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THE OSTRICH MARKET



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Highlights

The U.S. ostrich industry is changing rapidly. Over the past nine years a breeder market has expanded the population of ostrich to an estimated 150,000 to 200,000 birds. However, recent price declines in the breeding stock of greater than 50 percent since 1993 indicate the boom period for this market is over.

The future basis for market value will be based upon ostrich meat and other by-products. Due to the small volume of meat products currently entering the market, ostrich is still considered a specialty and novelty item. Ostrich meat is a red meat with beef-like texture and a lower fat content than most other meats. Currently, South Africa dominates the international market for ostrich products, exporting substantial quantities of meat, hide and feathers to the U.S. and other countries.

The future of the ostrich industry depends upon its ability to compete on a cost and quality basis with foreign imports of ostrich products and other sources of meat and hide. This will bring issues of feed-to-meat conversion ratios, economies of size in processing, and promotion of the unique attributes of ostrich products to the forefront.

The Ostrich Market

Rebecca L. Leitch and William C. Nelson¹

Introduction

The U.S. ostrich industry has been in the breeder market stage for the past seven to nine years and only recently has begun to move to the slaughter market stage (Spencer 1995). The breeder market has expanded domestic ostrich numbers to an estimated 150,000 to 200,000 birds, although no official census has been taken. The primary market for ostrich over the last nine years in the United States has been other producers interested in raising ostrich. During 1993, the quantity demanded for breeders peaked and has now downturned with an increase in quantity demanded for slaughter products in the U.S., including red meat and leather (Lakey 1995). In other words, the breeder market has reached maturity while the slaughter market is in its infancy.

Meat, leather and feathers are the three main products marketed from ostrich. Ostrich meat is sold in a number of "white table cloth" establishments where an ostrich entree generally commands \$20 to \$30. Ostrich is a red meat with beef-like texture that has been found to be lower in fat than other meats. However, the cholesterol level in ostrich meat is similar to levels in beef and chicken (Texas Agricultural Extension Service 1994). Ostrich leather is considered one of the highest quality leathers. Worldwide quantity demanded for ostrich hides at current prices is not expected to exceed 300,000 hides a year (Spencer 1995). Ostrich feathers are used in the feather duster industry, the electronics industry, and the automobile industry. However, domestic quantities of ostrich feathers are not sufficient and feathers must be imported.

Diligent efforts on the part of marketers are vital for the ostrich slaughter market to be successful. The low fat benefits of ostrich meat will take time to imprint on consumers, and it may take time before American consumers readily accept ostrich meat. "American consumers, on the whole, are not as adventuresome when it comes to eating as are European consumers" (Spencer 1995). Furthermore, ostrich meat must be competitively priced to compete with other packaged meats (ham, turkey, chicken, etc.) currently marketed as 97 percent fat free.

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Processors believe the quantity of ostrich meat demanded will increase once meat prices decline and consumers recognize the low fat benefits of ostrich. Some see ostrich meat becoming a supplement or blender meat for beef. Others believe a retail price decline of at least 25 percent is necessary before consumers will purchase ostrich. Domestic ostrich numbers need to continue to expand in order to provide sufficient numbers for a successful slaughter market. However, failure to effectively market ostrich meat and by-products may result in a glut of birds available for slaughter without a market outlet (Spencer 1995).

Purpose

The purpose of this study is to describe domestic and international markets for ostrich meat and ostrich by-products. Specific objectives are to:

- determine the extent of international trade of ostrich meat and ostrich by-products between the U.S. and the rest of the world,
- determine domestic quantities supplied and quantities demanded of ostrich meat and ostrich by-products,
- identify export opportunities,
- collect price and quantity data, and
- identify marketing channels.

Researching the ostrich market by identifying marketing channels and collecting market data will help North Dakota ostrich producers evaluate the ostrich market, allowing them to better compete in growing world markets.

Procedure

A list of 22 U.S. ostrich meat processors was obtained from the American Ostrich Association (AOA). This list provided names of meat suppliers who had contacted the American Ostrich Association; however, this list was not inclusive of all ostrich meat suppliers in the U.S. The AOA also provided the names of two feather firms that market ostrich feathers. In addition, the names of two ostrich leather firms were obtained through advertisements in *American Ostrich*. Once contacted, the owner or manager of each firm was questioned about their operation and the ostrich industry.

Response

Sixteen of the 22 meat processors, both leather processors and both feather firms were contacted and questioned. The American Ostrich Association and a regional American Ostrich Association affiliate were also contacted.

Markets - Supply, Demand & Channels

No published data are available on the amount of ostrich meat or by-products being processed domestically nor on imports to or exports from the United States. The USDA assigns harmonizing codes to commodities as a tracking mechanism to record international trade movements. According to the USDA Foreign Agricultural Service, agricultural products or commodities cannot be assigned a harmonizing code unless the product or commodity generates at least \$1 million in trade (Carter 1995). No harmonizing codes have been assigned to ostrich meat or by-products (Downing 1995).

Many of the processors contacted for this research had been in business only a short time and could not provide estimated annual processing figures. Eight of the 16 processors provided annual processing numbers ranging from 100 birds/year/processor to 5,000 birds/year/processor. Two respondents were exporting ostrich meat while two were importing ostrich meat. The domestic market for ostrich meat includes up-scale restaurants, grocery stores, direct sales and mail order.

Breeding Stock

The domestic ostrich industry has been a breeder market for the past seven to nine years, expanding flock size to an estimated 150,000 to 200,000 birds with breeders buying and selling birds to and from one another rather than selling birds for slaughter. The industry is now in the initial stages of a slaughter market.

Prices for breeding stock have fallen substantially during the past two years, leading to a convergence of breeder market prices and slaughter market prices (Table 1). Fertilized eggs, selling at an average price of \$625/egg in 1993, now average only \$307/egg, a 51 percent price decline. Larger price declines have occurred in the day-old chick and breeding pair markets. However, when compared to the average live weight value of slaughter birds (\$709), the average price received for breeding pairs (\$20,304) can be expected to continue to fall for some time.

Table 1. Prices of fertilized eggs, day-old chicks, and breeding pairs and percentage change, 1993, 1995.

	1993 Prices	1995 Prices^a	% Change
Fertilized eggs	\$1,250/pair ^b	\$307 each ^c	51% ↓
Day-old chicks	\$1,500 each	\$370 each ^d	75% ↓
Breeding pairs	\$50,000-\$75,000	\$20,304 ^e	59%-73% ↓

^a Based on responses of five participants plus prices advertised in **American Ostrich**. Mid-range values are used for price ranges. Averages may not reflect individual producer prices.

^b Price of a single egg is assumed to be \$625.

^c Range: \$50-\$350

^d Range: \$200-\$500

^e Average value of advertised prices is \$19,108/pair with a range of \$9,000-\$27,500. Average value of respondent prices is \$21,500 with a range of \$10,000-\$50,000. Overall breeding pair price range is \$9,000-\$50,000 with only one respondent giving a price greater than \$30,000/pair.

Source of 1993 prices: NDSU Extension Service Alternative Agriculture Series, Number 11, **Ostrich**, 1993.

Without a successful slaughter market and effective marketing, breeders can only continue to market birds to one another, and eventually the market will be saturated with breeders. A majority of the ostrich meat processors interviewed for this study agreed that there is a need for ostrich producers to sell more birds for slaughter even if the returns are less than returns from selling birds as breeders. Some experts suggest culling breeding stock that do not perform up to standards (Angel 1995). Others suggest culling excess males from the flocks for slaughter before they reach the age of three years, when the quality of their meat declines (Deeming 1995).

Infertile eggs have some value for ostrich producers. A small hole is drilled in each end of the egg, and the yolk is blown out. These egg shells can then be sold for around \$20 each. Shells are used in crafts and are either painted or carved (Marchello 1995).

Meat

Ostrich meat is gradually becoming recognized as an alternative red meat that is lower in fat than beef or chicken. A study of the nutrient composition of ostrich meat conducted by Texas A&M University found the cholesterol level in ostrich meat to be similar to USDA figures reported in beef and chicken (Texas Agricultural Extension Service 1994). However, the Texas A&M University study examined meat cuts from ostrich muscle groups that

do not directly correspond to the beef muscle groups examined by the USDA, which may impact results (Marchello 1995).

The quantity of ostrich meat demanded by restaurants is growing steadily (Lakey 1995). Also, the low fat benefits of ostrich meat have led to an increase in quantities demanded. However, reluctance on the part of producers to sell birds for slaughter, coupled with these increases in quantities demanded, have driven ostrich meat prices upward.

Some processors import ostrich meat to supplement domestic quantities. Dr. Raleigh A. Jobs of Oklahoma State University, Department of Agricultural Economics, estimates that if just half the population of the United States ate one 7-ounce ostrich steak per year, it would take 1,000,000 commercial birds per year to meet the demand (Farris 1995), an amount that domestic suppliers cannot provide. High ostrich meat prices have held consumption levels down although processors would prefer to see consumption increased. Slaughter numbers must increase and meat prices decline before consumers will increase their ostrich meat purchases.

Processors interviewed for this research project believe quantities demanded of ostrich meat and by-products will increase in the future. However, two critical factors are limiting quantity demanded: the high price of ostrich meat and consumer awareness. "If price can be lowered, the quantity demanded will increase tremendously, even exponentially," say processors.

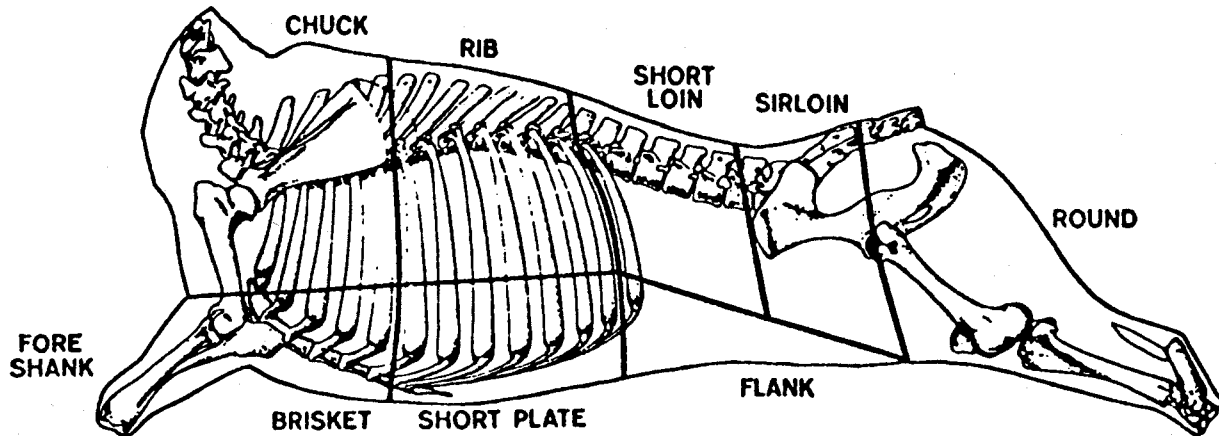
When asked what they thought should be done to increase quantities demanded, processors overwhelmingly suggested lower prices and consumer awareness. They suggested that all parties involved with the industry need to make a concerted effort to introduce the product to consumers. Many agreed that the American Ostrich Association needs to be more aggressive in its consumer awareness efforts. Several suggested that a check-off system may be beneficial for promotion.

Domestic Markets

The majority of interviewed meat suppliers market their meat to up-scale restaurants in larger cities. Several are marketing to specialty grocery stores and by direct sales and mail order to individuals. One supplier was marketing meat to a hotel/motel chain restaurant. A full range of meat cuts are being produced, including premium cuts such as steaks or filets, roasts, and ground burger and patties. Further processed products include summer sausage, salami, ham, Polish sausage, stir fry, stew meat, jerky, hot dogs, snack sticks, tenderloin strips, and pepperoni.

Beef cuts that are comparable to ostrich meat are found in the round, sirloin, and short loin cuts of a beef carcass (Figure 1) (Marchello 1995). Wholesale and retail prices of meat cuts and value-added meat products from both ostrich and beef are compared in Table 2 using price information from respondents, the USDA, and several local meat processors and grocery stores.

Figure 1. Wholesale cuts of beef and their bone structure.



Source: National Live Stock and Meat Board. Lessons on Meat. Chicago, IL.

Most processors sell their meat products wholesale and were unable to provide retail prices. The wholesale price of ostrich steaks, premium cuts, or filets ranges from about \$7.00 to \$23.50/lb. (Table 2). Retail prices range from \$24.00/lb. to \$35.00/lb. Wholesale prices for ostrich burger range from \$5.00 to \$16.00/lb. while retail prices range from \$6.00/lb. to \$16.00/lb. Wholesale prices for ostrich roast and summer sausage range from \$15.00/lb. to \$20.00/lb. and \$12.50/lb. to \$16.00/lb., respectively.

Table 2. Wholesale and retail prices for various cuts of ostrich meat and beef, May 1995.

Cut/product	Ostrich		Beef	
	Wholesale price	Retail price	Wholesale price ^b	Retail price ^b
	- - - - - \$/lb. - - - - -			
Premium cuts ^a	Avg.=20.94 Range 7.00-23.50	Avg.=26.33 Range 24.00-35.00	Avg.=2.76 Range 1.04-6.90	Avg.=5.16 Range 2.59-9.99
Roast	Avg.=18.00 Range 15.00-20.00	NA	Avg.=1.35 Range 1.04-1.97	Avg.=2.98 Range 2.49-3.69
Burger	Avg.=10.50 Range 5.00-16.00	Avg.=11.67 Range 6.00-16.00	Avg.=1.24 Range 1.19-1.29	Avg.=1.65 Range 1.19-2.29
Summer Sausage	Avg.=14.38 Range 12.50-16.00	NA	Avg.=1.84 Range 1.59-2.09	Avg.=2.85 Range 1.89-5.00
Salami	Avg.=14.50 Range 14.00-15.00	NA		
Polish sausage	Avg.=12.75 Range 12.50-13.00	NA		
Ham ^c	16.00	NA		
Stir fry ^c	17.00	NA		
Stew meat ^c	14.00	NA		
Jerky ^c	36.00	NA		
Snack sticks ^c	16.00-32.00	NA		
Tenderloin strips ^c	21.00	NA		
Pepperoni sticks ^c	24.00	NA		

^a Includes steaks and filets.

^b Based on responses of six local meat processors and six local grocery stores. Wholesale prices of premium cuts and roasts based on statistics from Livestock Market News Weekly Summary and Statistics, Livestock and Seed Division, U.S. Department of Agriculture, Washington, D.C., week ending May 6, 1995, boxed, fabricated beef cuts.

^c One respondent.

Average live weight of a typical slaughter bird is 213 pounds. Birds are slaughtered at an average age of about 14 months. Live weight prices received by producers average \$3.33/lb. and range from \$3.00/lb. to \$3.50/lb., resulting in an average live weight value for slaughter birds of \$709/bird. In comparison, the weekly average live weight price for beef was \$0.67/lb. for the week ending May 6, 1995 (U.S. Department of Agriculture 1995).

Many processors prefer purchasing birds on a hanging carcass weight basis since some birds have excess fat that processors want trimmed before making a purchase. The hanging carcass includes only useable meat and the bones. Average hanging carcass price of ostrich is \$5.22/lb. with a range of \$3.75/lb. to \$7.00/lb. This compares to a weekly average hanging carcass price of \$1.06/lb. for beef (week ending May 6, 1995) (U.S. Department of Agriculture 1995).

Carcass weight of an ostrich is generally about 59 percent of live weight. On a live weight basis, 58.59 percent of an ostrich is in the form of carcass (lean, fat and bone), 7.04 percent is hide, 1.85 percent is feathers, and the remaining 32.52 percent includes blood, wings, feet, tail, head, heart, lungs, trachea, gizzard, liver, viscera, abdominal fat, kidneys, testis, ovaries, and sternum plate. The knife-separable portions of the carcass consist of 62.4 percent lean, 9.2 percent fat and 26.9 percent bone (Texas Agricultural Extension Service 1994).

Exports

Requests for ostrich meat in European and Asian countries are greater than worldwide production at this time. The low fat benefits and palatability of ostrich meat have been more readily accepted in foreign countries than in the United States. American consumers, it seems, are not as adventuresome as foreign consumers, especially the Europeans, when it comes to trying new foods (Spencer 1995).

There are few processors exporting ostrich meat from the United States. Only two of the 16 meat suppliers contacted for this research were exporting ostrich meat. This is partly because ostrich meat must be USDA inspected and approved before most foreign countries will import, and most ostrich meat processors in the U.S. are state inspected. Other meat processors that are USDA inspected are interested in developing the domestic market before turning to exports, and still others are in the process of establishing export markets. As of the end of January 1995, there were 10 USDA approved ostrich packing plants in the U.S. (Ball 1995). Exports of the two exporting firms participating in this

study ranged from small quantities per processor per year used to introduce the product in other countries to a maximum of 2,000 pounds per processor per year.

According to participating processors, foreign markets for ostrich meat are dominated by the South African ostrich industry. The South Africans are able to produce and process ostrich meat at a lower cost because of low labor and feed costs. Many processors believe the United States cannot compete in the world ostrich market with current production and processing costs. The world market price of ostrich meat is estimated to be about \$8.00/lb., a price at which domestic processors cannot cover costs. On the other hand, some processors believe the United States will be able to compete with South Africa once the industry has matured. They also believe U.S. domestic meat is of higher nutritional quality and the birds are larger because of higher quality feeds and better production technology.

The two exporting processors participating in this study use air cargo for their shipments, and the meat is shipped raw and frozen. Shipping rates vary by country, and the party to pay for shipping is negotiated with each purchase. Exporters prefer to receive prices around 10 to 15 percent higher than domestic prices. Although no official trade statistics exist for ostrich, study participants, whether currently exporting or not, listed foreign countries and areas that are currently importing ostrich meat from the U.S. These countries include Japan, Canada, South Africa, several other Asian countries, and some European countries. Potential target export countries include France, Austria, Belgium, Australia, Germany, Taiwan, New Zealand, Korea, other Asian countries, and other European countries.

Those participants exporting or attempting to export were asked how they made their export connections. Only one had received any information from the Department of Commerce. Most others had made attempts to develop export markets on their own. These efforts consisted of contacting importers either directly or through personal connections. Other processors had been contacted by importers. Several had hired marketing companies or brokers to develop export markets for them. One firm was contacted by an export company that received their name from the American Ostrich Association, and one firm had a representative stationed in a foreign country to introduce the product and develop export markets.

Many attempts to export ostrich meat have been unsuccessful because of high prices and insufficient domestic supply. Processors agreed overall that the domestic ostrich market needs to develop before the U.S. can be competitive in the world market.

U.S. ostrich numbers need to expand, meat prices decline, costs of production lowered, and consumers made aware of the health benefits of ostrich meat. Once the domestic industry has matured, the U.S. will be in a better position to compete internationally.

U.S. Imports

Most of the processors contacted raise their own birds in addition to purchasing birds from other domestic ostrich producers. However, two of the meat processors contacted import meat from South Africa or Australia. Reasons given for importing meat were:

- insufficient domestic production for quantity demanded,
- imported meat is cheaper than processing domestic birds,
- started importing meat many years ago, when domestic meat was not available, and have stayed with it.

Import quantities of the two importing processors ranged from 7½ tons/year for one processor to 30 tons/year for the other.

Respondents indicated that only certain cuts of meat may be imported into this country and that meat from South Africa also must be precooked. This is a precaution to protect domestic flocks from Newcastle disease, which exists in Africa. Newcastle disease is a destructive virus disease of birds and especially domestic fowl that involves the respiratory and nervous systems. It is spread by direct or close contact among the birds. The disease may also be spread by close contact with fowl after handling raw meat, or the disease may be picked up by wild birds and transmitted to domestic birds (Berg 1995). Newcastle disease is not present in U.S. ostrich flocks, so meat exported from this country can be shipped uncooked.

Hide

Ostrich leather is said to be one of the finest, most durable leathers and is considered by one participating leather firm to be the "Cadillac" of leather. About 30,000 ostrich hides are used each year in the U.S. boot and shoe industry. Ostrich leather is also popular in the fashion and fashion accessory industries. Items made from ostrich leather include boots and shoes, watch bands, wallets, coin purses, brief cases, make-up bags, jackets, belts, and other fashion accessories. One of the two leather firms contacted for this study imports 10,000 to 14,000 hides per year from South Africa. The main reason given for importing hides was insufficient quantity of domestic hides.

Most ostrich processors sell their brine-cured hides to a tannery or a leather clothing/footwear manufacturer. Some have entered into joint-venture agreements with tanneries to market tanned hides. Others tan and market the hides on their own. Still others return the hides to the ranchers who sold the birds for slaughter. No hides were being exported by the meat processors contacted for this research, although several mentioned that manufactured leather products were exported by the leather processors who purchased their hides.

Hide prices received by producers vary depending on hide size and quality (Table 3). Hides generally come in three sizes: 10 to 12 square feet, 13 to 15 square feet, and 15 or more square feet. Hides 13 square feet or larger are requested most by boot manufacturers since three or more pairs of boots can be made from each hide.

Table 3. Producer prices for cured ostrich hides and retail prices of tanned ostrich leather by size and grade.

	Ostrich Leather Grades		
	One	Two	Three
Producer Prices	- - - - - \$/sq. ft. - - - - -		
10-12 sq. ft. size	10	8	6
13-15 sq. ft. size	12	10	8
15 or more sq. ft. size	15-20	12-16	10-12
Wholesale Prices (tanned)	36-40	32-33	30

Based on responses of 13 participants.

Ostrich leather is graded for quality on a scale of one to three. Grade one is the highest quality and has no holes per test panel. Grade two has no more than two holes per panel of hide and grade three has no more than three holes per test panel. Holes in the hide result from the skinning process or injuries to the birds.

In comparison, the average price for tanned cow hide is about \$3.00/sq. ft. with a range of about \$1.00/sq. ft. to \$4.25/sq. ft. (U.S. Hide, Skin and Leather Association 1995). Cattle leather prices vary by quality, weight, and tanning process. Cow hides average 45 square feet in size with a range of 30 to 60 sq. ft. and have an average weight of 49 pounds (Montana Export Company 1980). The weekly average price of cured cow hides is about \$96.23/cwt. or about \$1.05/sq. ft. (week ended May 6, 1995) (U.S. Department of Agriculture 1995).

Exports

According to participating leather firms, the world ostrich leather market is presently dominated by South Africa. About 96 percent of all ostrich hides come from South Africa and are distributed on an allotment system. The U.S. receives one-third of the exported hides, Asia receives one-third, and Europe receives the remaining one-third. Leather firm owners/managers participating in this project believe that once the domestic ostrich slaughter market expands, the U.S. will be able to capture leather market share from South Africa. Leather processing techniques in the United States have improved to make leather of the same or better quality than South African leather. Countries that currently import manufactured ostrich leather products include Thailand, Korea, Switzerland, and Germany. Potential target export countries include other European and Pacific Rim countries.

Feathers

The two U.S. feather firms contacted for this project indicated that the quantity of U.S. produced ostrich feathers is not sufficient for domestic uses. The majority of ostrich feathers used in the U.S. come from South Africa. Feathers are used in the womens' fashion industry and the costume industry (Las Vegas, Disney, Mardi Gras, etc.) as well as in other industries. According to the participating feather firms, ostrich feathers have a unique dust magnetism characteristic that is found in no other type of feather and for this reason are desired in the feather duster, electronics, and automobile industries. The electronics industry uses ostrich feathers to remove dust from micro chips and computer components, while the automobile industry uses the feathers to remove dust particles from automobile bodies before painting.

Several of the meat processors participating in this study indicated they had been contacted by feather companies, but that they did not have sufficient volume of feathers to supply these firms. Adding to the insufficient domestic quantity of ostrich feathers is the fact that most ostrich producers do not harvest feathers from the birds. Feathers can be harvested from the birds by plucking, a practice used in South Africa. However, one respondent indicated that for humane reasons, he did not harvest feathers in this manner. He commented, "Why do that to the birds when there isn't a market for the feathers anyway?"

Ostrich feathers must be cleaned and sorted to be marketable. Cleaning needs to be done soon after the feathers are removed, especially if the feathers are contaminated with blood. Feather

cleaning is a very labor intensive process and in many cases is not profitable for ostrich producers or processors. For this reason, most feathers from domestic birds are either destroyed or put into storage.

Feathers imported from South Africa are cleaned and sorted by low cost local labor prior to shipment. When asked if they would consider purchasing soiled feathers from domestic producers, responding feather firms said they might consider it. However, they would likely ship the soiled feathers to South Africa to be cleaned and sorted at lower cost. With the ready supply of cleaned and sorted feathers from South Africa, feather firms have not found it necessary to purchase soiled and unsorted domestic feathers.

One feather firm purchases feathers from South Africa, then markets them in Brazil in direct competition with South Africa. Purchase prices of imported feathers ranges from \$20/lb. to \$150/lb. depending on quality. Wholesale or retail prices of feather products were not provided by participating feather processors.

Costs of Production

Few people outside the meat and livestock industry understand that it is difficult to make a profit raising livestock or producing meat. Most livestock and meat producers operate under low profit margins and must continually incorporate new technology to increase efficiency (Morris 1995). The key cost components of an ostrich operation include the birds, shelter, feed, labor, health, equipment, and cost of money (Angel 1995). As previously mentioned, the cost for breeder birds has been declining (Table 1). Since prices received for slaughter birds are much lower than prices received for breeder birds, other costs of production will also need to decline if ostrich enterprises are to be profitable as the industry moves into the slaughter phase.

Several of the ostrich processors participating in this project believe American ostrich producers cannot compete with the low cost operations of South Africa. South African producers have ready access to low cost labor and also use less costly, lower quality feeds. However, feed quality is one area where domestic producers believe they may have a competitive advantage in ostrich production. They use higher cost but higher quality feeds, which they believe results in higher quality birds, meat and by-products.

The following economic and cash flow budgets for three alternative ostrich enterprises provide costs of production and

possible cash flow expectations. The three alternative enterprises are as follows:

- Enterprise A: sale of fertilized eggs and day-old chicks
- Enterprise B: sale of day-old chicks
- Enterprise C: chicks raised and sold for slaughter

All three enterprises assume 50 percent external financing (debt) at 9.5 percent interest with an opportunity cost of equity capital of 5 percent. All fixed assets are depreciated over 10 years. While assets are depreciated over 10 years for tax purposes, their useful life may be much longer. Maintenance costs could be used to reflect ownership costs of assets which do not depreciate in real terms.

Ownership costs in the economic budget include opportunity costs of equity capital (5 percent) in addition to interest costs. The cash flow budget includes only interest owed on debt capital. All budgets are based on a per breeding pair basis. Labor requirements for each enterprise may vary depending on handling facilities and equipment. For example, an automatic waterer would cut down on the labor required for watering. All returns are presented on a pre-tax basis and costs of production will vary by operation. Day-old chicks are assumed to subsist for 24 hours on the yolk sac, after which time they are sold. Consequently, starter-grower feed costs are not included in Analysis A or B.

Assumptions for Enterprise A are as follows:

eggs collected per hen (#)	40
hatching rate (%)	88
fertilized eggs sold (#)	17
fertilized eggs shipped (#)	8
day-old chicks sold (#)	18
day-old chicks shipped (#)	0
selling price per fertilized egg (\$)	307
selling price per day-old chick (\$)	370
breeding pair value (\$)	20,304
building value (\$)	27,500
fencing value (\$)	1,000
equipment value (\$)	27,770

Budgets for Enterprise A are shown in Table 4. The economic budget for Enterprise A shows that returns to management and risk are negative, an indication that for enterprises with the given production costs, returns will not exceed all costs in the long run. For example, only if operators were willing to accept less for their labor and were able to extend the life of fixed assets to 20 or 30 years to lower depreciation would the enterprise be

profitable. The positive cash flow returns indicate that producers could meet cash obligations with the costs and returns of this budget. The break-even price for the cash flow budget, assuming sales of only fertilized eggs, is \$185.42 per egg. The egg price necessary for break-even in the economic budget is \$477.63 per egg.

Table 4. Economic and cash flow budgets for a breeding pair of ostriches with sales of fertilized eggs and day-old chicks, North Dakota, 1995^a.

	Economic	Cash Flow
Returns	- - - Per Pair - - -	
Fertilized eggs--17 @ \$307 each	\$5,219	\$5,219
Day-old chicks--18 @ \$370 each	<u>\$6,660</u>	<u>\$6,660</u>
Gross revenue	\$11,879	\$11,879
Variable costs		
Feed and supplements	\$909	\$909
Worming, identification, & pest control	\$120	\$120
Sand	\$15	\$15
Utilities and fuel	\$1,300	\$1,300
Labor @ \$7.00/hour	\$2,562	xxxxxxx
Shipping--eggs	\$44	\$44
Interest	<u>\$237</u>	<u>\$113</u>
Total variable costs	\$5,188	\$2,502
Fixed Costs		
Building ownership	\$1,994	\$1,306
Fencing ownership	\$73	\$48
Equipment ownership	\$2,013	\$1,319
Depreciation on fixed assets	\$5,627	xxxxxxx
Breeding pair ownership	\$1,472	\$964
Insurance	<u>\$350</u>	<u>\$350</u>
Total fixed costs	\$11,529	\$3,987
TOTAL LISTED COSTS	<u>\$16,717</u>	<u>\$6,490</u>
Returns over variable costs	\$6,691	\$9,377
Returns to management and risk	-\$4,838	xxxxxxx
Cash flow ^b	xxxxxxx	\$5,389

^a Figures rounded to the nearest dollar.

^b Returns to operator labor & management, owner equity, & risk (excludes depreciation).

Source: Jenison Ostrich, Plume Crazy Ostrich Ranch, Harwood, ND, 1995 and Jobes, Raleigh A., An Economic Analysis of a Commercial Ostrich Production System, 1995

The budgets for the sale of only day-old chicks are calculated in Enterprise B. Assumptions for Enterprise B are as follows:

eggs collected per hen (#)	40
hatching rate (%)	88
day-old chicks sold (#)	35
day-old chicks shipped (#)	0
selling price per day-old chick (\$)	370
breeding pair value (\$)	20,304
building value (\$)	27,500
fencing value (\$)	1,000
equipment value (\$)	27,770

Economic and cash flow returns for sales of day-old chicks are similar to those for sales of a combination of eggs and chicks, as in Enterprise A (Table 5). Returns to management and risk are once again negative, while cash flow figures are positive. The break-even price for the cash flow budget of day-old chicks is \$184.61 per chick while the break-even price for the economic budget is \$476.80 per chick.

Enterprise C analyzes raising the chicks from one breeding pair to slaughter age and selling birds at slaughter prices of \$3.33/lb., \$4.00/lb. and \$6.50/lb. Assumptions for Enterprise C are as follows:

eggs collected per hen (#)	40
hatching rate (%)	88
chicks raised to slaughter (#)	35
transport costs per loaded mile (\$)	1.50
average miles transported (#)	275
breeding pair value (\$)	20,304
building value (\$)	42,500
fencing value (\$)	3,500
equipment value (\$)	27,834

Budgets for Enterprise C are shown in Table 6. Negative returns to all economic costs occur at slaughter prices of \$3.33 per pound (current average price) and \$4.00 per pound. Again, cash flow balances are positive at these prices. If operators were willing to accept lower returns to their labor and were able to obtain substantial extension of the useful life of fixed assets, their returns to management and risk may be positive.

Both the economic and cash flow budgets for the sale of slaughter chicks in Enterprise C show positive returns with a slaughter price of \$6.50 per pound (Table 6): The slaughter price needed for break-even in the cash flow budget is \$2.39 per pound and \$4.44 per pound for break-even in the economic budget.

Table 5. Economic and cash flow budgets for a breeding pair of ostriches with sales of day-old chicks, North Dakota, 1995^a.

	Economic Budget	Cash Flow Budget
Returns	- - - Per Pair - - -	
Day-old chicks--35 @ \$370 each	<u>\$12,950</u>	<u>\$12,950</u>
Gross revenue	\$12,950	\$12,950
Variable costs		
Feed and supplements	\$909	\$909
Worming, identification, & pest control	\$138	\$137
Sand	\$15	\$15
Utilities and fuel	\$1,300	\$1,300
Labor @ \$7.00/hour	\$2,562	xxxxxxx
Interest	<u>\$235</u>	<u>\$112</u>
Total variable costs	\$5,159	\$2,474
Fixed Costs		
Building ownership	\$1,994	\$1,306
Fencing ownership	\$73	\$48
Equipment ownership	\$2,013	\$1,319
Depreciation on fixed assets	\$5,627	xxxxxxx
Breeding pair ownership	\$1,472	\$964
Insurance	<u>\$350</u>	<u>\$350</u>
Total fixed costs	\$11,529	\$3,987
TOTAL LISTED COSTS	<u>\$16,688</u>	<u>\$6,461</u>
Returns over variable costs	\$7,791	\$10,476
Returns to management and risk	-\$3,738	xxxxxxx
Cash flow ^b	xxxxxxx	\$6,489

^a Figures rounded to the nearest dollar.

^b Returns to operator labor & management, owner equity, & risk (excludes depreciation).

Source: Jenison Ostrich, Plume Crazy Ostrich Ranch, Harwood, ND, 1995 and Jobes, Raleigh A., An Economic Analysis of a Commercial Ostrich Production System, 1995

Table 6. Economic and cash flow budgets for a breeding pair of ostriches with sales of slaughter chicks, North Dakota, 1995^a.

	Economic	Cash	Economic	Cash	Economic	Cash
Slaughter Price/Lb.	- - - \$3.33 - - -		- - - \$4.00 - - -		- - - \$6.50 - - -	
Returns	- - - - -		Per Pair - - -		- - - - -	
Slaughter birds--35	<u>\$24,825</u>	<u>\$24,825</u>	<u>\$29,820</u>	<u>\$29,820</u>	<u>\$48,458</u>	<u>\$48,458</u>
Gross revenue	\$24,825	\$24,825	\$29,820	\$29,820	\$48,458	\$48,458
Variable costs						
Feed and supplements	\$9,674	\$9,674	\$9,674	\$9,674	\$9,674	\$9,674
Worming, I.D. & pest control ^b	\$178	\$178	\$178	\$178	\$178	\$178
Sand	\$15	\$15	\$15	\$15	\$15	\$15
Utilities and fuel	\$2,100	\$2,100	\$2,100	\$2,100	\$2,100	\$2,100
Labor @ \$7.00/hour	\$5,124	xxxxxx	\$5,124	xxxxxx	\$5,124	xxxxxx
Transport cost	\$413	\$413	\$413	\$413	\$413	\$413
Interest	<u>\$1,026</u>	<u>\$588</u>	<u>\$1,026</u>	<u>\$588</u>	<u>\$1,026</u>	<u>\$588</u>
Total variable costs	\$18,529	\$12,968	\$18,529	\$12,968	\$18,529	\$12,968
Fixed Costs						
Building ownership	\$3,081	\$2,019	\$3,081	\$2,019	\$3,081	\$2,019
Fencing ownership	\$254	\$166	\$254	\$166	\$254	\$166
Equipment ownership	\$2,018	\$1,322	\$2,018	\$1,322	\$2,018	\$1,322
Depreciation on fixed assets	\$7,383	xxxxxx	\$7,383	xxxxxx	\$7,383	xxxxxx
Breeding pair ownership	\$1,472	\$964	\$1,472	\$964	\$1,472	\$964
Insurance	<u>\$350</u>	<u>\$350</u>	<u>\$350</u>	<u>\$350</u>	<u>\$350</u>	<u>\$350</u>
Total fixed costs	\$14,558	\$4,822	\$14,558	\$4,822	\$14,558	\$4,822
TOTAL COSTS	<u>\$33,088</u>	<u>\$17,789</u>	<u>\$33,088</u>	<u>\$17,789</u>	<u>\$33,088</u>	<u>\$17,789</u>
Returns over variable costs	\$6,296	\$11,858	\$11,291	\$16,852	\$29,928	\$35,490
Returns to management and risk	-\$8,262	xxxxxxx	-\$3,266	xxxxxxx	\$15,370	xxxxxxx
Cash flow ^c	xxxxxxx	\$7,036	xxxxxxx	\$12,031	xxxxxxx	\$30,668

^a Figures rounded to the nearest dollar.

^b Slaughter chicks are assumed not to receive worming medication.

^c Returns to operator labor & management, owner equity, & risk (excludes depreciation).

Source: Jenison Ostrich, Plume Crazy Ostrich Ranch, Harwood, ND, 1995 and Jobes, Raleigh A., An Economic Analysis of a Commercial Ostrich Production System, 1995

Costs of production will vary by operation; however, producers will want to minimize costs without compromising production levels. To lower costs of production, producers should select stock with the genetic potential to maximize fertility, hatchability, and survivability to three months and to minimize age to sexual maturity. Producers should also look for slaughter characteristics such as growth rate and yield. Use of a preventive health system will lower long-term costs and increase survivability and productivity, leading to increased profits (Angel 1995).

Feed costs tend to be one of the higher cost components of any animal production unit. Productivity and cost are important factors to consider when purchasing feed. In addition, alternative feed management systems should be explored. Corn, alfalfa and/or pasture are cost efficient feed alternatives. Once again, the nutritive value of these feed alternatives should be considered (Angel 1995).

Optimal slaughter age is another factor to consider when attempting to control costs of production. Beyond a particular growth phase, ostrich growth slows and tends to favor fat gain. Fat gain is a costly and undesirable use of feed. Therefore, to minimize feed costs, producers need to be aware of the optimal slaughter age and select birds for slaughter at that time (Angel 1995).

Summary & Conclusions

This report was based on a review of recent literature and telephone interviews with 16 of 22 meat processors identified by the American Ostrich Association in addition to ostrich leather processors, ostrich feather firms, and local meat processors and grocery stores.

Historically, the market for ostrich has been based on the demand for breeding stock. However, price comparisons from 1993 to 1995 showed a greater than 50 percent decline and indicated that this market is moving rapidly from a breeding stock basis to a mature market based on the commercial meat, hide, and feather value of ostrich. The typical commercial value of \$600 to \$700 for a 200+ pound live-weight bird is based upon its meat value, 80 to 90 percent, and the value of hide, 10 to 20 percent. Feathers have no value for domestic producers at this time. Meat is imported from South Africa and Australia due to insufficient domestic production at current meat prices.

The industry needs to expand the number of birds going to slaughter to establish ostrich as an alternative meat instead of a

novelty item. Also, the industry needs to take necessary steps to increase demand to prevent a drop in market prices. Currently, consumers are limited to up-scale restaurants, specialty grocery stores, and direct or mail-order sales.

The hide market for ostrich is better established but is dominated by South Africa, which exports 96 percent of hides moving through international channels. Approximately one-third of South Africa's ostrich hide exports are imported by the United States. The market for feathers, used as clothing accessories, feather dusters, and by the automobile and electronics industries, is also dominated by U.S. imports from South Africa. Labor costs and lack of labor-saving technology in processing feathers have prevented U.S. production from entering the domestic or international markets.

Costs and returns in the ostrich industry are changing rapidly. The future of the ostrich industry depends on its ability to compete on a cost and quality basis with foreign imports of ostrich products and other sources of meat and hide. This will bring issues of feed-to-meat conversion ratios, economies of size in processing, and promotion of the unique attributes of ostrich products to the forefront.

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