

A BASE LINE ANALYSIS OF SELECTED ASPECTS OF
RATITE PRODUCTION POTENTIAL AND
DEVELOPMENT OF A PROCESSING
INDUSTRY IN SOUTHWESTERN
OKLAHOMA

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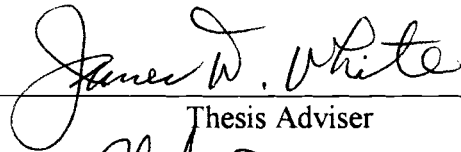
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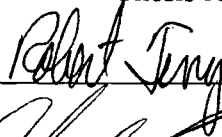
Submitted to the Faculty of the
Graduate College of
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
July, 1995

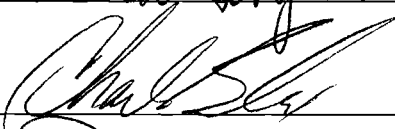
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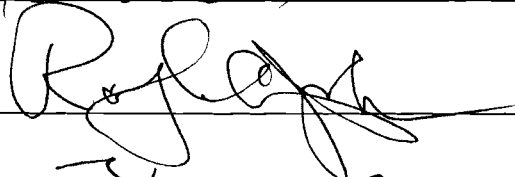
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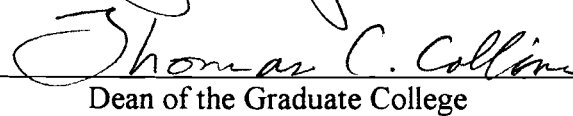


Thesis Adviser









Dean of the Graduate College

ACKNOWLEDGMENTS

When I began this project I had no idea the number of people and the amount of assistance they would give me before this project was completed. I owe all of them a debt of thanks for the help they provided. However, there were a few key people that deserve special recognition.

The first person I would acknowledge is Dr. Raleigh Jobes. Dr. Jobes provided expertise in ratite production, resources, direction and incentive to undertake this project. The next person I would like to acknowledge is Dr. James D. White. Dr. White was always there to provide me with advice and instruction. I could not have completed this thesis without his assistance. He always knew which word I was looking for when I was lost. Dr. Robert H. Terry provided invaluable assistance in providing direction and organization when it was greatly needed. I will always appreciate Dr. Charles Cox for stepping in at the last minute to serve on my advisory committee.

Most importantly of all I would like to thank my wife, Stephanie, for the support she provided. Stephanie made great sacrifices by allowing me to attend classes while she looked after the kids. Stephanie provided me with motivation, inspiration and encouragement to complete this project. I will always be grateful to her for the sacrifices she made.

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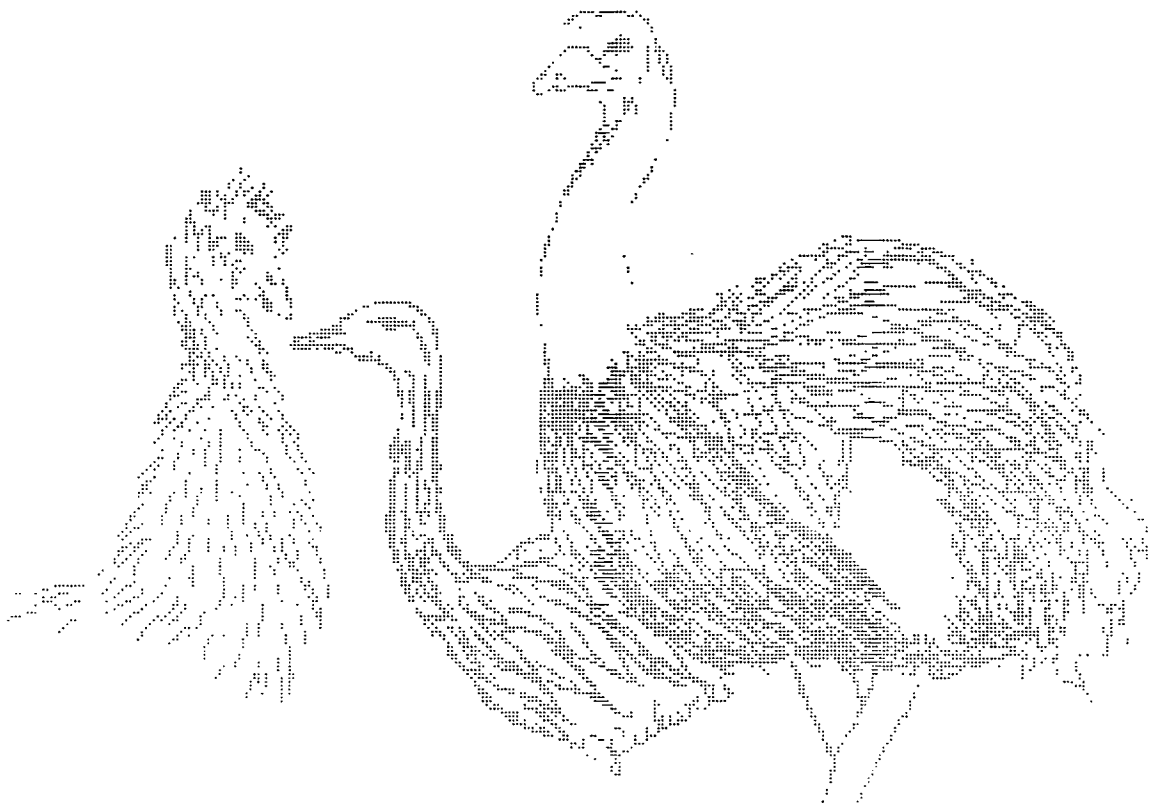
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CHAPTER I

INTRODUCTION

Over the past ten years, a new industry has developed in southwest Oklahoma, ratite production. Ratite production is the practice of breeding, hatching and growing ostriches, emus and rheas.

In the past, ostriches were raised for their feathers but that industry faded during the 1930's. Today, ostriches and other ratites are raised for foundation stock to establish a large enough population to begin commercial production of meat, hide, and feathers. Currently ratites are being produced in a breeders market and very few are actually slaughtered commercially (Crawford, 1993).

Commercial ratite production has the potential of developing into a profitable alternative agriculture enterprise with two primary products, meat and hide. Numbers of breeding ratites have expanded to the point that birds will soon be available for slaughter at prices that could make commercial production economically feasible. Prices for producing females were about \$25,000 in 1993. Today, in 1994, the price is in transition with prices being quoted from \$10,000 to \$20,000 each. Females with good production levels in the range of \$10,000 can support a commercial market (Jobes, 1994).

Research needs to be conducted to determine status of and potential for the industry. Producers should be surveyed to discover if they are willing to change their production operations to meet the demands of a commercial market.

Statement of the Problem

The ratite industry, especially the ostrich industry, is close to or at the point of changing from a breeding/seedstock market to a consumption-oriented market. Since a commercial market does not currently exist in Oklahoma, ratite population, locations and distribution are important aspects to the development of a consumption and value-added industry. In addition, survivability estimates are important from the aspect of the number of ratites available for commercial markets. Therefore, research to determine the size and scope of the ratite population, markets and production industry in southwestern Oklahoma could be of great benefit to current and prospective producers as well as related support industries. Recent trends indicate that expansion to a commercial status will be slow as long as profits maintain the current pace among seedstock operations, as well as a definite lack of a processing industry.

Purpose of the Study

The purpose of this study was to determine a ratite producer population, production potential and possibilities for the development of a commercial processing industry in southwestern Oklahoma.

Objectives of the Study

The following specific objectives were developed in order to accomplish the purpose of this study:

1. Identify a population of ratite producers in southwestern Oklahoma from production association directories, cooperative extension producer lists and industry publication subscriber lists.

2. Determine demographic characteristics common among ratite producers in southwest Oklahoma.
3. Conduct an inventory and determine the approximate age of the ratite population and distribution among breeding flocks in southwest Oklahoma by county.
4. Estimate the survivability rates of ostriches, emus and rheas based on egg fertility, egg incubation to hatch and birds zero to three months, three to six months and six to twelve months as reported by the ratite producers in southwest Oklahoma.
5. Determine the perceived willingness among southwest Oklahoma ratite producers to support a commercial processing industry.

Assumptions of the Study

The following assumptions were made for the purpose of this study:

1. The responses of southwest Oklahoma ratite producers were accurate and sincere.
2. The list of producers included in this study was complete.
3. The data gathering instrument was adequate in acquiring the desired information concerning ratite production in southwest Oklahoma.

Scope of the Study

The population of this study included individuals who are currently breeding, producing and hatching ratites: Ostriches, Emus and Rheas in southwest Oklahoma.

Limitations of the Study

The study was limited to southwest Oklahoma as defined by the Oklahoma Cooperative Extension Service. Furthermore, ratites in this study were limited to Ostriches, Emus and Rheas.

Definitions

The following are terms defined as used in the study:

Alternative Agricultural Enterprise: Any agriculture enterprise a producer chooses as an alternative to his traditional agricultural production to improve his economic position (Pursewell, 1991).

Breeders Market: Any market that is producing ratites for the sole purpose of reproduction.

Perceptions: Awareness of the elements of environment through physical sensation; observation (Webster, 1981).

Producers: Any one involved in the practice of breeding, hatching and growing of ratites.

Ratites: A bird with a flat breast bone; any of a superorder of birds (as an ostrich, emu, moa or kiwi) that have small rudimentary wings and no keel at the breastbone (Webster, 1981). For the purpose of this study, ratite will be limited to ostrich, emu and rhea.

Southwest Oklahoma: Defined by the Oklahoma Cooperative Extension Service as counties encompassing the Southwest District: Beckham, Caddo, Canadian, Cleveland, Comanche, Cotton, Custer, Garvin, Grady, Greer, Harmon, Jackson, Jefferson, Kiowa, McClain, Oklahoma, Roger Mills, Stephens, Tillman and Washita.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter was to present to the reader an overview of material which was related to the subject of study-ratite production. The presentation of the background of study is divided into five major areas and a summary. The major areas of literature were: (1) What is a ratite, (2) The history of ratites, (3) Ratite management, (4) Present uses for ratites and their products, (5) Market development for ratites and (6) Summary.

What is a Ratite?

According to Webster (1984, p. 976),

A ratite designates a flightless bird, as the ostrich or the emu, having a flat breastbone without the keellike prominence characteristic of most flying birds.

For the purposes of this study, a ratite is an ostrich, emu or a rhea.

Ostriches are the worlds largest bird. Native to South Africa, they have a life expectancy of 70 years. They are the only bird with just two toes. Ostriches begin breeding in two to two and a half years, for up to 35 years. Ostriches breed during the summer months. Females lay 20 to 100 eggs per year, with a fertility rate up to 85 percent. Incubation of fertile eggs is 40 to 42 days. The eggs are cream color and weigh three to five pounds. Females roost on the nest during the day, males take over during the night. Ostriches eat corn, alfalfa and grasses. They consume two to five pounds of feed daily. The ostrich requires a pen at least five and a half feet tall. They may be kept as pairs or trios on one third to one half acre. Chicks can be slaughtered at twelve to

fourteen months. Adults average 350 pounds and reach heights up to nine and a half feet. Adults yield 100 to 125 pounds of meat. Ostrich meat is healthy. It contains half the calories of beef, one-seventh the fat and considerably less cholesterol (Riley, 1992 p. 71). In addition to 12 to 16 square feet of hide and two to four pounds of feathers that can be harvested twice a year (Texoma Ostrich/Ratite Group, 1993). Ostriches can run at an average speed of 20 miles per hour, with bursts of speed up to 50 mph. They defend themselves by kicking forward and pecking.

Emu are the world's second largest bird and native to Australia. At maturity, they weigh 120 to 150 pounds and stand five to six feet tall. Emus begin breeding at two to three years. They lay a green opaque egg about five inches long which resembles an avocado. Emu breed during the winter, October to March. They produce 20 to 45 eggs a year, if eggs are removed for artificial incubation. In the wild, the male incubates the eggs and raises the chicks.

There are no visible differences between the male and the female. Birds can be digitally sexed by an expert. Chicks make a pleasant whistling sound up until about one year of age. Emu have life spans up to 30 years or more. They are a docile, curious bird. The meat of the emu is an all red meat similar to an ostrich. The taste is comparable to beef with fewer calories, carbohydrates and less fat. The meat is also lower in fat and cholesterol than chicken or turkey. Unlike ostrich, the emu produces an oil which is used in cosmetics and medications (Texoma Ostrich/Ratite Group, 1993).

The rhea originates in South America and is the smallest of the three ratites. There are two species of rhea: white and gray. White rheas are considered to be more valuable. They mature between 14 and 20 months of age and lay 15 to 60 eggs during their summer breeding season. (Texoma Ostrich/Ratite Group, 1993)

Ratites are very unique animals. They are flightless birds that can be used to produce meat, leather, feathers and other by products.

The History of Ratites

Ratites have a long and colorful history. Fossil remains of emus have been found in Australia dating from 100,000 years ago (Norton, 1994). Ostrich fossils have been found in rock dating back 5 million years. In more recent times, the emu remains in Australian history for an episode known as the "Charge of the Ratite Brigade".

It appears that the Aussie government was persuaded by irate farmers to eradicate emus as pests. This, the Down Under Final Solution, was foiled when Aussie machine gunners, startled by the emu habit of charging INTO danger instead of AWAY, suffered multiple jams in their automatic weapons, leaving the field to the emu triumphant (Done, 1989, pp. 181-182).

Ostriches have long been accused of burying their head in the sand when danger approaches. The truth behind the story is, when a hen is sitting on her nest and danger approaches, she lowers her head and neck to the ground to camouflage herself and her nest. From a distance, it appears she has buried her head in the sand (Shirley, 1987).

Ostrich feathers or plumes have been in demand for hundreds of years. They adorned the helmets of medieval European knights (Norton, 1994). The ancient Egyptians revered the feathers as a symbol of truth and justice. The armies of Assyria, Rome, Babylon, England and even the tribal warriors of Africa adorned their battle gear with ostrich plumes (Shirley, 1987). In the 1800's, the plumes became very popular in women's fashion. The demand led to a new industry in the United States, South Africa and elsewhere.

The first domesticated ostriches were brought to the United States in 1891. By the year 1906, there were over 2500 birds in the country. The majority were in Arizona with the remainder in California, Florida and Arkansas. The San Joaquin Valley was also home to the farm raised birds.

However, the industry was literally driven into obscurity in 1914 with advent of the automobile. Women could no longer wear their high-plumed hats while riding in windy 25 mph automobiles. (Rolling Hills Ostrich Ranch, 1991, p.125).

The change in ladies fashions was fortunate for wild ostriches, because they were almost hunted into extinction during the mid 1800's (Rolling Hills Ostrich Ranch, 1991).

Since the plume boom and bust of the early 1900's, ostriches have made a slow comeback. Today, ratites are used for meat, hide and feather production.

Ratite Management

Ratite production is a relatively new enterprise in the United States. Over the past five years, it has been a very attractive enterprise. Ratites require intensive labor, small amounts of land and can generate high profits. Starting production is very expensive and risky. There are five areas to ratite production: facilities; incubation and hatching; feed and maintenance; health care; and purchasing and transporting stock.

Facilities are important in any livestock enterprise. Whether you are starting out or growing out, changes in facilities are an ongoing process. The most important consideration in facilities is security. The birds must be protected from predators and theft. Next, the facilities require several pens.

Separate pens are required for chicks 0-4 months old, juveniles 4 months to 2 years and adults. Ideally, adults need 1/4 acre per bird. But, there are some one half that area that do just fine. All facility plans should provide fresh water to every pen and room for expansion. Shelter is minimal for birds older than 4 months. All they need is a wind break and a place to get out of the sun. Chicks require more elaborate facilities. Chicks need an area with constant temperature and access to outside runs.

Incubation and hatching facilities need to be separate. These rooms require constant temperature and humidity. This facility should also allow for easy cleaning and disinfecting to help prevent the spread of bacteria and fungus. After hatching chicks, a brooding area is needed to maintain a warm dry environment.

Two final areas are required to complete the facilities, an isolation area and a quarantine area. An isolation area is not of any particular size, but should be located away from the rest of the flock. This area is used for sick birds. The quarantine area is for apparently healthy birds that are new to the farm or returning. This area is necessary to observe birds for symptoms of disease before exposing them to the rest of the flock (Ostrich/Ratite Research Foundation, 1992).

Incubation and hatching is the most critical time of production. Eggs can be consolidated for up to one week before being placed in the incubator. Incubators should be set at 36.1 degrees Celsius and turned every two hours. After 10 to 14 days the eggs should be candled to determine fertility. Eggs should be moved to the hatcher 2 days before the anticipated hatch date. Eggs need to be weighed and recorded to maintain a good record keeping system (Ley, Morris, Smallwood and Loomis, 1986).

The temperature and humidity levels in the hatcher are different than in the incubator. Higher humidity assists the emerging chick by preventing the egg membrane from hardening. After the chick has pipped internally, it may require 18 to 48 hours to break through the shell. Hatching should be as natural as possible. Breaking the shell may remove the stimulus to hatch (Ostrich/Ratite Research Foundation, 1992).

Since the ratite industry in the United States is relatively new, there has been very little research done on the nutritional need of the birds. The value of the birds has been and is such that the risk was too great to try very many different rations. The trend has been to find something that works and stick to that rather than conduct experiments (Berry, 1993, p.10).

According to "A Blueprint for Ratite Management in a Nutshell" , Zero to three week old chicks chick feed should be fed 24% - 28% protein turkey starter or ratite chick starter. Chicks three to twelve weeks should be on an 18% protein pellet. Twelve weeks and on, chicks should be 16% to 18% protein. Emus require less fiber than ostrich or rhea. By two years, the protein levels can be dropped to 16% (Ostrich/Ratite Research Foundation, 1992).

The best recommendation for health care is to find a well trained and experienced ratite veterinarian. The next best recommendation is prevention. Ratites can pick up diseases from bacteria, fungi and other animals. Facilities should be cleaned and disinfected regularly. New arrivals to the farm should be quarantined and observed before being integrated into the flock. Most importantly, sick birds should be isolated from the flock.

The most common problems with ratites are: impactions, internal and external parasites and viruses. All of these problems can be treated by a qualified veterinarian (Ostrich/Ratite Research Foundation, 1992; Beavers, 1993).

Ratites should be selected based on industry goals, meat and leather production. The best bird would reach slaughter weight in 12 to 14 months and produce a large surface area of hide. Upon inspection, the bird should have straight legs and beak, good feather quality and proper weight. Records should be inspected for production history or family production history. A veterinarian can test for worms, bacteria or viruses.

Once purchased, transportation creates a new set of problems. What is needed:

- A. Dry, non-slip surfaces.
 - B. Ventilation (No uncovered trailers).
 - C. Lack of holes to stick heads and feet through.
 - D. No sharp corners or protrusions that will cause injury.
 - E. Divided compartments that restrict movement yet allow room for birds to sit.
 - F. For longer trips, a water source is advisable during stops.
 - G. Darkened trailer if possible.
 - H. During extremely hot weather transportation at night helps
- (Ostrich/Ratite Research Foundation, 1992, p.13).

Ratites have high mortality rates. If they survive, they have a productive life of 35 to 40 years and a total life span of 70 years. With that productive life span, only a three percent replacement rate is needed to maintain an operation.

It is easier to present an example, than to talk about death loss. A typical ostrich pair will produce on average 50 fertile eggs per year. When the fertile eggs are incubated, 80 percent or 45 chicks will hatch. Death loss of newly hatched chicks is

quite high, 50 percent. Only 20 of the newly hatched chicks will reach one month of age. The period of one to three months shows a better survival rate with death loss of 20 percent. This translates to 16 chicks reaching three months of age or 32 percent of the original 50 eggs. Death loss from three to six months is 5 percent and 4 percent from six months to one year. Typically 28.31 percent of fertile eggs will reach maturity, 14 mature birds (Jobes and Hendrickson, 1993).

In summary, ratite production is different than any other type of livestock enterprise. Requirements to produce include the ability to bear the risk of loss, a large capital base, well trained labor and good management ability (Jobes and Hendrickson 1993).

Present Uses for Ratites and Their Products

Ratites are very versatile when it comes to uses and products. Today, because of their high value, most ratites are used for breeding purposes only. The only birds that are used other wise were injured, accidentally killed or not breeding suitable breeding stock.

Ratites are used for many purposes. Meat and leather are their mainstay. Their feathers can be used for fashion or in the computer or automotive industry. Their corneas can be used in the medical field. Their eggshells and toenails are used in arts and crafts. The eggs make bountiful omelets. The oil from the emu is used in the medical and cosmetic industry.

By the year 2000, bird burgers could be a big menu item. If the American Ostrich Association has it way, people in the U.S. will learn what consumers in Japan and Switzerland already know: Ostrich meat is yummy.

Some upscale restaurants already serve ostrich. But as luck would have it for the ostrich, emu has already made it as a menu offering on Quantas Airways. Since last summer, the Australian airline has served smoked emu as an appetizer in first class and braised emu in garlic and ginger sauce for business class passengers (Lawrence, 1994, p. 12).

Today, the tanned ostrich hide is expensive. It sells for \$42 a square foot wholesale, less about \$9 for tanning, or a net of \$33 a square foot. Each ostrich yields about 14 square feet of usable hide. Some people regard the hide of United States ostriches as better quality than those imported from South Africa. They say this is due to thicker hides that result from better feeding and mature harvesting in the United States.

The current estimate of demand for ostrich hides is 250,000 to 300,000 hides per year. Production above this level will cause a reduction in the prices of hides. The current supply from South Africa is controlled at about 100,000 to 150,000 hides (Biondi & Dierks, 1993, p. 14).

The feathers of an ostrich on the European market bring \$50 to \$1000 per pound and are used for feather dusters, fashion accessories, elaborate showgirl costumes, pens and other accessories and decorations. Feathers may be taken twice a year from live birds and in total at slaughter (Crawford, 1989, p. 14).

Because of the ostrich feather dust collection capability and lack of oil on their surface, feathers are used in the automobile and computer industries as dusters (Biondi & Dierks, 1993, p. 14).

A research team comprising South African and overseas eye specialists and headed by a Johan-nesburg eye specialist, have found that ostrich corneas are an ideal alternative to human cornea transplants. Both human and ostrich corneas are histologically and structurally compatible. Ostrich corneas for use in human cornea transplants could prove a great medical breakthrough for South Africa and thousands of poor-sighted people - if the research already being carried out on animals is successful (Wolfe, 1987, p. 15).

The emu produces approximately five liters of hypo-allergenic oil per mature bird (Jodion, 1990, p.172).

Ratites have a large number of products to offer consumers. If the public acquires a taste for them, they may be here to stay.

Market Development for Ratites

The ostrich has unique products that have strong market potential which have attracted the attention of many entrepreneurs. But, ostrich breeders are facing a saturation point in bird population in the next few years that will end the current high prices for their breeding birds. It will be the sale of ostrich meat and the hides that makes the ostrich industry a long-term profitable venture for breeders (Biondi & Dierks, 1993, p. 14).

The ratite industry is at a crossroads. It can either remain an industry of breeders with no viable product or it can move ahead and continue with the expansion phase and

develop markets that will allow commercial producers to enter the industry with the intent of servicing those markets (Jobes & Hendrickson, 1993).

Product demand can drive any market. The current estimate of demands for ostrich hides is 250,000 to 300,000 per year. The current supply for South Africa is controlled at about 100,000 to 150,000 hides (Biondi and Dierks, 1993). Hides seem to be the market that is ready for ratite production.

On the other hand, meat has the greatest market potential. If the ostrich industry could capture one-tenth of one percent of total meat consumption, it would require 746,780 feeder birds annually. It has been estimated that 150,000 birds per year were needed to support one slaughter plant. This would require five slaughter plants and over 54,000 breeder pairs to support the demand. There is little to no data detailing current numbers of birds at any age, let alone adult birds of productive age. For that reason, it is almost impossible to determine when supply will be available to meet market demand (Jobes and Hendrickson, 1993).

Biondi, Foran, Sparks and Dierks (1993) made an extensive study of the ostrich breeding industry as part of a field study project. From this study, the team developed five recommendations to induce a stronger strategic focus for the ostrich industry, specifically for the North Carolina Ostrich Breeders Association. The following recommendations have been summarized.

Recommendation #1: Information collection and communication are keys to providing accurate measures of the industries position, needs and development. Ostrich organizations should communicate the importance of information and lay the ground work to get comparable information.

Recommendation #2: Establishing standards will give credibility to the producers and give an incentive to provide accurate and meaningful records.

Recommendation #3: Create strategic alliances with slaughter houses and restaurants.

Recommendation #4: Establish a "Downed Bird Hotline." A means of mitigating the loss of a bird and transporting it to the proper slaughter or research facility.

Recommendation #5: Research needs to be performed to find out exactly what type of consumer will demand the meat.

No one really knows the future of the ratite industry. We do know there is a definite need to collect data and define the markets available for ratites and their products. The ratite market has a chance to become productive. That chance may be the European market, but it is a chance (Jobes & Hendrickson, 1993).

As the ostrich population increases, the opportunity for markets will become reality. The leather industry is watching with a hopeful eye, and the meat industry will benefit tremendously from an outstanding source of red meat. Ostriches are our great opportunity (Coody, 1987).

Summary

A ratite is a large flightless bird with a flat chestbone. For the purposes of this study a ratite is an ostrich, emu or rhea. Ratites may be used to produce meat, leather, feathers and other by products.

Ostriches are the worlds largest bird, native to South Africa. Emus are the world's second largest bird and native to Australia. The rhea originates in South Africa and is the smallest of the three ratites.

Ratites have a colorful history. Ostrich feathers or plumes have been in demand for hundreds of years. The plumes adorned the helmets of medieval knights. In the 1800's, the plumes became very popular in women's fashions. The demand led to a new industry in the United States.

The first domesticated ostriches were brought to the United States in 1891. By the year 1906 there were over 2500 birds in the country. The industry was literally driven into obscurity in 1914.

Over the past five years, ratite production has been a very attractive enterprise. Ratites require intensive labor and small amounts of land. They can generate high profits, but starting production is expensive and risky.

Ratites are very versatile when it comes to uses and products.

Ratite meat has the greatest market potential. If the ostrich industry could capture one tenth of one percent of total meat consumption, it would require 746,780 feeder birds annually. This would require five slaughter plants and over 54,000 breeder pairs.

On the other hand leather already has a viable market. The current demand of hides is 250,000 to 300,000 per year.

The ratite industry is at a crossroads. It can either remain an industry of breeders with no viable product or it can move ahead and continue with the expansion phase and develop markets that will allow producers to enter the industry with the intent of servicing those markets.

CHAPTER III

METHODOLOGY

Introduction

The purpose of this chapter is to explain the methods used and the procedures followed in this study. The objectives of this study were: (1) Identify a population of ratite producers in southwestern Oklahoma, (2) determine demographic characteristics common among ratite producers in southwest Oklahoma, (3) conduct an inventory and determine the approximate age of the ratite population and distribution among breeding flocks in southwest Oklahoma by county as perceived by producers, (4) estimate the survivability rates of ostriches, emus and rheas based on egg fertility, egg incubation to hatch and birds zero to three months, three to six months and six to twelve months as perceived by ratite producers in southwest Oklahoma, and (5) determine the perceived willingness among southwest Oklahoma ratite producers to support a commercial processing industry.

In order to collect data which would provide information relating to the purpose of this study, the population was determined and the instrument was developed for the collection of data. A procedure was established and methods of data analysis were selected.

Federal regulations and Oklahoma State University policy require review and approval by the Institutional Review Board (IRB) of all research studies that involve human subjects before investigators can begin their research. In compliance with the

aforementioned policy, this study received the proper surveillance, and was granted permission to continue. A copy of the IRB approval is provided at the end of the study.

This study was coordinated with the assistance and cooperation of Oklahoma State University Agricultural Education Department, the Agricultural Economics Department, the Oklahoma Cooperative Extension Service and the researcher's graduate committee members.

The Population

The population of this study included ratite producers in southwest Oklahoma. This population was selected as part of a larger statewide study to be conducted. The population was identified from a review of producer association lists, cooperative extension producer lists and industry publication subscriber lists. Specific sources included: Oklahoma Ostrich Association, Oklahoma Emu Association, Oklahoma Rhea Association, the Texoma Ostrich/Ratite Group, Oklahoma Emu Today and Tomorrow, Ostrich News and OCES. Each source provided the researcher either a membership list or a subscriber list for the selected geographical area (Figure 1). The OCES provided a list of previously identified producers. Membership and subscribership lists were combined to form a mailing list which was used for this research. The Ostrich News provided mailing labels. Labels could not be duplicated for the combined list, therefore potential duplication between the two lists did exist.

Development of the Instrument

In developing the instrument to meet the objectives of the study, the first step was to review instruments used in previous studies. In analyzing various methods of data collection, the most appropriate method was determined to be a mail questionnaire.

An early activity in preparing the instrument was to compile a list of questions that were relevant to the purpose and the objectives. The most important questions were to determine from producers the population and survivability rates of ratites, and then to determine the producers' perceptions of the changing market.

Next, the questionnaire was structured and reviewed. The instrument was reviewed by the Agricultural Department staff of Cameron University, Stephens County Extension Agents, and OCES Southwest District Area and District Staff located in Duncan, Oklahoma.

The next step was to make the necessary revisions and determine the importance of each question in relation to the objectives of the study. Questions for determining ratite population and survivability rates were quantitative in nature. Questions concerning producers perceptions of potential populations, market development and processing industry were qualitative in nature.

The instrument was divided into four sections. (1) Demographics of Producers, (2) Operations and Marketing, (3) Industry Inventory and (4) Anticipated Production and Marketing Plans. The questions in sections (1) and (2) simply required the producers to check the most appropriate response. Section (3) required the producer to complete statistical data concerning production history and inventory of eggs and birds. Section (4) asked for a brief explanation of production and marketing plans.

After the instrument was structured and revised, it was submitted for approval by the major advisor.

The validity of this study was confirmed by a panel of experts from Oklahoma State University.

Procedures For Collecting Data

Prior to the collection of data was the need to develop a letter of introduction to accompany the questionnaire. The purpose was to explain and introduce the

questionnaire to the producer so there would be a clear understanding of the instrument. The cover-letter also offered incentives to return the survey, which included: the ratite survey results and OCES produced materials: Ostriches, Economic Analysis of a Commercial Production System; Ostriches, Analysis of Production, Breeding, Hatching, Growing; or Emus, Economic Analysis of a Commercial Production System.

The following step was to color code the questionnaires to help avoid duplication. Two sets of questionnaires were mailed. The first questionnaire, printed on green paper, was mailed to the producers on the list generated by the researcher. The second questionnaire, on gray paper was mailed by John Crawford, editor of the Ostrich News, to subscribers who reside in southwest Oklahoma. Once the surveys were returned the respondents names were compiled to form a ratite producers directory. All known non-respondents were sent a card requesting a response. Questionnaires were mailed by the Ostrich News on February 17, questionnaires were mailed by the researcher on February 23. Follow-up cards were mailed on March 3 to nonrespondents on the initial mailing list.

This survey was conducted in conjunction with a larger survey which included the entire state of Oklahoma. The research was funded by a matching grant from the Oklahoma Emu Association and OCAST.

Analysis of Data

The researcher had the data compiled and summed by Agricultural Economic Data Processing and Computer Services. Once the data was combined it was divided into categories coinciding with the researchers four objectives. The data was then analyzed using descriptive statistics, summations, item counts and percentages.

One emphasis of the study involved surveying current ratite populations. Numbers were totaled by species from returned instruments to determine the population.

These questions also requested Ratite production and inventory data. Survivability rates were calculated from production and inventory data. The rates were calculated by specie and the percentages were determined using statistical methods. Frequencies were based on number of responses, not number of respondents.

Certain questions concerning operations and marketing were analyzed by using a Likert-type scale. The respondents were given a choice of response categories dealing with the extent of agreement or the rank of the market or marketing option. Each response category was assigned a numerical value so that responses for each statement could be totaled and mean scores calculated. The response categories or ranks numerical values and real limits were as follows:

<u>Category</u>	<u>Numerical Value</u>	<u>Range of Real Limits</u>
Strongly Agree	5	5.00 - 4.50
Agree	4	4.49 - 3.50
Don't Know	3	3.49 - 2.50
Disagree	2	2.49 - 1.50
Strongly Disagree	1	1.49 and Below

<u>Rank</u>	<u>Numerical Value</u>	<u>Range of Real Limits</u>
1	1	Less than 1.49
2	2	1.50 - 2.49
3	3	2.50 - 3.49
4	4	3.50 - 4.00

The questions concerning the producers' production and marketing plans were qualitative in nature and were compiled by grouping of answers and analyzed.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

The primary purpose of this study was to determine a ratite producer populations, production potential and possibilities for the development of a commercial processing industry in southwestern Oklahoma. In order to achieve this purpose, the following specific objectives were developed:

1. Identify a population of ratite producers in southwestern Oklahoma from production association directories, cooperative extension producer lists and industry publication subscriber lists.
2. Determine demographic characteristics common among ratite producers in southwest Oklahoma.
3. Conduct an inventory and determine the approximate age of the ratite population and distribution among breeding flocks in southwest Oklahoma by county.
4. Estimate the survivability rates of ostriches, emus and rheas based on egg fertility, egg incubation to hatch and birds zero to three months, three to six months and six to twelve months as reported by the ratite producers in southwest Oklahoma.
5. Determine the perceived willingness among southwest Oklahoma ratite producers to support a commercial processing industry.

Population of the Study

The population of the study was determined to be the ratite producers in southwest Oklahoma. The population was identified through ratite associations, ratite magazine subscriber lists and OCES producer lists. The Ostrich News assisted with locating the population by allowing the researcher to mail questionnaires to subscribers, with the stipulation that the subscriber list would not be duplicated. This was helpful in locating producers, but led to duplication and surveys being mailed to non-producers.

Six hundred and sixty-five questionnaire packets were mailed, 18 were returned due to address changes and could not be forwarded. One hundred thirteen surveys were completed and returned, however, one of the 113 was not useable. The 112 respondents were used as the representative of the population for the study. Table I indicates the summary of the survey mailing and location of producers.

Findings of the Study

The findings of this study were based on the 112 returned questionnaires. However, discrepancies in the number of responses per question did occur because some producers did not respond to all questions, while some gave more than one response.

Tables II through IX correspond with objective two, determining demographic characteristics among ratite producers in southwest Oklahoma.

TABLE I
A SUMMARY OF SURVEY MAILINGS AND
RETURNED QUESTIONNAIRES

Selected Sequences	Frequency
Total number mailed	685
Number mailed from producers list	193
Number mailed through Ostrich News	492
Number which were non-deliverable	18
Total number returned	113
Number non-usable	1
Number of ratite producers returning useable surveys	112

Table II revealed the number of respondents by county surveyed. Fifty-seven percent of the respondents indicate they were largely from the following five counties; Oklahoma, Cleveland, Canadian, Beckham and Garvin. There were no responses from either Roger Mills or Greer counties.

The data illustrated in Table III indicates that the respondents by gender were 81.5 percent male and 18.5 percent female.

TABLE II
A DISTRIBUTION OF STUDY RESPONDENTS BY COUNTY

County	Frequency N = 108	Percent (%)
Beckham	12	11.1
Caddo	01	.9
Canadian	12	11.1
Cleveland	13	12.0
Comanche	05	4.6
Cotton	01	1.0
Custer	02	1.9
Garvin	12	11.1
Grady	08	7.4
Greer	-	-
Harmon	01	1.0
Jackson	03	2.8
Jefferson	04	3.7
Kiowa	01	.9
McClain	06	5.6
Oklahoma	13	12.0
Roger Mills	-	-
Stephens	09	8.3
Tillman	01	.9
Washita	04	3.7
Total	108	100.0

TABLE III
A DISTRIBUTION OF STUDY RESPONDENTS BY GENDER

Gender	Frequency N = 108	Percent (%)
Female	20	18.5
Male	88	81.5
Total	108	100.0

The data in Table IV showed that 31.5 percent of the respondents were 51 to 60 years old, 20.4 percent were 31 to 40 years old, while 1.9 percent were over 71 years of age.

Table V identified fifty percent of the respondents as ostrich producers only, while 25.5 percent were emu producers and 1.8 percent were rhea producers. However, the remaining 22.7 percent produce various combinations of ostrich, emu and rheas.

The data in Table VI illustrated a distribution of survey respondents by type of ratite production operation. Of the 114 responses, 34.2 percent produced breeding/seedstock, 49.1 percent produced for breeding and commercial markets and 4.4 percent responded to the other category (2 were brokers and 3 were not in production).

TABLE IV
A DISTRIBUTION OF STUDY RESPONDENTS BY AGE

Age	Frequency N = 108	Percent (%)
20 Yrs. and Under	4	3.7
21-30	12	11.1
31-40	22	20.4
41-50	21	19.4
51-60	34	31.5
61-70	13	12.0
71 Yrs. and Over	2	1.9
Total	108	100.0

TABLE V
A DISTRIBUTION OF STUDY RESPONDENTS BY TYPES OF
RATITES PRODUCED

Ratites Produced	Frequency N = 110	Percent (%)
Ostriches Only	55	50.0
Emus Only	28	25.5
Rheas Only	2	1.8
Ostriches and Emus	15	13.6
Ostriches and Rheas	2	1.8
Ostriches, Emus and Rheas	3	2.7
Emus and Rheas	5	4.5
	110	100.0

TABLE VI
A DISTRIBUTION OF STUDY RESPONDENTS BY KIND OF
RATITE OPERATION

Kind of Ratite Operation	Frequency N = 114	Percent (%)
Breeding/Seedstock	39	34.2
Commercial/Processed for Human Consumption	2	1.8
Combination: Breeding and Commercial	56	49.1
Feather Production	-	-
Combination: Breeding, Commercial and Feather Production	12	10.5
Other: (2 brokers and 3 not in production)	5	4.4
Total	114	100.0

The data in Table VII provided a breakdown of respondents by years of ratite production experience. Seventy-five percent of the respondents were in production less than four years. One producer has been in business over 10 years.

Table VIII illustrated production experience by a distribution of respondents by year entering the ratite business. Over 44 percent entered the ratite business in 1992 and 1993, 10.6 percent entered in 1987.

The data summarized in Table IX was a distribution of respondents by primary reason for involvement in the ratite business. Over 41 percent were involved to increase farm income, almost 20 percent were involved for the novelty of a new industry and 10.7 percent for diversification of their agricultural operation.

TABLE VII

A DISTRIBUTION OF SURVEY RESPONDENTS BY YEARS
OF RATITE PRODUCTION EXPERIENCE

Years Experience	Frequency N = 108	Percent (%)
Less than 1 Year	9	8.3
1-2 Years	37	34.3
3-4 Years	35	32.4
5-6 Years	8	7.4
7-8 Years	15	13.9
9-10 Years	3	2.8
Over 10 Years	1	.9
Total	108	100.0

TABLE VIII

A DISTRIBUTION OF SURVEY RESPONDENTS BY YEAR
ENTERING THE RATITE BUSINESS

Year Entered the Ratite Business	Frequency N = 104	Percent (%)
1984	1	1.0
1985	1	1.0
1986	2	1.9
1987	11	10.6
1988	5	4.8
1989	6	5.8
1990	6	5.8
1991	11	10.6
1992	23	22.0
1993	23	22.1
1994	15	14.4
Total	104	100.0

TABLE IX

A DISTRIBUTION OF SURVEY RESPONDENTS BY PRIMARY
REASON FOR INVOLVEMENT IN RATITE BUSINESS

Primary Reason	Frequency N = 108	Percent (%)
Increase Farm Income	51	41.8
Novelty of a New Industry	24	19.7
Social Status	1	.8
Diversification of Agricultural Operation	13	10.7
Other Categories:		
Alternative/Second Income	11	9.0
Retirement Income	9	7.4
Change of Profession	7	5.7
Miscellaneous Responses	6	4.9
Total	122	100.0

Note: Other categories were grouped from qualitative answers.

Tables X through XV correspond to objective three, determining the age of the ratite population and distribution among breeding flocks in southwest Oklahoma.

Table X summarized the number of producing ratites by gender and specie. There were 605 ostriches, 387 emus and 63 rheas for a total of 1055 ratites, 527 females and 528 males.

TABLE X
NUMBER OF PRODUCING RATITES BY GENDER AND SPECIE
AS REPORTED BY SURVEY RESPONDENTS

Specie	Female Ratites	Male Ratites	Total
Ostrich	302	303	605
Emu	189	198	387
Rhea	36	27	63
Total:	527	528	1055

Table XI provides a breakdown of male to female production ratios by species. Over 88 percent of the ostriches were produced in a 1:1 ratio. Almost 3 percent were produced in a colony or multiple ratio, 3:3 and 2:2. While, ninety-three percent of the emus were produced in a 1:1 ratio and 4.3 percent were produced in a colony. However, 63.6 percent of the rhea were produced in as 1:1 ratio and 36.4 percent were produced in a 1:2 ratio.

Estimating the average age of the breeding flock by gender Table XII revealed 75.5 percent of the males were 2 to 4 year sold and 79.8 percent of the females were also 2 to 4 years old.

Table XIII is a breakdown of producing ratios by county, specie and gender as indicated by survey respondents. All counties involved in the survey produced ostriches, except Roger Mills and Greer, which had no respondents. Emus populated all counties except, Cotton, Harmon, Kiowa, Tillman, Roger Mills and Greer. While, rheas were only located in five counties, Beckham, Canadian, Comanche, Garvin and Stephens.

Tables XIV through XVIII correspond with objective three estimating survivability rates. While analyzing the data, the researcher discovered the data did not contain all the variables, therefore, it should be pointed out the data only reflected some of the factors associated with survivability rates.

Table XIV analyzes ostrich survivability rates based on survey responses. Seventy-four percent of the produced eggs were fertile, 31.7 percent survived to three months of age, while 5.9 survived one year.

TABLE XI

MALE TO FEMALE PRODUCTION RATIO DISTRIBUTION BY
SPECIES AS REPORTED BY SURVEY RESPONDENTS
(EXAMPLE: 1 MALE TO 3 FEMALES = 1:3)

Species	Ratio Male : Female	Distribution of Respondents	
		Frequency N = 67	Percent (%)
A) Ostrich	1:1	59	88.1
	1:2	5	7.5
	1:4	1	1.5
	2:2	1	1.4
	3:3	1	1.5
Total		67	100.0
		N = 46	
B) Emu	1:1	43	93.5
	1:2	1	2.2
	3:3	1	2.1
	9:8	1	2.2
Total		46	100.0
		N = 11	
C) Rhea	1:1	7	63.6
	1:2	4	36.4
Total		11	100.0

TABLE XII
 AVERAGE AGE OF BREEDING FLOCK BY GENDER AS
 ESTIMATED BY SURVEY RESPONDENTS

Gender	Age	<u>Frequency</u> N = 102	Percent (%)
<hr/>			
A) Male			
	1 Year or Less	9	8.8
	2-4 Years	77	75.5
	5-7 Years	16	15.7
Total		102	100.0
N = 89			
B) Female			
	1 Year or Less	9	10.1
	2-4 Years	71	79.8
	5-7 Years	9	10.1
Total		89	100.0
<hr/>			

TABLE XIII

A DISTRIBUTION OF PRODUCING RATITES BY COUNTY, SPECIE AND
GENDER IN SOUTHWEST OKLAHOMA ACCORDING TO
SURVEY RESPONDENTS

County	Number of Respondents	Ratite Species	Ratite Gender		Total
			Female	Male	
Beckham	12	Ostrich	31	31	62
		Emu	16	23	39
		Rhea	-	-	-
Caddo	1	Ostrich	1	1	2
		Emu	1	1	2
		Rhea	-	-	-
Canadian	11	Ostrich	19	23	42
		Emu	21	21	42
		Rhea	7	5	12
Cleveland	12	Ostrich	21	19	40
		Emu	29	29	58
		Rhea	-	-	-
Comanche	5	Ostrich	2	2	4
		Emu	11	11	22
		Rhea	6	4	10
Cotton	1	Ostrich	1	1	2
		Emu	-	-	-
		Rhea	-	-	-
Custer	2	Ostrich	2	3	5
		Emu	-	1	1
		Rhea	-	-	-
Garvin	12	Ostrich	42	42	84
		Emu	16	16	32
		Rhea	2	2	4
Grady	8	Ostrich	10	13	23
		Emu	9	9	18
		Rhea	-	-	-
Harmon	1	Ostrich	1	1	2
		Emu	-	-	-
		Rhea	-	-	-
Jackson	3	Ostrich	4	4	8
		Emu	12	13	25
		Rhea	-	-	-
Jefferson	4	Ostrich	10	9	19

TABLE XIII (Continued)

County	Number of Respondents	Ratite Species	Ratite Gender		Total
			Female	Male	
		Emu	1	1	2
		Rhea	-	-	-
Kiowa	1	Ostrich	10	11	21
		Emu	-	-	-
		Rhea	-	-	-
McClain	6	Ostrich	32	30	62
		Emu	6	6	12
		Rhea	-	-	-
Oklahoma	13	Ostrich	42	30	72
		Emu	15	15	30
		Rhea	-	-	-
Stephens	9	Ostrich	17	19	36
		Emu	6	6	12
		Rhea	3	3	6
Tillman	1	Ostrich	14	14	28
		Emu	-	-	-
		Rhea	-	-	-
Washita	4	Ostrich	16	21	37
		Emu	41	41	82
		Rhea	-	-	-
Other: Respondents who did not specify a county	6	Ostrich	25	27	52
		Emu	5	5	10
		Rhea	-	-	-
Total	112		525	526	1051

Note: No respondents were from Greer or Roger Mills counties

TABLE XIV
ANALYSIS OF OSTRICH SURVIVABILITY RATES BASED
ON SURVEY RESPONSES

Production Category	Number of Eggs/Chicks Produced on Farm	Survivability Rate (%)
Eggs Produced	2230	-
Eggs Fertile	1650	74.0
<u>Chicks</u>		
3 months old	707	31.7
6 months old	583	26.1
12 months old	131	5.9

Emu survivability rates were higher according to Table XV. Over 79 percent of emu eggs were fertile, 34.9 percent survived to three months of age and 13.3 percent survived to one year.

Rhea survivability rates were lower than ostrich or emu according to Table XVI. Only 57.1 percent of rhea eggs were fertile, 15 percent of the rheas survived to three months of age and 3.7 percent survived to 12 months.

Death loss of ratites was reported in Table XVII, analysis of death loss by age for ostrich, emu and rhea. Rhea had the highest death loss of 40.7 percent before age three months, however ostrich was second with a loss of 30 percent before three months,

TABLE XV
ANALYSIS OF EMU SURVIVABILITY RATES BASED
ON SURVEY RESPONSES

Production Category	Number of Eggs/Chicks Produced on Farm	Survivability Rate (%)
Eggs Produced	1713	-
Eggs Fertile	1359	79.3
<u>Chicks</u>		
3 months old	597	34.9
6 months old	338	19.7
12 months old	228	13.3

TABLE XVI
ANALYSIS OF RHEA SURVIVABILITY RATES BASED
ON SURVEY RESPONSES

Production Category	Number of Eggs/Chicks Produced on Farm	Survivability Rate (%)
Eggs Produced	266	-
Eggs Fertile	152	57.1
<u>Chicks</u>		
3 months old	40	15.0
6 months old	23	8.6
12 months old	10	3.7

TABLE XVII

ANALYSIS OF DEATH LOSS BY AGE FOR OSTRICH, EMU AND RHEA AS REPORTED BY SURVEY RESPONDENTS

Age	Number of Eggs/Chicks Produced on Farm					
	Survivability		Survivability		Survivability	
	Ostrich	Rate (%)	Emu	Rate (%)	Rhea	Rate (%)
Eggs Incubated	1903	-	1637	-	108	-
Bad Eggs	319	16.8	271	16.6	27	2.5
Death						
Before 3 Months	551	30.0	74	4.5	44	40.7
3 - 6 months	79	4.2	11	.7	1	.9
6-12 months	36	1.9	3	.2	-	-
12 months-2 years	1	.1	-	-	3	2.8

while emu had the lowest with 4.5 percent before three months. All species reported death losses of less than three percent from six months to two years.

An analysis of ostriches, emus and rheas as sold by age is illustrated by Table XVIII. The highest percentage sold by age was achieved by ostrich and emu with over 44 percent sold between ages three to six months. The next high percentages were also reported by ostrich and emu selling over 22 percent between ages six to twelve months. Rhea only reported one sale, 1 bird twelve months to two years old.

TABLE XVIII

ANALYSIS OF OSTRICHES, EMUS AND RHEAS SOLD BY AGE
AS REPORTED BY SURVEY RESPONDENTS

Age	Number of Eggs/Chicks Produced on Farm					
	Ostrich	Percent Sold (%)	Emu	Percent Sold (%)	Rhea	Percent Sold (%)
<u>Eggs</u>	123	20.4	20	6.2	-	-
<u>Chicks</u>						
Less than 3 months	40	6.6	57	17.6	-	-
3-6 months	271	44.9	143	44.3	-	-
6-12 months	136	22.6	94	29.1	-	-
12 months-2 years	33	5.5	9	2.8	1	100.0
Total	603	100.0	323	100.0	1	100.0

Tables XIX through XXX correspond to objective four determining the perceived willingness of producers to support a commercial processing industry.

Table XIX is a summary of the responses concerning levels of agreement with statements describing selected operation and marketing values. The data in Table XIX indicated that the producers perceived that their operations currently emphasized the production of birds for breeding purposes and eggs for hatching, with a mean response of 4.23 which falls in the category of "agree". Marketing emphasis illustrated that the respondents' were directed toward the sale of seedstock and eggs for hatching, with a mean response of 3.8 which was in the "agree" category.

TABLE XIX

RESPONDENTS' EXTENT OF AGREEMENT WITH STATEMENTS DESCRIBING
SELECTED OPERATION AND MARKETING VARIABLES

Operation and Marketing Variables	Distribution of Respondents by Extent of Agreement Category										Cumulative Response	Mean Response	Overall Response
	Strongly Agree		Agree		Don't Know		Disagree		Strongly Disagree				
	N	%	N	%	N	%	N	%	N	%			
Our operation currently emphasizes the production of birds for breeding purposes and eggs for hatching (N=107)	38	35.5	63	58.9	-	-	5	4.7	1	.9	453	4.23	Agree
Marketing emphasis in our operation is directed toward the sale of seedstock and eggs for hatching (N=105)	26	24.8	54	51.4	6	5.7	16	15.2	3	2.9	399	3.8	Agree
Marketing options used in our operation are primarily private treaty and auctions (N=104)	13	12.5	61	58.7	12	11.5	15	14.4	3	2.9	378	3.63	Agree
Using a broker to market our birds provides us with the best option for our operation (N=124)	4	3.8	6	5.8	19	18.3	50	48.1	25	24.0	226	2.17	Disagree
Having the opportunity to go directly to a processor with our birds would greatly benefit our operation (N=106)	51	48.1	45	52.5	9	8.5	1	1.9	-	-	464	4.38	Agree

TABLE XIX (Continued)

Operation and Marketing Variables	Distribution of Respondents by Extent of Agreement Category										Cumulative Response	Mean Response	Overall Response
	Strongly Agree		Agree		Don't Know		Disagree		Strongly Disagree				
	N	%	N	%	N	%	N	%	N	%			
The marketing of ratites and ratite products for human consumption and the apparel industry would provide expansion opportunities for producers in southwest Oklahoma (N=106)	72	67.9	33	31.1	1	.9	-	-	-	-	495	4.67	Strongly Agree
Currently the apparel industry holds more profit for potential expansion of ratite operations in southwest Oklahoma than does the processing of birds for human consumption (N=105)	2	1.9	10	9.5	23	21.9	47	44.8	23	21.9	236	2.25	Disagree

However, marketing options respondents used in their operations were primarily private treaty and auctions, with a mean score of 3.63 which was in the "agree". Responses concerning using a broker to market birds provided respondents' with the best option for their operation, with a mean score of 2.17, which fell in the "disagree" category.

However, data concerning respondents having the opportunity to go directly to a processor with their birds would greatly benefit their operation, with a mean score of 4.38 which was in the "agree" category. Data which concerned the marketing of ratites and ratite products for human consumption and the apparel industry would provide expansion opportunities for producers in southwest Oklahoma, had a mean score of 4.67 which placed in the "strongly agree" category. Responses concerning the apparel industry holding more promise for potential expansion of ratite operations in southwest Oklahoma than the processing of birds for human consumption had a mean score of 2.25 which placed in the "disagree" category.

The data in Table XX summarized the respondents' perceptions concerning the most profitable marketing option. Over 70 percent responded to private treaty, while 13.9 percent responded to direct to processor, and less than 4 percent responded to the remaining options.

A summary of respondents' perceptions of their primary product they were interested in marketing was illustrated in Table XXI. Two categories were responded to as 27.1 percent, commercial processing for human consumption and the category of

TABLE XX

A SUMMARY OF RESPONDENTS' PERCEPTIONS CONCERNING THE
MOST PROFITABLE MARKETING OPTION

Marketing Option	Frequency N=115	Percent (%)
Private Treaty	81	70.4
Direct to Processor	16	13.9
Auction Market	6	5.2
Brokers	4	3.5
Don't Know	4	3.5
Other	4	3.5
Total	115	100.0

TABLE XXI

A SUMMARY OF RESPONDENTS' PERCEPTION OF THE PRIMARY
PRODUCT THEY ARE INTERESTED IN MARKETING

Primary Marketing Interest	Frequency N=107	Percent (%)
Commercial Processing for Human Consumption	29	27.1
Seedstock, Eggs, Feathers, Oil and Commercial Processing	29	27.1
Seedstock	25	23.4
Seedstock and Eggs	9	8.4
Eggs	5	4.7
Feathers, Oil and Commercial Processing	4	3.7
Eggs, Feathers, Oil, and Commercial Processing	2	1.9
Eggs, Feathers, and Oil	2	1.9
Oil and Commercial Processing	2	1.9
Eggs and Feathers	1	0.9
Seedstock, Eggs, Feathers, and Oil	1	0.9
Feathers	-	-
Oil	-	-
Feathers and Oil	-	-
Total	107	100.0

seedstock, eggs, feathers, oil and commercial processing. These categories were followed by a 23.4 percent seedstock interest.

Summarizing respondents' perceived willingness to produce ratites for a commercial processing industry, considering the current production environment, Table XXII indicated a 99.1 percent "yes" to a 0.9 percent "no".

Table XXIII further emphasized the producers willingness to produce for a commercial market by summarizing the numbers of birds producers were willing to provide a processing industry if it were established in southwest Oklahoma. Thirty-one percent indicated they would produce 20 or less, 25 percent indicated 21 to 40, while 11 percent indicated 101 to 120 and 9 percent indicated 201 or more birds for market.

Illustrating a summary of prices respondents' would expect to receive for ratites produced for a commercial processing industry, Table XXIV indicated 37.5 percent responded to \$4.01 to \$5.00, however 21.2 percent indicated \$5.01 to \$6.00, 18.3 percent indicated \$3.01 to \$4.00, while 1 percent expected to receive \$10.01 or more.

Illustrating expected prices, Table XXV summarizes responses to minimum prices before production for a commercial processing market would be terminated. Over 38 percent responded to \$2.01 to \$3.00, while 22.3 percent indicated \$3.01 to \$4.00. However 17.5 percent responded to \$1.01 to \$2.00, and one respondent indicated they would stop production if prices fell below \$10.01.

TABLE XXII

A SUMMARY OF THE RESPONDENTS' PERCEPTIONS CONCERNING
WHETHER OR NOT THEY WERE WILLING TO PRODUCE RATITES
FOR A COMMERCIAL PROCESSING INDUSTRY

Willingness to Produce a for a Commercial Processing Market	Frequency N = 106	Percent (%)
Yes	105	99.1
No	1	.9
Total	106	100.0

TABLE XXIII

A SUMMARY OF NUMBER OF BIRDS RESPONDENTS' WERE WILLING
TO SUPPLY TO A PROCESSING INDUSTRY IF ESTABLISHED
IN SOUTHWEST OKLAHOMA

Number of Birds	Frequency N = 100	Percent (%)
20 or less	31	31.0
21-40	25	25.0
41-60	9	9.0
61-80	4	4.0
81-100	8	8.0
101-120	11	11.0
21-140	-	-
141-160	2	2.0
181-200	1	1.0
201 or More	9	9.0
Total	100	100.0

TABLE XXIV

SUMMARY OF PRICES RESPONDENTS EXPECT TO RECEIVE FOR RATITES
PRODUCED FOR A COMMERCIAL PROCESSING INDUSTRY

Price Per Pound (\$)	<u>Frequency</u> N = 104	Percent (%)
2.00 or less	-	-
2.00-3.00	3	2.8
3.01-4.00	19	18.3
4.01-5.00	39	37.5
5.01-6.00	22	21.2
6.01-7.00	15	14.4
7.01-8.00	3	2.9
8.01-9.00	2	1.9
9.01-10.00	-	-
10.01 or More	1	1.0
Total	104	100.0

TABLE XXV

SUMMARY OF RESPONSES AS TO MINIMUM PRICE BEFORE
PRODUCTION FOR A COMMERCIAL PROCESSING
MARKET WOULD BE TERMINATED

Price Per Pound (\$)	<u>Frequency</u> N = 103	Percent (%)
1.00 or less	7	6.8
1.01-2.00	18	17.5
2.01-3.00	40	38.8
3.01-4.00	23	22.3
4.01-5.00	7	6.8
5.01-6.00	5	4.9
6.01-7.00	2	1.9
7.01-8.00	-	-
8.01-9.00	-	-
9.01-10.00	-	-
Under 10.01	1	1.0
Total	103	100.0

Table XXVI summarizes whether or not respondents were willing to expand production if a commercial processing market was created. Out of one hundred producers, 95.2 percent, responded "yes" to the question. Only five producers, 4.8 percent responded "no" they would not expand production.

TABLE XXVI

A SUMMARY OF WHETHER OR NOT RESPONDENTS WERE WILLING TO
EXPAND PRODUCTION IF A COMMERCIAL PROCESSING MARKET
WAS CREATED

Willingness to Expand	<u>Frequency</u> N = 105	Percent (%)
Yes	100	95.2
No	5	4.8
Total	105	100.0

Qualitative data concerning respondents expansion plans was summarized in Table XXVII. The researcher grouped data from 87 respondents into 14 categories. Sixteen respondents expansion plans included adding breeding pairs. However, twelve respondents plan to expand by retaining ownership of birds. Eleven respondents plan to purchase more birds. Two respondents plan to expand to trios. While one respondent plans on boarding for investors and another plans to strive for efficiency with little expansion.

Table XXVIII shows respondents' ranking of components of marketing plans for birds and products. The four components were seedstock, eggs, feathers and

TABLE XXVII
SUMMARY OF THE RESPONDENTS' EXPANSION PLANS
BY SELECTED RESPONSE

Selected Response(s)	Number of Respondents
Expand Breeding Pairs	16
Expand the Retained Ownership of Birds	12
Purchase More Birds	11
Increase Production, Incubation and Hatching	11
No Expansion Plans	9
Expand Facilities	8
Already Expanded in Anticipation of Market	5
Plan to Grow with Market	3
Feedlot/Purchase Chicks for Processing	3
Raise Birds for Market	2
Increase from Pairs to Trios	2
Strive for Efficiency with Little Expansion	1
Board for Investors	1
Total	87

TABLE XXVIII

RESPONDENTS' RANKING OF COMPONENTS OF MARKETING PLANS
FOR BIRDS AND PRODUCTS

Components	<u>Distribution of Responses by Rank and Category</u>										Cumulative Rank	Mean Rank	Overall Rank
	1		2		3		4		4				
	N	%	N	%	N	%	N	%					
Seedstock (N=86)	52	60.5	28	32.6	2	2.3	4	4.7	130	1.51	1		
Eggs (N=76)	7	9.2	15	19.7	48	63.2	6	7.9	205	2.70	3		
Feathers (N=73)	3	4.1	1	1.4	8	11.0	61	83.6	273	3.74	4		
Commercial Processing (N=87)	27	31.0	41	47.1	17	19.5	2	2.3	168	1.93	2		

commercial processing. Seedstock had a mean rank of 1.51 with an overall rank of "1". Commercial processing had a mean rank of 1.93 which gave it an overall rank of "2". However, eggs had a mean rank of 2.70 which gave eggs an overall rank of "3". Leaving feathers with a mean rank of 3.74 and an overall rank of "4".

An illustration of the respondents' rankings concerning marketing options is depicted in Table XXIX. The possible marketing options were broker, direct to processor, auction market and private treaty. Private treaty ranked "1" with a mean rank of 1.55. Direct to processor ranked "2" with a mean rank of 2.02. However, auction market ranked "3" with a mean rank of 3.13, while broker ranked "4" with a mean rank of 3.15 only 0.02 higher than auction market.

The final table, Table XXX, illustrated qualitative data which was summarized by the researcher. The researcher summarized the 71 respondents' marketing plans into 10 categories. Eighteen respondents marketing plans consisted of selling a combination of seedstock and commercial processing. While thirteen producers indicated they were not ready to market their birds. However, twelve planned to sell their birds private treaty, while ten plan to sell to commercial processors. One producer planned to sell to brokers and another planned to sell boarding contracts.

TABLE XXIX

RESPONDENTS' RANKING OF MARKETING OPTIONS

Marketing Options	<u>Distribution of Responses by Marketing Options by Rank</u>								Cumulative Rank	Mean Rank	Overall Rank
	1		2		3		4				
	N	%	N	%	N	%	N	%			
Broker (N=72)	7	9.7	7	9.7	26	36.1	32	44.4	227	3.15	4
Direct to Processor (N=84)	30	35.7	30	35.7	16	19.0	8	9.5	170	2.02	2
Auction Market (N=72)	1	1.4	18	25.0	24	33.3	29	40.3	225	3.13	3
Private Treaty (N=80)	48	60.0	23	28.8	6	7.5	3	3.7	124	1.55	1

TABLE XXX

SUMMARY OF RESPONDENTS' CURRENT MARKETING PLANS AS
COMPILED FROM QUALITATIVE DATA

Summarized Response	Number of Respondents
Sell Seedstock and Commercial Processing	18
Not ready to market - No plans	13
Sell seedstock - Private treaty	12
Sell to commercial processors	10
Advertisement: Newspaper, Magazine, Word of Mouth	8
Sell through Cooperatives	3
Sell Eggs, Seedstock, Commercial Processing	3
Sell Eggs	2
Sell Boarding Contracts	1
Sell to Brokers	1
Total	87

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Over the past ten years, a new industry has developed in southwestern Oklahoma; ratite production. Ratite production is the practice of breeding, hatching and growing ostriches, emus and rheas.

Commercial ratite production has the potential of developing into a profitable alternative agricultural enterprise with two primary products, meat and hide. Numbers of breeding ratites have expanded to the point that birds will soon be available for slaughter at prices that could make commercial production feasible.

The ratite industry is close to, or at the point of changing from a seedstock market to a consumption-oriented market. Since a commercial market does not currently exist in southwestern Oklahoma, ratite populations, distribution and locations are important aspects to the development of a consumption and value added industry. In addition, survivability estimates are important from the aspect of the number of ratites available for a commercial market.

Recent trends indicate that expansion to commercial oriented operations will be slow as long as profits are at current levels among seedstock producers. In order for the

industry to progress producers must change their operations to support the demands of a commercial oriented market.

The purpose of this chapter was to present the major findings, conclusions and recommendations of the study as well as summarizing the purpose, objectives and procedures.

Purpose of the Study

The purpose of this study was to determine a ratite producer population, production potential and possibilities for the development of a commercial processing industry in southwestern Oklahoma.

Objectives of the Study

The following specific objectives were developed in order to accomplish the purpose of this study:

1. Identify a population of ratite producers in southwestern Oklahoma from production association directors, cooperative extension producer lists, and industry publication subscriber lists.
2. Determine demographic characteristics common among ratite producers in southwest Oklahoma.
3. Conduct an inventory and determine the approximate age of the ratite population and its distribution among breeding flocks in southwest Oklahoma by county.

4. Estimate the survivability rates of ostriches, emus and rheas based on egg fertility, egg incubation to hatch and birds zero to three months, three to six months and six to twelve months as reported by ratite producers in southwest Oklahoma

5. Determine the perceived willingness among southwest Oklahoma ratite producers to support a commercial processing industry.

Procedures

Design and Procedures of the Study

The population of this study was determined to include ratite producers in southwest Oklahoma. This area of the state was selected because it was part of a larger study being conducted state-wide. There was not a producer list available from which a population could be determined. However, the researcher generated a list of potential producers from various sources, including producer associations, industry magazines and the Oklahoma Cooperative Extension Service (OCES).

The instrument designed by the researcher was deemed to have face-validity by a panel of Extension experts. The instrument was also reviewed by the Agricultural Department staff of Cameron University, Stephens County Extension Agents, and OCES Southwest District Area and District Staff located in Duncan, Oklahoma.

Qualitative and quantitative data were determined from the questionnaire. The instrument was divided into four sections. (1) Demographics of Producers, (2) Operations and Marketing, (3) Industry Inventory, and (4) Anticipated Production and Marketing Plans. The question in sections one and two simply required the

producers to check the most appropriate response. Section three required the producer to complete inventory data concerning production history and enumeration of eggs and birds. Section four asked for a brief explanation of production and marketing plans.

Once the data were summarized they were divided into major areas coinciding with the four objectives of the study. The data was analyzed using descriptive statistics; frequency distributions, percentages, mean scores and a summary of open response items.

Major Findings of the Study

The major findings of the study were divided into four sections corresponding to the five objectives of the study.

Objective One: Identify Ratite Producers in Southwestern Oklahoma

The population of 112 ratite producers was identified from a review of producer association lists, cooperative extension producer lists and industry publication subscriber lists.

Objective Two: Ratite Producer Demographics

Over 57 percent of the survey respondents were from five counties in southwestern Oklahoma; Beckham, Canadian, Cleveland, Garvin and Oklahoma counties. However, there were two counties without any respondents, Greer and Roger Mills counties. Eighty-eight respondents were male and 20 were female. Almost

one-third of the respondents were in the 51 to 60 year old range, while 1.9 percent of the respondents were over 70 years of age.

One half, 50 percent, of the respondents indicated they produced ostriches, however, one quarter, 25.5 percent, produced emus, while 1.8 percent produced rheas. The remaining 22.7 percent produced a combination of ostriches, emus and rheas. Almost 50 percent of the respondents, ratite production operations were for a combination of breeding and commercial purposes. However, 34.2 percent of the respondents produced seedstock only, while 1.8 percent produced for commercial purposes.

An overwhelming 75 percent of the respondents had less than four years of production experience, while 42.6 percent of the respondents had been producing for less than two years. However, almost four percent had been producing for over nine years. During 1992 and 1993, 44.2 percent of the respondents entered the ratite business, while 14.4 percent entered during the 1994 calendar year.

Over 41 percent of the survey respondents indicated their primary reason for entering the ratite business was to increase farm income, while 19.7 percent entered for the novelty of a new industry and 0.8 percent entered for the social status. A summary of producer demographics is illustrated in Table XXXI.

Objective Three: Distribution and Age of Ratites

Respondents to the survey reported 1055 ratites in southwestern Oklahoma; 605 ostriches, 387 emus and 63 rheas. This translates into approximately 500 pairs of producing ratites. The male to female production ratio was 1:1 for 88.1 percent of the

TABLE XXXI
A SUMMARY OF PRODUCER DEMOGRAPHICS

Demographic Category	Percent of Respondents (%)
<u>County of Residence</u>	
Beckham	11.1
Canadian	11.1
Cleveland	12.0
Garvin	11.1
Oklahoma	12.0
Other Counties	42.7
Total	100.0
<u>Gender</u>	
Female	18.5
Male	81.5
Total	100.0
<u>Age</u>	
31-40	20.4
41-50	19.4
51-60	31.5
Other Ages	28.7
Total	100.0
<u>Years of Ratite Production Experience</u>	
Less than 1 year	8.3
1-2 years	34.3
3-4 years	32.4
4 or more years	25.0
Total	100.0

TABLE XXXI (Continued)

Demographic Category	Percent of Respondents (%)
<u>Primary Reason for Investment</u>	
Increased Farm Income	41.8
Novelty of a New Industry	19.7
Social Status	.8
Diversification of Agricultural Operation	10.7
Other Reasons	27.0
Total	100.0
<u>Type of Ratite Production Operation</u>	
Breeding/Seedstock	34.2
Commercial/Processing	1.8
Combination: Breeding and Commercial	49.1
Other Types of Operations	14.9
Total	100.0

ostriches, 1:1 for 93.5 percent of the emus while 63.6 percent of the rheas were 1:1. The range in age for the majority of the male and female ratites was two to four years.

Surprisingly, 63.5 percent of the ratites were located in six of the 20 counties in southwest Oklahoma; 132 in Beckham county, 96 in Canadian county, 98 in Cleveland county, 120 in Garvin county, 102 in Oklahoma county and 119 in Washita county. Table XXXII summarizes the distribution and age of ratites in southwest Oklahoma.

Objective Four: Industry Inventory and Survivability Rates

Survey respondents reported 2230 ostrich eggs produced during the 1993-1994 production year. However, of the 2230 eggs 1650 were fertile, 707 hatched and survived to three months of age, while only 131 of the 707 hatched to one year of age. These numbers translate into a 31.7 percent survival rate to three months and 5.9 percent to one year.

Emu survey respondents reported 1713 eggs produced in the 1993-1994 production year. Five hundred and ninety-seven chicks hatched survived to three months and 228 of the 597 hatched survived to one year of age. In other words, 34.9 percent survived to three months of age, while only 13.3 percent lived to one year of age.

Rhea producers reported 266 eggs produced, 40 of the eggs hatched and the chicks lived to three months of age, while only 10 chicks survived to one year of age. Fifteen percent of the chicks survived to three months and 3.7 percent survived to twelve months. Table XXXIII summaries the survivability rates based on the survey responses.

TABLE XXXII

A SUMMARY OF THE DISTRIBUTION AND AGE OF RATITES
IN SOUTHWESTERN OKLAHOMA

Category/Specie	Number of Ratites	Percent of Respondents (%)
<u>Number of Ratites</u>		
Ostrich	605	57.3
Emu	387	36.7
Rhea	63	6.0
Total	1055	100.0
<u>Number of 1:1 Male to Female Production Ration by Specie</u>		
Ostrich		88.1
Emu		93.5
Rhea		63.6
<u>Estimated Average Age of Breeding Flock</u>		
Male Ratites 2-4 years		100.0
Female Ratites 2-4 years		75.5
		79.8
<u>Location of Majority of Ratites by County</u>		
Beckham	132	12.6
Canadian	96	9.1
Cleveland	98	9.3
Garvin	120	11.4
Oklahoma	102	9.7
Washita	119	11.3
Remaining Counties	384	36.6
Total	1051	100.0

TABLE XXXIII

ANALYSIS OF RATITE SURVIVABILITY RATES
BASED ON SURVEY RESPONSES

Production Category/Specie	Number of Eggs/Chicks Produced on the Farm	Percent of Respondents (%)
<u>Ostrich</u>		
Eggs Produced	2230	-
Chicks - 3 months old	707	31.7
Chicks - 12 months old	931	5.9
<u>Emu</u>		
Eggs Produced	1713	-
Chicks - 3 months old	597	34.9
Chicks - 12 months old	228	13.3
<u>Rhea</u>		
Eggs Produced	266	-
Chicks - 3 months old	40	15.0
Chicks - 12 months old	10	3.7

The survivability data does not reflect the chicks and eggs that may have moved on or off the farms.

Objective Five: The Respondents' Perceived

Willingness to Produce for a Commercial

Processing Industry

When respondents were given the opportunity to indicate the extent to which they agreed or disagreed with statements concerning the development of a processing industry and their perceptions concerning the change in production practices, they seemed to agree with changing the emphasis of the ratite industry. Table XXXIV summarizes these findings.

In summarizing the producers' most profitable marketing option it was determined that 70.4 percent of the respondents perceived "private treaty" as the most profitable, however, 13.9 percent perceived "direct to the processor" as the most advantageous. Slightly over 27 percent, perceived the primary product they were interested in marketing was "commercial processing for human consumption" and an additional 27.1 percent perceived, "seedstock, eggs, feathers, oil and commercial processing" as the primary product in which they were interested in marketing. However to the contrary, 23.4 percent indicated they were interested in marketing "seedstock".

According to producer responses, an overwhelming 99.1 percent stated they were willing to produce for a commercial market, while 0.9 percent responded that they would not produce for a commercial market. Furthermore respondents also indicated the numbers of birds they were willing to produce for a processing industry. Thirty-one

TABLE XXXIV
 RESPONDENTS' EXTENT OF AGREEMENT WITH STATEMENTS
 CONCERNING CHANGES IN OPERATIONS AND
 MARKETING PLANNING

Statement	Mean Score	Category of Mean Response
The marketing of ratites and ratite products for human consumption and the apparel industry would provide expansion opportunities for producers in southwest Oklahoma.	4.67	Strongly Agree
Having the opportunity to go directly to a processor with our birds would greatly benefit our operation.	4.38	Agree
Our operation currently emphasizes the production of birds for breeding purposes and eggs for hatching.	4.23	Agree
The marketing emphasis in our operation is currently directed toward the sale of seedstock and eggs for hatching.	3.8	Agree
The marketing options currently used in our operation are primarily private treaty and auctions.	3.63	Agree
Currently the apparel industry holds more promise for potential expansion of ratite operations in southwest Oklahoma than does the processing of birds for human consumption.	2.25	Disagree
Using a broker to market our birds provides us with the best option for our operation at the present time.	2.17	Disagree

percent indicated 20 birds or less, 25.0 percent were willing to produce 21 to 40 birds for a commercial market, while 9.0 percent indicated they would provide 201 or more birds for a commercial processing industry.

Over 37 percent of the respondents indicated they expected to receive \$4.01 to \$5.00 per pound for their birds on a commercial basis, while 21.2 percent indicated they expected \$5.01 to \$6.00 per pound. Slightly over 18 percent of the respondents indicated they would produce for a commercial market if prices were in the range of \$3.01 to \$4.00 per pound. While over one-fifth of the respondents stated they would not be willing to produce for a commercial processing industry within the parameters of the price ranges indicated. However, on the other hand, 38.8 percent of the respondents indicated they would not produce for a commercial industry if market prices fell below \$2.01 per pound.

An interesting finding was that over 95.0 percent of the respondents indicated a willingness to expand production if a commercial processing market was created. Only 4.8 percent indicated they would not expand. A summary of the data concerning the perceived willingness of respondents to produce for a commercial market is illustrated in Table XXXV.

As indicated in Table XXXVI, respondents ranked components of marketing plans for birds and products. "Seedstock" ranked first, "commercial processing" ranked second, "eggs" ranked third and "feathers" ranked fourth. Furthermore, respondents also ranked marketing options. Using mean scores, "private treaty" ranked first, "direct

TABLE XXXV

A SUMMARY OF DATA CONCERNING THE PERCEIVED
WILLINGNESS OF RESPONDENTS TO PRODUCE FOR
A COMMERCIAL PROCESSING INDUSTRY

Perception Category	Percent (%)
<u>Most Profitable Marketing Option</u>	
Private Treaty	7.0
Direct to Processor	13.9
Other Options	15.7
Total	100.0
<u>Primary Marketing Interest</u>	
Seedstock, Eggs, Feathers, Oil and Commercial Processing	27.1
Commercial Processing for Human Consumption	27.1
Seedstock	23.4
Other	22.4
Total	100.0
<u>Willingness to Produce for a Commercial Processing Market</u>	
Yes	99.1
No	0.9
Total	100.0
<u>Number of Birds Respondents were Willing to Produce for a Commercial Market</u>	
20 or less	31.0
21-40	28.0
101-120	11.0
201 or more	9.0
Other	24.0
Total	100.0
<u>Price Expected on a Commercial Processing Market</u>	
\$5.01-5.00	21.2
\$4.01-6.00	37.5
\$3.01-4.00	18.3
Other	23.0
Total	100.0

TABLE XXXV (Continued)

Perception Category	Percent (%)
<hr/>	
<u>Minimum Market Price Before Production Termination</u>	
\$3.01-4.00	22.3
\$2.01-3.00	38.8
\$1.01-2.00	17.5
Other	21.4
<u>Willingness to Expand Production if a Commercial Market was Created</u>	
Yes	95.2
No	4.8
Total	100.0

TABLE XXXVI
 RESPONDENTS' RANKING OF MARKETING
 PLANS AND OPTIONS

Category	Mean Score	Overall Rank
<u>Marketing Plans</u>		
Seedstock	1.51	1
Commercial Processing	1.93	2
Eggs	2.70	3
Feathers	3.74	4
<u>Marketing Options</u>		
Private Treaty	1.55	1
Direct to Processor	2.02	2
Auction Market	3.13	3
Broker	3.15	4

to processor” ranked second, “auction market” ranked third and “brokers” ranked fourth.

Conclusions

The following conclusions were based on the data analyzed and the major findings of the study.

1. It seemed that producer association lists, cooperative extension producer lists and industry publication subscriber lists were adequate in identifying ratite producers in southwestern Oklahoma.

2. The typical ratite producer respondent in southwestern Oklahoma was male and were novices in the industry with regard to production experience. Furthermore it was concluded that the typical response given for entering the ratite business was to find a way to increase farm income. In addition, it was apparent that ostriches were the ratite of choice for production.

3. The primary production area of ratites in southwest Oklahoma was widely dispersed. It was apparent from the data that ratite populations were rather young and entering their productive life. Furthermore, it seemed that survey respondents were rather pessimistic concerning the survival rate of ratites at any age.

4. The typical response given for the most profitable ratite marketing option among survey respondents was “private treaty”.

However, producer respondents seemed to indicate a willingness to produce for a commercial oriented market and expand production if conditions merit the situation.

Recommendations

The following recommendations were made on the basis of the major findings and conclusions drawn from the study:

1. Producers need to determine whether a particular specie of ratite is more profitable than another. Producers should carefully analyze their current operations before making decisions to get into the ratite production business.
2. Based on the age and distribution of the ratites, producers should take steps to change their production patterns. The ratites would be less expensive to produce if there were fewer male birds to feed. Therefore, male birds could be fed and directed toward a commercial processing industry. A higher female to male ratio would seem to be more practical and profitable situation.
3. Ratite producers should look for a central location among the most heavily populated ratite counties to establish a processing facility, if they plan to proceed with a commercial oriented industry.
4. It is imperative that ratite producers seriously take survivability rates into consideration when making production decisions. New methods for increasing survivability rates should be addressed.
5. Producers should provide the leadership in creating a commercial processing market for their industry such as a cooperative.

Recommendations for Additional Research

1. There is a definite need for better identification of producers and their geographical distribution across the state.
2. A study should be conducted to determine the feasibility of a commercial ratite processing plant and more precisely estimate the availability of ratites for a commercial market.
3. Further study should be conducted to find new methods of enhancing ratite survivability rates and to determine production practices that would make the industry more profitable.

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APPENDIXES

APPENDIX A

**SURVEY COVER LETTER TO
SOUTHWEST OKLAHOMA
RATITE PRODUCERS**



Oklahoma Cooperative Extension Service

Division of Agricultural Sciences and Natural Resources
Oklahoma State University

February 24, 1995

Dear Ratite Producer:

Ratite production is a relatively "new" agricultural enterprise in Oklahoma. It is essential that industry leaders such as yourself have access to current information and available technology. This study is designed in cooperation with ratite producers to develop base-line information concerning the industry. We are interested in additional information which you feel would prove valuable to your operation and those involved in market development.

This survey is a joint effort among the departments of Agricultural Economics, Agricultural Education, Communications and 4-H Youth Development and the Oklahoma Cooperative Extension Service. Survey responses will be held in strict confidentiality. Identification of individual answers will not be possible as only a summary of responses will be reported. Please support your industry by spending about 15 minutes completing the survey.

If you would like to be publicly identified as a ratite producer, please sign and complete the enclosed information sheet. This in no way jeopardizes the confidentiality of your responses. Your name will be used to develop a producers directory.

Please return the completed survey in the enclosed pre-addressed stamped envelope.

Thank you for your cooperation and assistance.

Jeffrey Sallee
OSU Graduate Student
Comanche County Extension Agent

Michael Dicks, Professor
Dept. of Agricultural Economics

James D. White, Professor
Dept. Agricultural Education, Communications
and 4-H Youth Development

Raymond E. Campbell
Associate Director Oklahoma
Cooperative Extension Service

enclosure

APPENDIX B

SOUTHWEST OKLAHOMA RATITE

PRODUCER SURVEY

**SOUTHWEST OKLAHOMA RATITE PRODUCER
SURVEY
Spring, 1995**

I. DEMOGRAPHICS OF PRODUCERS:

1. County: _____
2. Gender:
 - Female
 - Male
3. Age:
 - 20 years or less
 - 21 - 30
 - 31 - 40
 - 41 - 50
 - 51 - 60
 - 61 - 70
 - 71 years and over
4. Kind of ratites produced:
 - Ostriches only
 - Emus only
 - Rheas only
 - Ostriches and Emus
 - Ostriches and Rheas
 - Ostriches, Emus and Rheas
 - Emus and Rheas
5. Type of ratite operation:
 - Breeding/seedstock production only
 - Commercial/processed for human consumption
 - Combination: breeding and commercial/processing operation
 - Feather production
 - Combination: breeding, feather production and commercial/processing operation
 - Other(please be specific) _____
6. Years of ratite production experience:
 - less than one year of experience
 - 1 - 2
 - 3 - 4
 - 5 - 6
 - 7 - 8
 - 9 - 10
 - over 10 years experience

7. Number of producing females by specie:
 Ostriches ___ Emus ___ Rheas ___
8. Number of production/breeding males by specie:
 Ostriches ___ Emus ___ Rheas ___
9. Male to female ratio: (Ex. 1 male to 3 females - 1:3)
- | | | |
|-----------|---------|---------|
| Ostriches | Emus | Rheas |
| ___:___ | ___:___ | ___:___ |
10. Estimated average age of breeding flock:
- | <u>Males</u> | <u>Females</u> |
|----------------------|----------------------|
| ___ 1 year or less | ___ 1 year or less |
| ___ 2-4 years | ___ 2-4 years |
| ___ 5-7 years | ___ 5-7 years |
| ___ 8-10 years | ___ 8-10 years |
| ___ 11-13 years | ___ 11-13 years |
| ___ 14-16 years | ___ 14-16 years |
| ___ 17-19 years | ___ 17-19 years |
| ___ 20-22 years | ___ 20-22 years |
| ___ 23 years or over | ___ 23 years or over |
11. Year you entered the ratite business? _____
12. Why did you get involved in ratite production (primary reason)?
- ___ Allowed me an alternative to increase net farm income.
 - ___ The novelty of being involved and associated with a new agricultural industry.
 - ___ The social status of producing ratites.
 - ___ Allowed me to diversify my production agriculture operation.
 - ___ Other (please be specific) _____

II. OPERATIONS AND MARKETING

Please answer the following questions by circling the most appropriate response.

Strongly Agree **Agree** **Don't Know** **Disagree** **Strongly Disagree**
 1 2 3 4 5

13. Our operation currently emphasizes the production of birds for breeding purposes and eggs for hatching.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

14. The marketing emphasis in our operation is currently directed toward the sale of seedstock and eggs for hatching.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

15. The marketing options currently used in our operation are primarily private treaty and auctions.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

16. Using a broker to market our birds provides us with the best option for our operation at the present time.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

17. Having the opportunity to go directly to a processor with our birds would greatly benefit our operation.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

18. The marketing of ratites and ratite products for human consumption and the apparel industry would provide expansion opportunities for producers in southwest Oklahoma.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

19. Currently the apparel industry holds more promise for potential expansion of ratite operations in southwest Oklahoma than does the processing of birds for human consumption.

Strongly Agree Agree Don't Know Disagree Strongly Disagree

20. Currently, the most profitable marketing option available to our operation is :

Brokers
 Direct to processor
 Auction market
 Private treaty
 Other (specify) _____

21. We are primarily interested in marketing: (check only one)

Seedstock
 Eggs
 Feathers
 Oil
 Commercial processing for human consumption
 Seedstock and eggs
 Seedstock, eggs and feathers
 Seedstock, eggs, feathers and oil
 Seedstock, eggs, feathers, oil and commercial processing
 Eggs and feathers
 Eggs, feathers and oil
 Eggs, feathers, oil and commercial processing
 Feathers and oil
 Feathers, oil and commercial processing
 Oil and commercial processing

22.. Considering the current production environment for ratite producers in Oklahoma, would you be willing to produce birds for a commercial ratite processing industry? Yes No

23. If a processing industry were established in your area (Southwest Oklahoma), how many birds would you be willing to supply during the production year?

- 20 birds or less
- 21 - 40
- 41 - 60
- 61 - 80
- 81 - 100
- 101 - 120
- 121 - 140
- 141 - 160
- 161 - 180
- 181 - 200
- 201 birds or more

24. If you were willing to produce ratites for a commercial processing industry....

A. What price would you realistically expect to receive for your birds on a commercial processing market?

- \$2.00/lb or less
- \$2.00 to \$3.00/lb
- \$3.01 to \$4.00/lb
- \$4.01 to \$5.00/lb
- \$5.01 to \$6.00/lb
- \$6.01 to \$7.00/lb
- \$7.01 to \$8.00/lb
- \$8.01 to \$9.00/lb
- \$9.01 to \$10.00/lb
- \$10.01/lb or more

B. How low would the price have to fall before you would stop producing for a commercial processing market and terminate production?

- under \$1.00/lb
- \$1.01 to \$2.00/lb
- \$2.01 to \$3.00/lb
- \$3.01 to \$4.00/lb
- \$4.01 to \$5.00/lb
- \$5.01 to \$6.00/lb
- \$6.01 to \$7.00/lb
- \$7.01 to \$8.00/lb
- \$8.01 to \$9.00/lb
- \$9.01 to \$10.00/lb
- under \$10.01 /lb

III. INDUSTRY INVENTORY:

Please complete the following questions for the past production year by specie.
 Summer of 1994 for Ostrich and Rhea. Winter and Spring 1993-1994 for Emu.

SURVIVABILITY RATE

	Ostrich	Emu	Rhea
Total number of eggs produced	_____	_____	_____
Eggs sold	_____	_____	_____
Eggs Infertile	_____	_____	_____
Eggs currently in Inventory	_____	_____	_____
Total number of eggs Incubated	_____	_____	_____
Bad eggs	_____	_____	_____
Current inventory	_____	_____	_____
Total number of chicks hatched			
Current Inventory of chicks (less than 3 months of age)	_____	_____	_____
Chicks died (before 3 months of age)	_____	_____	_____
Chicks sold (before 3 months of age)	_____	_____	_____
Total number of chicks that survived (to 3 months of age on the farm)	_____	_____	_____
Current Inventory of chicks (3 to 6 months of age)	_____	_____	_____
Chicks died (between 3 and 6 months of age)	_____	_____	_____
Chicks sold (between 3 and 6 months of age)	_____	_____	_____
Total number of chicks that survived (to 6 months of age on the farm)	_____	_____	_____
Current inventory of birds (6 to 12 months)	_____	_____	_____
Birds died between 6 and 12 months of age	_____	_____	_____
Birds sold between 6 and 12 months of age	_____	_____	_____
Total number of chicks that survived (to 12 months of age on the farm)	_____	_____	_____
Current inventory of birds (12 months to 2 years of age)	_____	_____	_____
Birds died between 12 months and 2 years	_____	_____	_____
Birds sold between 12 months and 2 years	_____	_____	_____
Total number of Birds that survived to 2 years of age on the farm	_____	_____	_____

IV. ANTICIPATED PRODUCTION AND MARKETING PLANS:

PRODUCTION PLAN:

Would you expand your production if a commercial processing market was created?

YES

NO

Please describe your expansion plan?

MARKETING PLAN:(rank each column 1-4)

Market of birds and products

- Seedstock
- Eggs
- Feathers
- Commercial processing

Marketing options

- Brokers
- Direct to processor
- Auction market
- Private treaty

Please briefly describe your current marketing plan.

SOUTHWEST OKLAHOMA RATITE PRODUCERS DIRECTORY

In order to help us make our survey as complete as possible, would you please list the names and addresses of other ratite producers in your area.

If these producers are not on our list, they will be added and mailed a survey.

NAME	ADDRESS	PHONE #

Would you consider being included on a Ratite Producer Directory to provide additional information as needed? YES NO

If so, please include your name, address and telephone number in the space provided.

Farm Name _____

Managers Name _____

Address _____

City _____ State _____ Zip _____

Home Phone (____) _____ Business(____) _____

County of Residence _____

THANK YOU FOR YOUR COOPERATION.

FREE GIFT

As a free gift to you for your cooperation, please check the information you wish to receive. (One only please)

- Ratite survey results
- Ostriches, Economic Analysis of a Commercial Production System
- Ostriches, Analysis of Production, Breeding, Hatching, Growing
- Emus, Economic Analysis of a Commercial Production System

These materials have been produced through research conducted by Oklahoma State University.

*If you receive more than one copy of this survey, please return only one.

APPENDIX C

INSTITUTIONAL REVIEW BOARD (IRB)

APPROVAL FORM

**OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW**

Date: 02-03-95

IRB#: AG-95-009

Proposal Title: RATITE PRODUCERS PERCEPTIONS OF POTENTIAL POPULATIONS,
MARKET DEVELOPMENT AND DEVELOPMENT OF A PROCESSING INDUSTRY IN
SOUTHWESTERN OKLAHOMA

Principal Investigator(s): James D. White, Jeffrey Sallee

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL. ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Provisions received and approved.

Signature:



Chair of Institutional Review Board

Date: February 14, 1995

VITA

Jeffrey Alan Sallee

Candidate for the Degree of

Master of Science

Thesis: A BASE LINE ANALYSIS OF SELECTED ASPECTS OF RATITE PRODUCTION POTENTIAL AND DEVELOPMENT OF A PROCESSING INDUSTRY IN SOUTHWESTERN OKLAHOMA

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Fort Smith, Arkansas, October 7, 1965 the son of Albert Sallee and Bertha Terry. Married to Stephanie L. Sallee with two daughters, Katelyn Elizabeth and Emily Anne.

Education: Graduated from Sallisaw High School, Sallisaw, Oklahoma in May 1984; received a Bachelor of Science degree from Oklahoma State University in May, 1989, with a major in Agricultural Economics; completed requirements for the Master of Science degree from Oklahoma State University in July, 1995 with a major in Agricultural Education.

Professional Experience: Accountant for Buffalo Farmers Cooperative, Buffalo, Oklahoma, September, 1989 to October, 1990. County Extension 4-H Agent, Pushmataha and Choctaw Counties, July, 1991 to January, 1993. County Extension 4-H Agent Comanche County, February 1993 to present.

Professional Organizations: National Association of Extension 4-H Agents, Oklahoma Association of Extension 4-H Agents and Phi Kappa Phi Honor Fraternity, Oklahoma State University.