Preliminary results on productive quality of emu in the Volgograd region of Russia

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With support from Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA) an emu flock development project was initiated at Krasnodonskoye Agrofirm, a division of Kazachya Holding Company located in the Volgograd region of Russia. In February 1999 Feather Hill Emu Farm, Monroeville, Alabama donated two hundred eggs. Due to transport breakage, 192 eggs were numbered, weighed, and placed in incubators. Eggs were weighed weekly to verify an average weight loss of 14% was achieved by day 48. Incubation temperature and humidity were 35.8 C and 30%, respectively, with adjustments in humidity as necessary to achieve targeted weight loss. In April, 116 chicks hatched (60.4% hatchability). In March 2000 180 eggs were donated, but due to breakage 142 eggs remained. In May 68 chicks hatched (47.9% hatchability). The two-year-old breeder flock produced a total of 173 eggs with the first egg produced January 9, 2001 and final egg April 23. As a result, 160 eggs were incubated and 35 chicks hatched (21% hatchability). During incubation, an error in humidity control occurred, resulting in late embryonic death. In 2003, a total of 105 chicks were hatched from 325 eggs (32.3% hatchability) and in 2004, a total of 258 chicks were produced from 532 eggs (48.5% hatchability). In 2004 problems with flock fertility resulted in the production of 175 infertile eggs (32.9% of total eggs). Emu production for meat, oil and leather products is a new agribusiness venture in Russia. The fat, when refined into an oil product for use in pharmaceutical and cosmetic products, is currently the most valued component. The Volgograd Region appears suitable for emu production and Kazachya Holding Company has successfully established emu as an alternative agribusiness enterprise with a long-term commitment.

Keywords: emu, incubation, ACDI/VOCA, Russia

Introduction

Krasnodonskoye Agrofirm is a large swine and poultry production operation located near the village of Ilovlya approximately 80 km north of the city of Volgograd, Russia. The operation was established in 1980 and remained a state-owned farm until 1992, when it was reorganized into a joint-stock company. Krasnodonskoye Agrofirm has an interest in expanding its facilities to include emu production. Presently, there is no commercial emu production in Russia. Analyses have been conducted that indicate emu meat has certain health characteristics (i.e. low fat and cholesterol) and that the birds can be economically raised for meat, leather, and feather production provided that economic and financial considerations are strictly observed. In addition, there is a demand by the cosmetic, pharmaceutical, and machining industry for emu oil that is rendered from the bird's fat. Certainly, there exists an opportunity to develop this type of business in Russia.

As a result, a project to establish an emu flock at Krasnodonskoye Agrofirm was initiated with funding provided by US Agency for International Development (USAID) through ACDI/VOCA (Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance). Numerous organizations support agricultural based projects overseas, with a major source of funding originating from USAID via the Farmer-to-Farmer program. Such programs rely
on the expertise of volunteers from U.S. farms, land grant universities, cooperatives, private agribusiness' and nonprofit farm organizations to provide assistance to individual farm enterprises, cooperatives, farmer's associations, agribusiness', rural credit institutions, universities, and agricultural youth groups overseas.

Materials and Methods

Egg Transport and Incubation

In February, 1999 two hundred emu eggs were donated by Featherhill Emu Farm, Monroeville, Alabama to Krasnodonskoye Agrofirm, Volgograd Region, Russia for an incubation project to establish the first commercial emu flock in Russia (Blake and Moorer, 1999). Individual eggs were placed in a styrofoam envelope sealed with tape and packed in a plastic container surrounded with styrofoam peanuts. Five shipping containers (40 eggs/container) were checked as standard-sized baggage and accompanied two project specialists to their final destination. All eggs were disinfected and dried prior to packing in accordance with Russian veterinary requirements as provided by Krasnodonskoye Agrofirm. The required paperwork included an International Health Certificate, Letter of Origin, Letter of Cooperation, Invoice, and Scientific Agreement.

Due to breakage during transport, a total of 192 eggs were numbered, weighed, and placed in incubators. Eggs were weighed weekly to verify that an average weight loss of 14% was achieved by the 48th day of incubation. The determination of weight loss is an important parameter to monitor to achieve good hatchability. All eggs were incubated on their side and turned every two hours. Incubation temperature and humidity parameters were 35.8 C and 30%, respectively, with adjustments in humidity being made as necessary to achieve targeted weight loss. In addition, electronic temperature and humidity monitoring equipment was used to assist with the consistent regulation of these parameters during the incubation period. Eggs were transferred to the hatcher on day 48 and after a 50-day incubation period a total of 116 chicks hatched (60.4% hatchability).

In March 2000, one-hundred eighty emu eggs were donated by Featherhill Emu Farm to Krasnodonskoye Agrofirm for a second incubation project (Blake and Moorer, 2000). Four containers (45 eggs/container) were packed and shipped in a similar manner. A total of 142 eggs survived the rigorous shipping and was placed for incubation. It was reported that 68 chicks resulted (47.9% hatchability).

Breeder Flock Establishment

During Summer 2000, Krasnodonskoye Agrofirm constructed emu breeding facilities for housing ten pedigree pairs, which were selected to serve as their base population for genetic selection. The facilities were well planned and constructed so they could be expanded to twice their current size. A total of 41 pairs were selected from the 1999 hatch. Thirty-one pairs were maintained in a colony-breeding pen. During Summer 2001, the pedigree facility was expanded to accommodate 20 pairs of breeders.

On January 9, 2001 the first Russian egg was laid and 173 total eggs were obtained from the young breeder flock established from the 1999 hatch (Blake and Moorer, 1999; 2001). It is interesting to note that emu are atypical among avian species and initiate their breeding season during winter months, December to April in the Northern Hemisphere and June to October in the Southern Hemisphere. The final egg of the season was laid on April 23. A total of 160 eggs were suitable for incubation and 35 chicks were obtained (21% hatchability). Problems that may have contributed to a lower than anticipated performance may relate to belated attention to breeder management more specifically pair selection and time of housing interval. Resulting fertility was 62.3%. There also appeared to be an error in incubation management. During the incubation period, an error in humidity control occurred, which resulted in late embryonic death prior to hatch. The resulting error caused the chicks to accumulate excessive moisture prior to hatch, resulting in suffocation. While incubation parameters were strictly observed, problems with fertility were encountered in 2002 resulting in 51.4% hatchability (285 out of 555 eggs).
In 2003, a total of 105 chicks were hatched from 325 eggs (32.3% hatchability) and in 2004, a total of 258 chicks were produced from 532 eggs (48.5% hatchability). In 2004 problems with flock fertility resulted in the production of 175 infertile eggs (32.9% of total eggs). Problems with fertility continued into the 2005 season where 300 chicks were hatched from a total of 676 eggs (44.4% hatchability). Table 1 summarizes yearly production of eggs and chicks since the initiation of this project.

Table 1. Summary of emu production from 1999-2005 at Krasnodonskoye Agrofirm, in the Volgograd region of Russia.

<table>
<thead>
<tr>
<th>Year</th>
<th>Eggs placed in incubator</th>
<th>Chicks hatched</th>
<th>Mortality</th>
<th>Slaughtered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999</td>
<td>189</td>
<td>115</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>2000</td>
<td>132</td>
<td>79</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>2001</td>
<td>173</td>
<td>68</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>2002</td>
<td>555</td>
<td>285</td>
<td>50</td>
<td>160</td>
</tr>
<tr>
<td>2003</td>
<td>325</td>
<td>105</td>
<td>4</td>
<td>49</td>
</tr>
<tr>
<td>2004</td>
<td>532</td>
<td>258</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>2005</td>
<td>676</td>
<td>300</td>
<td>18</td>
<td>60</td>
</tr>
<tr>
<td>Total</td>
<td>2604</td>
<td>1214</td>
<td>104</td>
<td>321</td>
</tr>
</tbody>
</table>

1Eggs donated by Doug Moorer from Feather Hill Emu Farm, Monroeville, AL
2Diagnosis of tuberculosis in the emu flock resulted in the removal and disposition of these birds (Blake, 2003).

Nutritional recommendations appeared to be adequate and were based on published information (Blake, 1996; O’Malley, 1996). It was essential to establish a program that enhanced current knowledge concerning the nutritional requirements of the emu, since limited information exists concerning their nutrient requirements (Blake and Moorer, 1999; 2000; 2001).

Educational Seminars and Training

A total of seven visits were completed from 1999-2006 to assist with this emu flock development project. During each visit a series of lectures were presented to specialists involved with the Emu Project at Krasnodonskoye Agrofirm. Lecture materials covered a variety of topics including: (1) Location and construction of facilities, (2) Breeder management, (3) Incubation management, (4) Chick rearing management, (5) Slaughter bird production and management, (6) Diseases, (7) Slaughter facility requirements, (8) Meat and further processing, (9) Product quality and packaging, (10) Marketing concerns, (11) Distribution, and (12) Business planning. Printed materials were also provided to reinforce lecture topics and as a resource for future reference. A complete and comprehensive resource concerned with emu farming compiled by Minaar and Minaar (1992; 1998) was also provided as reference material. There was also an opportunity to develop a disease control plan that embodied all factors necessary for the long-term success of this emu flock. This plan was comprehensive and considered the health care, nutrition, and management of breeders, incubation facility and production of birds for processing (Blake, 2003). The plan was modified as needed to accommodate the company’s goals for expansion and marketing (Blake, 2006).

Individualized on-site training was also provided to emphasize practical applications. Breeder selection was an important component of several training visits (Blake and Moorer, 2001; Moorer, 2003). It is necessary to select and pair breeders well in advance of the expected season (December-April). Techniques for the safe and humane handling as well as methods employed for sexing young adult (35 kg) birds were demonstrated. All breeder candidates were individually caught, restrained, and assessed for reproductive fitness in anticipation of the upcoming breeding season. Birds were individually evaluated for conformation and selection criteria developed for emu (Minaar, 1998). A total of 20 pairs of birds were selected for establishment of the pedigree flock. Individuals selected as a pedigree candidate received a microchip and leg band for future identification. Birds not selected for the pedigree flock were placed into a colony-breeding pen (both one and two year old birds) in preparation for the upcoming breeding season. The establishment of a pedigree breeding flock
enabled Krasnodonskoye Agrofirm to gain state certification for their emu breeding program and acknowledges them as the first government approved emu breeding facility in Russia.

During one visit, a single bird was slaughtered to demonstrate humane killing, defeathering, skinning, fat collection, and meat curing procedures (Blake and Moorer, 2000). Meat cutting procedures were demonstrated (Department of Agriculture, 1993) and a smoked sausage product was prepared with the assistance of the Krasnodonskoye specialists. Fat obtained from the bird was refined using suitable laboratory techniques to demonstrate its use in pharmaceutical and cosmetic products.

**Results and Discussion**

Krasnodonskoye Agrofirm has made a firm commitment to be "first" in developing the emu as an alternative agricultural commodity in Russia. Their current progress has been well recognized through media exposure they received since this project was initiated. Their success thus far is commendable and they need to make a long-term commitment to continue along their current course and commit to being a noted emu producer.

Investment into this business and anticipated returns must be long-term. As a result, production of birds for a slaughter market will not be realized for at least a six-year period, two years for production of eggs from breeders, two to three years for breeder multiplication, and one year to raise slaughter age birds from hatchling. Krasnodonskoye Agrofirm has been very successful in establishing emu as an alternative agricultural enterprise. Within the next two years, they will begin to slaughter birds for meat, leather, and oil production.

Krasnodonskoye Agrofirm has shown considerable interest and dedication in being the first agricultural firm to pursue large-scale emu production in Russia. They have invested the capital to construct the facilities for incubation, chick and juvenile rearing, and breeder selection. They have received the necessary certificates to be recognized as an official breeding farm and have certified their meat and oil products in accordance to Russia standards. In order to be successful and profitable with emu production, they have estimated the need to slaughter a minimum of 2,000 birds annually. In their opinion, it is the critical number whereby emu farming and processing becomes profitable. The climate in the Volgograd Region appears suitable for emu production and Krasnodonskoye Agrofirm has successfully established emu as an alternative agribusiness enterprise with a long-term commitment.

**References**


