	0.13	0.12
Valine, %	0.81	0.45	0.77
Arginine, %	0.79	0.53	0.77
Histidine, %	0.45	0.26	0.40
Leucine, %	2.26	1.62	1.85
Isoleucine, %	0.63	0.37	0.64
Phenylalanine, %	0.78	0.60	0.96

Comparison of Phosphorus Level and Relative Availability of DDGS for Swine (88% dry matter basis)

	"New" DDGS	"Old" DDGS	DDGS NRC (1998)	Corn NRC (1998)
Total P, %	0.78 Range 0.62-0.87	0.79	0.73	0.25
P Availability, %	90 Range 88-92	No data	77	14
Available P, %	0.70	No data	0.56	0.03

Maximum Inclusion Rates of “New Generation” DDGS in Swine Diets

(Based Upon University of Minnesota Performance Trials)

- Nursery pigs (> 7 kg)
 - Up to 25 %
- Grow-finish pigs
 - Up to 20% (higher levels may reduce pork fat quality)
- Gestating sows
 - Up to 50%
- Lactating sows
 - Up to 20%

Assumptions: no mycotoxins

formulate on a digestible amino acid and available phosphorus basis

Calculating the Value of “New Generation” DDGS in Swine Diets Using Soybean Meal 44%

Additions/1000 kg diet

+ 100 kg DDGS	x	cost/kg	= \$
+ 1.5 kg limestone	x	cost/kg	= \$
TOTAL ADDITIONS (A)			= \$

Subtractions/1000 kg diet

- 88.5 kg corn	x	cost/kg	= \$
- 10 kg SBM (44%)	x	cost/kg	= \$
- 3 kg dicalcium phosphate	x	cost/kg	= \$
TOTAL SUBTRACTIONS (S)			= \$

S - A = Opportunity cost for DDGS/100 kg

Current Livestock and Poultry Industries in Canada

Number of Cattle, Swine, and Poultry in Canada

- 15.55 million cattle and calves
- 13.96 million pigs
- 102.26 million layers and broilers
- 8.59 million turkeys

Source: 2001 Canada Census of Agriculture

Province Ranking of Number of Cattle and Calves on Inventory (2001)

- Total – 15.55 million hd
- 1. Alberta – 6.62 million hd (42.54%)
- 2. Saskatchewan – 2.90 million hd (18.64%)
- 3. Ontario – 2.14 million hd (13.77%)
- 4. Manitoba – 1.42 million hd (9.16%)
- 5. Quebec – 1.36 million hd (8.76%)
- 6. British Columbia – 0.81 million hd (5.24%)

Source: 2001 Canada Census of Agriculture

Province Ranking of Number of Swine on Inventory (2001)

- Total – 13.96 million hd
- 1. Quebec – 4.27 million hd (30.57%)
- 2. Ontario – 3.46 million hd (24.77%)
- 3. Manitoba – 2.54 million hd (18.20%)
- 4. Alberta – 2.03 million hd (14.52%)
- 5. Saskatchewan – 1.11 million hd (8.00%)
- 6. British Columbia – 0.17 million hd (1.18%)

Source: 2001 Canada Census of Agriculture

Province Ranking of Number of Layers and Broilers on Inventory (2001)

- Total – 126.16 million hd
- 1. Ontario – 43.62 million (34.58%)
- 2. Quebec – 29.21 million (23.15%)
- 3. British Columbia – 18.82 million (14.92%)
- 4. Alberta – 12.18 million (9.65%)
- 5. Manitoba – 7.99 million (6.33%)
- 6. Saskatchewan – 4.68 million (3.71%)

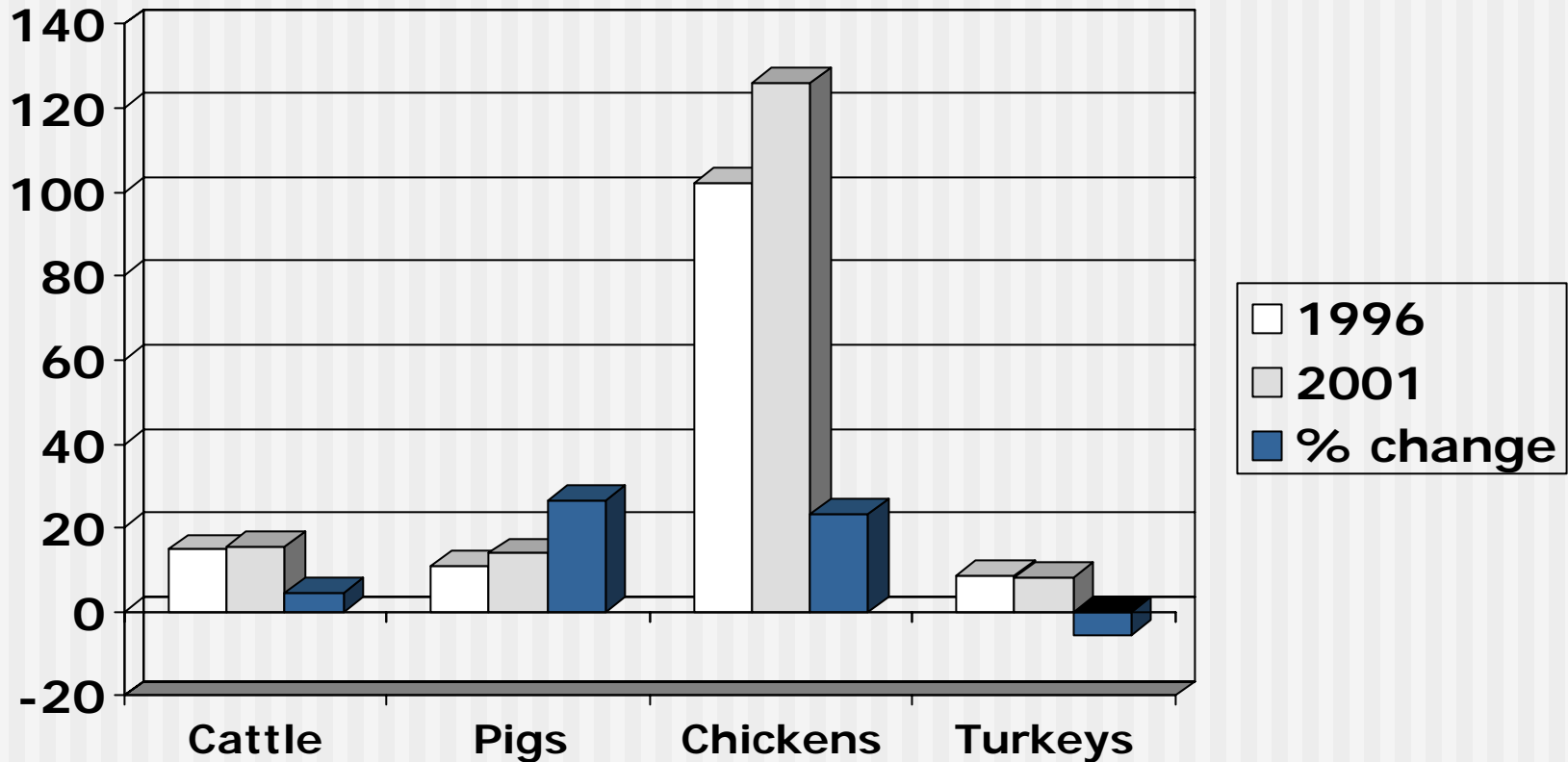
Source: 2001 Canada Census of Agriculture

Province Ranking of Number of Turkeys on Inventory (2001)

- Total – 8.12 million hd
- 1. Ontario – 3.40 million (41.93%)
- 2. Quebec – 1.75 million (21.53%)
- 3. Alberta – 0.86 million (10.65%)
- 4. British Columbia – 0.82 million (10.10%)
- 5. Manitoba – 0.69 million (8.55%)
- 6. Saskatchewan – 0.28 million (3.44%)

Source: 2001 Canada Census of Agriculture

Number and % Change of Cattle, Swine, and Poultry from 1996 to 2001 (million hd)



Source: 2001 Canada Census of Agriculture

Estimated Total Amount of Feed Required in the Canadian Livestock and Poultry Industries

- 23 million metric tonnes
 - Swine – 36%
 - Beef – 29%
 - Dairy – 18%
 - Poultry – 14%
 - Other – 3%

Source: Animal Nutrition Association of Canada, 2000

What If 1% of All Canadian Livestock and Poultry Feeds Contained 10% DDGS?

	Feed Manufactured/Yr (metric tonnes)	DDGS added to 1% of total feed tonnes	DDGS diets contain 10% DDGS
Swine	8,280,000	82,800	8,280 MT
Beef	6,670,000	66,700	6,670 MT
Dairy	4,140,000	41,400	4,140 MT
Poultry	3,220,000	32,200	3,220 MT

Total = 22,310 MT DDGS

Total Number of Commercial Feed Mills in Canada

- Approximately 520 commercial feed mills (vary in manufacturing capacity)
 - Quebec – 34%
 - Ontario – 33%
 - Prairies – 23%
 - British Columbia – 5%
 - Atlantic – 5%

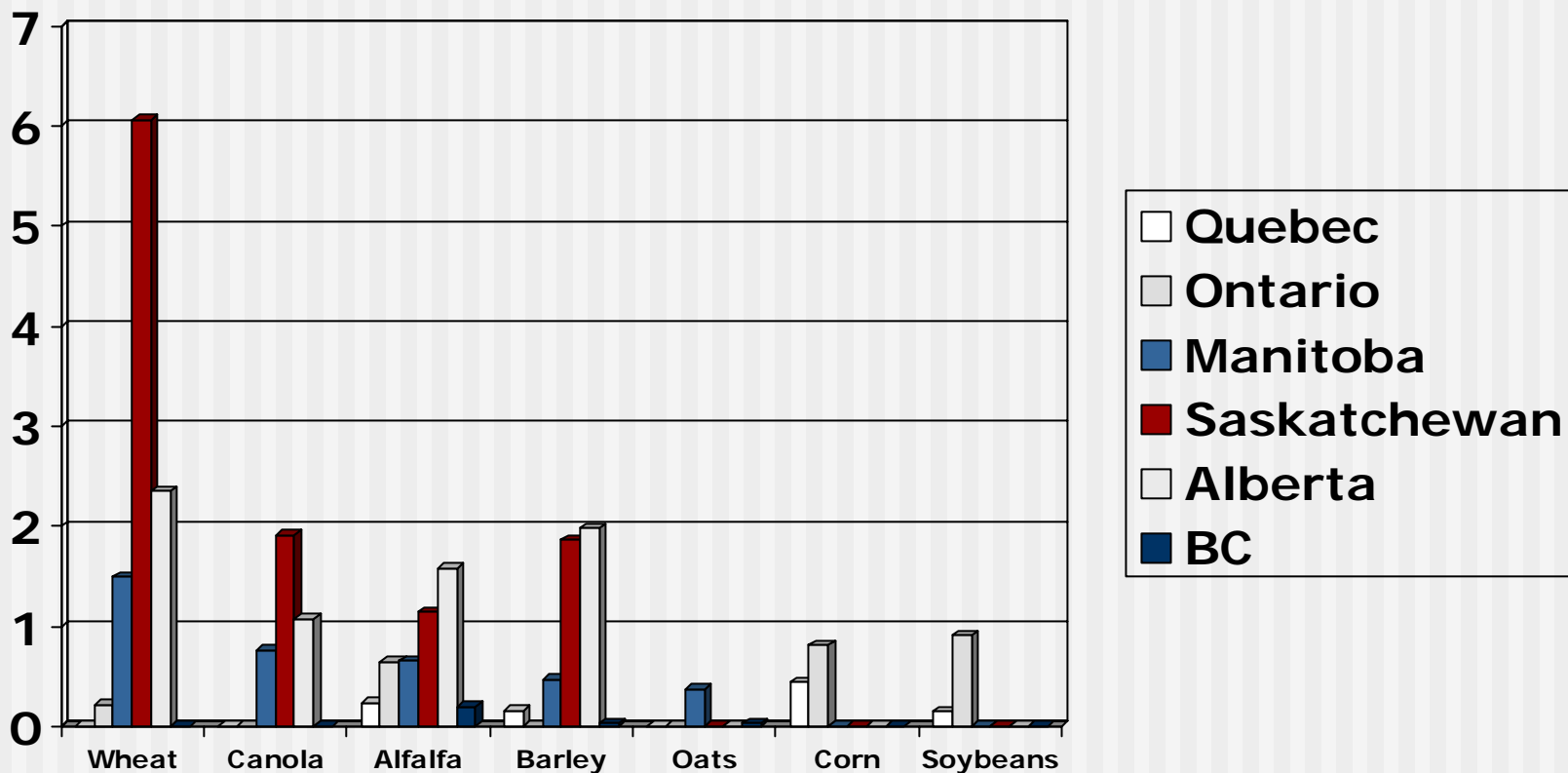
Source: Animal Nutrition Association of Canada, 2000

Primary Crops Produced in Canada

- Spring wheat – 8.3 million hectares
- Barley – 4.7 million hectares
- Alfalfa – 4.5 million hectares
- Canola – 3.8 million hectares
- Other hay and fodder – 2.8 million hectares

Source: 2001 Canada Census of Agriculture

Hectares of Various Crops Produced in Canadian Provinces (millions)



Source: 2001 Canada Census of Agriculture

Future of DDGS Use in Canada

- Corn DDGS will compete with wheat, barley, corn, canola, and soybean meal in livestock and poultry feeds used in Canada
- Limited quantities of wheat DDGS produced in Canada are available to the feed industry
- As the Canadian ethanol industry grows, more wheat and corn DDGS will be available for feeding in Canada
- Lower quality corn DDGS has been used in cattle feeds in Canada for many years

Future of DDGS Use in Canada

- Very little high quality DDGS is currently being fed to swine and poultry
 - Lack of awareness of nutritional value for swine and poultry
- 65% of commercial feed manufactured is for swine and beef cattle
 - Canadian swine and beef industries represent an excellent target export market
 - Good opportunities exist for dairy and poultry also
- Close proximity of northern U.S. ethanol plants to Canada provides a freight advantage compared to other export markets

Issues Regarding DDGS Use in Canada

- Consistency of quality and nutrient content
 - Identify single source
 - Complete nutrient profiles are essential
 - Certification
- Risk of vomitoxin contamination
- Awareness of feeding value of “new generation” DDGS for swine and poultry
- Price, transportation logistics, and storage

Recommendations

- Canadian swine industry represents the largest potential DDGS market followed by beef, dairy, and poultry.
- Educational programs are needed to increase awareness and understanding of the feeding value of “new generation” DDGS to swine and poultry.

Recommendations

- Additional market development efforts are needed in:
 - Ontario
 - 1st broilers and layers
 - 1st turkeys
 - 2nd pigs
 - 3rd cattle
 - Quebec
 - 1st pigs
 - 2nd broilers and layers
 - 2nd turkeys

Recommendations

- A regional or national DDGS certification program is needed to meet the demands of customers in the export market (including Canada).
- Research funding and coordination is needed to answer export customer questions related to DDGS (and fractions) quality and usage.