



**RED-LEGGED
SERIEMA**
(*Cariama cristata*)
CARE MANUAL

CREATED BY
**AZA RED-LEGGED SERIEMA
SPECIES SURVIVAL PLAN[®]**
IN ASSOCIATION WITH THE
**AZA GRUIFORMES
TAXON ADVISORY GROUP**

Red-Legged Seriema (*Cariama cristata*) Care Manual

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This manual presents a compilation of knowledge provided by recognized animal experts based on the current science, practice, and technology of animal management. The manual assembles basic requirements, best practices, and animal care recommendations to maximize capacity for excellence in animal care and welfare. The manual should be considered a work in progress, since practices continue to evolve through advances in scientific knowledge. The use of information within this manual should be in accordance with all local, state, and federal laws and regulations concerning the care of animals. While some government laws and regulations may be referenced in this manual, these are not all-inclusive nor is this manual intended to serve as an evaluation tool for those agencies. The recommendations included are not meant to be exclusive management approaches, diets, medical treatments, or procedures, and may require adaptation to meet the specific needs of individual animals and particular circumstances in each institution. Commercial entities and media identified are not necessarily endorsed by AZA. The statements presented throughout the body of the manual do not represent AZA standards of care unless specifically identified as such in clearly marked sidebar boxes.

This nutrition chapter is an excerpt
from the complete Animal Care
Manual available at the
Association of Zoos and Aquariums
(AZA)'s website:

[http://www.aza.org/animal-care-
manuals/](http://www.aza.org/animal-care-manuals/)

Further information about diets and
the nutrition of this and other species
can be found at the

AZA's Nutrition Advisory Group
(NAG)'s website:

<http://nagonline.net>

Chapter 5. Nutrition

5.1 Nutritional Requirements

A formal nutrition program is recommended to meet the nutritional and behavioral needs of all red-legged seriemas (AZA Accreditation Standard 2.6.2). Diets should be developed using the recommendations of nutritionists, the Nutrition Scientific Advisory Group (NAG) feeding guidelines: (http://www.nagonline.net/Feeding%20Guidelines/feeding_guidelines.htm), and veterinarians as well as AZA Taxon Advisory Groups (TAGs), and Species Survival Plan® (SSP) Programs. Diet formulation criteria should address the animal's nutritional needs, feeding ecology, as well as individual and natural histories to ensure that species-specific feeding patterns and behaviors are stimulated.

From the limited data available, it appears that although seriemas are omnivorous, their dietary habits may be primarily insectivorous/carnivorous, as hypothesized by Redford and Peters (1986). The gastrointestinal tract of the seriema was noted to have a large gizzard, but no visible crop (Boyle, 1917). This type of gastrointestinal tract is seen with insectivores, herbivores, and omnivores. Carnivores tend to have a more developed proventriculus and thin-walled, weak gizzard (Klasing, 1998). With this in mind, seriemas may be best adapted for an omnivorous/insectivorous feeding strategy. Suggested target nutrient levels are presented in Table 5. These concentrations are based on those for poultry, dogs, and cats, which are similar to the seriema's omnivorous/insectivorous eating habits. Recommended diet proportions are listed in Table 6.

AZA Accreditation Standard

(2.6.2) A formal nutrition program is recommended to meet the behavioral and nutritional needs of all species and specimens within the collection.

Table 5. Proposed nutrient guidelines for seriemas on a dry matter basis. *

Nutrient	Proposed Nutrient Guidelines 2008
Protein, %	16.5–30.0**
Fat, %	10–30***
Crude Fiber, %	-
Calcium, %	0.66–2.0**
Phosphorus, %	0.33–1.0**
Calcium:Phosphorus Ratio	1:1–2:1
Potassium, %	0.44–0.72
Sodium, %	0.13–0.18
Magnesium, %	0.04–0.06
Copper, mg/kg	5.5–12.4
Iron, mg/kg	55–80
Zinc, mg/kg	55–96
Manganese, mg/kg	66–72
Selenium, mg/kg	0.2–0.4
Iodine, mg/kg	0.33–0.44
Vitamin A, IU/kg	170–7500
Vitamin D3, IU/kg	22–550
Vitamin E, IU/kg	11.0–38
Thiamin, mg/kg	2.2–5.6
Riboflavin, mg/kg	2.75–10.5
Pyridoxine, mg/kg	3.3–5.0
Vitamin B12, mg/kg	0.003–0.035
Biotin, mg/kg	0.11–0.25
Choline, mg/kg	990–2250
Folacin, mg/kg	0.8–1.1
Niacin, mg/kg	15–42.5
Pantothenic Acid, mg/kg	10.5–17.6

* Target values based on NRC for poultry, 1994 and NRC dogs and cats, 2006

** Values at high end of range for breeding only.

*** This is not a requirement for fat, but represents the range of fat in prey items and zoo diet items commonly fed. This range is thought to be appropriate, will supply essential fatty acids and will promote fat-soluble vitamin absorption.

Table 6. Seriema recommended diet proportion guidelines (as fed basis)

Item	Minimum, % of Diet	Maximum, % of Diet
Vertebrate Prey	0	25
Invertebrate Prey*	10	30
Nutritionally Complete Feeds**	40	75
Produce (greens, vegetables)	5	20

*Insects should be gut loaded or supplemented with a high calcium diet prior to feeding to compensate for the inverse Ca:P ratio in insects. To help explain further gut-loading please refer to Coslik et. al., 2009 and Latney et.al., 2009.

** Nutritionally complete feeds are those designed to meet specific recommended nutrient levels. These may be dry feeds, meat-based diets or a combination thereof.

Most adult red-legged seriemas average between 2.5–3 kg (5.5–6.6 lb), with females weighing less than males. Weights of juvenile birds have not been reported. Quantifiable data is not available on energy requirements/feeding based on body size.

No life stage research is available for this species (see Chapter 10.2); however, offering diets that meet the target nutrient range should meet nutritional needs through all life stages. Feeding diets with a nutrient composition at the upper end of the range should meet the needs of growing and reproductive birds. It is important to consider the nutrients provided by the overall diet as consumed. The analysis of many “maintenance” diets may already meet or exceed the target nutrients for growth and reproduction. Consequently, as long as appropriate foods and sufficient quantity to support growth and reproduction are available, diets may not need to be altered in composition for life stages. More research can be done on the target serum and nutrient values seriemas by collecting blood samples from clinically “normal” seriemas (see Chapter 10.2).

In the wild, parents were observed selecting small reptiles to feed to their chicks (Redford & Peters, 1986). If chicks consume a diet that meets the target ranges expressed in Table 5, no changes are needed. However, adjustments may be needed to the size of items offered to allow the parents to select appropriate size items for the chicks. Some institutions crush bones and remove pelts of vertebrate prey to reduce the possibility of impaction. All insects should be gut-loaded and/or supplemented with a high calcium diet to provide appropriate calcium levels in these food items.

Seriemas swallow small prey items whole and head first. Larger animals are held between their sharp claws, and torn apart. In the wild, killing their prey may involve beating the animal on the ground, or throwing it against a hard surface such as a rock. Seriemas in zoos will often kill a live rodent by beating it against the ground, but will not do this with dead prey items. Provided that the current diet is meeting target nutrient levels, dietary changes for breeding birds is not necessary (see Table 5). Excess calcium can be toxic with the effect of reducing the absorption of phosphorus, magnesium, manganese, and zinc. Some institutions begin supplementation to bring the calcium levels up to 2% after the third clutch of eggs has been laid to prevent depletion of the hen’s calcium stores. The calcium:phosphorus ratio should be 1:1 to 2:1 for the best tolerance of high calcium levels (Klasing, 1998).

Seasonal weight changes have not been reported for red-legged seriemas, as they have in some other Gruiformes. Diet composition and amounts can be fairly consistent throughout the year, although food consumption may increase during the colder months due to increased caloric needs. While nutritional requirements for seriemas do not change seasonally, in northern latitudes, where temperatures regularly fall below 0 °C (32 °F), birds should be offered more food during colder months. Such increases may be based on observed increased food consumption. Seriema activity level remains fairly stable year round, and food amounts are likely to remain stable throughout the year as well. Seasonal changes will influence food changes more than other factors. As long as a diet meeting target nutrient levels is consumed, no alterations should be necessary.

Decreased food consumption and listlessness is a main sign of stress in seriemas. Decreased food consumption should be monitored very closely, as it may not only be caused by stressors, but also by impaction or illness. If a bird does not eat after 2 days, a veterinarian should be notified. Encouraging birds to eat with favorite food items, or food items not normally part of the diet, may be needed after consultation with veterinarians. Birds that are not provided with appropriate levels of nutrients may show poor feather conditions, low weights, and lack of reproductive activity.

AZA Accreditation Standard

(2.6.3) Animal diets must be of a quality and quantity suitable for each animal’s nutritional and psychological needs. Diet formulations and records of analysis of appropriate feed items should be maintained and may be examined by the Visiting Committee. Animal food, especially seafood products, should be purchased from reliable sources that are sustainable and/or well managed.

5.2 Diets

The formulation, preparation, and delivery of all diets must be of a quality and quantity suitable to meet the animal's psychological and behavioral needs (AZA Accreditation Standard 2.6.3). Food should be purchased from reliable, sustainable, and well-managed sources. The nutritional analysis of the food should be regularly tested and recorded.

Tables 7 and 8 list sample maintenance diets and selected nutrient composition of these diets. The sample diets meet or exceed the proposed target nutrient levels for the nutrient selected. More investigation is needed to acquire complete nutrient data for all ingredients as well as diets for different life stages.

Table 7. Sample daily diet compositions and amounts provided to a single, adult seriema by AZA institutions

Institution	Diet item	Amount
A	AM: Nebraska Feline diet	75 g
	AM: Hopper mice	2
	AM: Adult crickets	10
	PM: Nebraska Feline diet	75 g
	PM: Hopper mouse	1
	PM: Adult crickets	10
B	Natural Balance Carnivore	150 g
	Zeigler Bird of Paradise pellet	160 g
	Mazuri Exotic Gamebird Maintenance	160 g
	Fuzzy mice	10
	Mealworms	3 g
C	Nebraska Bird of Prey diet	0.62 g
	Diamond Adult dog kibble, soaked	0.16 g
	Fruits and vegetables	108.86 g
	Mazuri Exotic Gamebird Maintenance	90.72 g
	Weds/Fri: Mice or small rats	2
D	Shur-gain Plus weight dog kibble, soaked	30 g
	Millken meat feline diet	75 g
	Mazuri softbill diet M512	15 g
	Sun/Tues/Thurs: Hard boiled egg	½
	Mon: Crickets	4
	Weds/Sat: Mealworms	4

Table 8. Nutrient composition of sample diets compared to proposed target nutrient levels

Nutrient	Target nutrient levels	Zoo A	Zoo B	Zoo C	Zoo D
Protein, %	16.5–30.0	51.04	21.92	30.5	40.7
Fat, %	10-30	31.3	8.10	13	13.5
Vitamin A, IU/kg	170–7500	6900	16530	12600	11000
Vitamin D3, IU/kg	22–550	910	~5580	2200	500
Vitamin E, IU/kg	11.0–38	77	106	87	173
Calcium, %	0.66–2.0	1.16	2.34	1.01	1.11
Phosphorus, %	0.33–1.0	1	1.09	0.44	0.85

The potential for spoilage is based on the type/number of micro-organisms present on the meat, in the storage and preparation areas, or transferred by the handler or by “pest” species with access to the seriema enclosures (Frazier & Westhoff, 1988). Meat and whole prey items should be held at appropriate temperatures during periods of thawing, preparation, and storage, and meat items should not remain at temperatures capable of promoting excessive microbial growth for excessive periods of time once fed to the animals (Crissey et al., 2001). Uneaten meat should be disposed of according to local or state requirements.

Feeding schedules: In zoos, seriemas should be fed twice per day, but additional feedings should be considered to allow for necessary husbandry management and to promote behavioral opportunities for foraging and feeding throughout the day. As long as birds have adequate time to consume the diet, the period of access to diet can range from several hours to all day. Minimizing the presence of pest species, and their consumption of the diet, may shorten the periods of time when the diet is offered to the birds,

unless pest-proof feeders are provided. The presence of pests should always be considered when determining the period of time the seriemas have access to the diet.

Species-appropriate feeding and foraging: Seriemas are curious, intelligent animals. Table 9 lists a range of food items that can promote foraging behavior. Most of the items can be scattered around enclosures to encourage foraging/searching and object manipulation behaviors. It is important to note that different seriemas will respond differently to different items, and observations on preferred items that promote species-appropriate behaviors should be recorded for each individual. Approval from area veterinarians, managers, and nutritionists should be obtained if the following feeding approaches are considered.

Table 9. List of enrichment initiatives to promote foraging behaviors (S. Hallager, personal communication)

Food Item	Description
Live Insects	Seriemas respond well to live insects, such as super worms, crickets, regular mealworms, and waxworms. Birds that are off their food for various medical reasons will often start eating again if live insects are offered.
Live prey	If available, live mice are often relished by seriemas and promote natural feeding behaviors. The birds are also good at capturing and consuming small snakes, lizards, toads, and small birds that make their way into their pens.

Food preparation must be performed in accordance with all relevant federal, state, or local regulations (AZA Accreditation Standard 2.6.1). Meat processed on site must be processed following all USDA standards. The appropriate hazard analysis and critical control points (HACCP) food safety protocols for the diet ingredients, diet preparation, and diet administration should be established for the taxa or species specified. Diet preparation staff should remain current on food recalls, updates, and regulations per USDA/FDA. Remove food within a maximum of 24 hours of being offered unless state or federal regulations specify otherwise and dispose of per USDA guidelines.

AZA Accreditation Standard

(2.6.1) Animal food preparations must meet all local, state/provincial, and federal regulations.

If browse plants are used within the animal's diet or for enrichment, all plants must be identified and assessed for safety. The responsibility for approval of plants and oversight of the program should be assigned to at least one qualified individual (AZA Accreditation Standard 2.6.4). The program should identify if the plants have been treated with any chemicals or near any point sources of pollution and if the plants are safe for the red-legged seriema. If animals have access to plants in and around their exhibits, there should be a staff member responsible for ensuring that toxic plants are not available.

AZA Accreditation Standard

(2.6.4) The institution should assign at least one person to oversee appropriate browse material for the collection.

Seriemas are typically not browsers nor do they exhibit herbivorous behaviors. However, plant material should be offered during the nesting season to aid in nest construction. This should consist of small pencil diameter sized sticks and grass stems of species approved by the curator, nutritionist or veterinarian.

5.3 Nutritional Evaluations

Health issues: One of the most common signs of stress in seriemas is decreased food consumption. Decreased food consumption should be monitored very closely, as it may not only be caused by environmental stressors, but also by impaction or illness. If a bird does not eat for more than 48 hours ~~days~~ a veterinarian should be notified immediately. Encouraging birds to eat by providing favorite food items—or food items not normally part of the diet—may be needed after consultation with area veterinarians.

For hand-reared chicks, it is strongly recommended that individual food items be weighed when diets are prepared, so that a more accurate determination of nutrient content can be made when assessing the diet during the early growth period of the chicks (S. Hallager, personal communication).

Huchzermeyer (1998) provides a scale (1–10) for scoring body condition in ostrich and Bailey (2008) provides descriptive text for assessing weight, hydration, cere, nares, beak, oropharynx, eyes, ears,

pectoral muscle condition, neck, saccus oralis, body, coelomic space, vent, thoracic and pelvic limbs, feathers, and skin in bustards. A grading system for overall body condition that takes into account the entire body of the bird should be developed for seriemas to assist in proper husbandry (see Chapter 10.2).

7.5 Assisted Rearing

Although eggs may successfully hatch, there are times when parents are not able to properly care for their offspring, both in the wild and in *ex situ* populations. Fortunately, animal care staff in AZA-accredited institutions are able to assist with the rearing of these offspring if necessary.

- On the first day after being laid, eggs should be taken from the incubating parents for weighing and measuring. During this procedure, the egg taken should be replaced with a dummy egg warmed to 37.5 °C (99.5 °F). Once the egg assessment has been completed, the egg should be returned to the pair and the dummy egg removed. Note that some pairs of seriemas may not tolerate this interference and pairs often immediately reject dummy eggs. The keepers' knowledge of the pairs incubation behavior including any past egg tossing behaviors should determine if the eggs are checked on day 1, or delayed until day 7 or not even checked at all.
- On day 7, the egg(s) (or first egg laid if there are two) should be removed for the remainder of the incubation period, and replaced with a warmed dummy egg. The removed egg should be re-weighed and candled, and placed in an artificial incubator (e.g., Grumbach) at 37.2 °C (99.0 °F) and 55–65% relative humidity.
- The target weight loss for seriema eggs is 12–13%, and the humidity in the incubator should be adjusted to result in this weight loss. Eggs should be turned every two hours. Humidity should be increased to 70–80% once candling shows that the air cell within the egg begins to drop down or at internal pip.
- At internal pip, the egg should be placed back under the pair for hatching. Assistance with hatching is not recommended for at least 24 hours after external pipping. Once hatched, the chick should be left to imprint on the parents for the first 24 hours, where this is possible. After this time, the chick can be removed briefly so that it can be examined, weighed, and yolk-sac absorption confirmed, before being returned. A betadine solution should be applied to the umbilici of chicks when they are first handled.

Artificial incubation: The following table (Table 10) provides a summary of the artificial incubation protocols for seriema eggs used at an AZA-accredited institution. While the incubator used at this facility has been successful, other models may be appropriate as well.

Table 10. Artificial incubation protocol for red-legged seriema eggs. (J. Barkowski, personal communication)

Incubator	Grumbach incubator
Temperature	37.2 °C (99.0 °F)
Relative humidity	64.5%
Egg turning	Every 2 hours
Egg cleaning	No
Egg weight loss	12.8–13.6%
Moved to hatchery	External pip

When seriema eggs are artificially incubated, an average weight loss of 12–13% should be expected. If artificial incubation is performed, delayed incubation of seriema eggs is generally not recommended. Delayed incubation of Houbara bustard (*Chlamydotis undulata*) eggs (a species related to seriemas), where the eggs were stored for a period of time before being transferred to incubators, resulted in a 19% lower hatchability rate, with higher mortality recorded between 3–5 days of development (Jalme & Van Heezik, 1996). Seriema eggs should be placed in an incubator as soon as they are discovered.

If artificially incubated seriema chicks do not hatch within established pipping intervals, or seem to be weak, then it is possible to perform radiography, endoscopy, and ovariectomy to determine the status of the embryo. Assisted hatching techniques can be successful, but survival of chicks is lower if they are used (see Bailey & Anderson, 2000 for details on this process in bustard eggs).

Hand-rearing: Hand-rearing should be considered, and is strongly recommended, for any situation where seriema enclosures are not predator-proof. Seriema chicks are vulnerable to predation by bird and mammal species that commonly occur in and around zoos in the United States. Hand-rearing should also be considered when parents do not show normal chick rearing behaviors (e.g., feeding and brooding the chicks). Hand-reared seriemas have become viable breeding birds.

Hand-rearing protocol: Hatching occurs on the 27th or 28th day of incubation. After hatching, the chick's umbilicus should be cleaned with Betadine (100%) solution, and the chick should be weighed. If the chick is clinically dehydrated or has had difficulty hatching, 2cc of half-strength Lactated Ringer's and 2.5% dextrose solution should be provided subcutaneously. After the initial assessment, the chick should be allowed to rest for several hours in the hatcher, before being moved to a brooder. Brooders that are 69.9 cm x 33 cm x 35.5 cm (27.5 in. x 13 in. x 14 in.) deep and that are kept at 36.1 °C (97 °F) have been successfully used to hand-rear chicks. The floor of the brooder should be carpeted, and a feather duster hung in one corner to simulate the parent. A small mirror affixed in the brooder can also act as a visual stimulus for the chick. Raising hand-reared chicks with a sibling reduces the likelihood of imprinting.

Chicks housed alone may benefit from a mirror, which acts as a calming agent, and serves to reduce the degree of imprinting that occurs. Typically, chicks reared alone have the highest degree of imprinting on their caretakers (e.g., approaching animal caretakers, readily accepting food from them) and for birds destined for show, this will be a desirable trait. Placing the chicks in visual contact with adult seriemas may also reduce human imprinting to some degree. However, this may negatively influence the behavior of the breeding pair, and should only be attempted at the end of the breeding season.

Cross-fostering and shared-rearing techniques have not been used with seriemas in zoos in the United States, but further investigation into these approaches might be useful to determine if they are applicable to this species. For cross-fostering to be successful, the timing needs to be appropriate for the animals involved.

As hand-reared seriema chicks grow, they should be exercised following each feeding session and as often as possible throughout the day. This will minimize musculoskeletal health problems such as slipped tendons. Access to larger, more complex enclosures should be provided as the chicks continue to develop. Containment for hand-reared chicks should follow recommendations made in Chapter 2, section 2.2. To minimize injuries, chicks should not be housed in enclosures with barriers and obstacles that the birds can impact or trip over. Whenever hand-reared chicks are introduced to a new enclosure, a familiar keeper should acquaint them to the new space immediately after releasing them by walking around with the birds and showing them the resources available within the enclosure (e.g., plants, fences, walls, dishes, etc.) (S. Hallager, personal communication). Complete day-to-day hand-rearing protocols for seriema chicks are summarized in Appendix G.

7.6 Contraception

Many animals cared for in AZA-accredited institutions breed so successfully that contraception techniques are implemented to ensure that the population remains at a healthy size.

When breeding is not recommended, eggs should be pulled as soon as they are laid, discarded, and replaced with dummy eggs. The pair should be allowed to sit on the nest until they desert it. Eggs that are pulled should always be replaced with dummies in order to stop the female from laying excessive eggs, and becoming calcium depleted. Seriemas are notorious for ejecting their eggs from nests. Dummy eggs constructed from wood or plaster that are successful under most other species, are often rejected by seriemas and kicked out of the nest. The best substitute is to blow out a real egg (if available), and fill it with sand or kitty litter, sealing the hole with plaster of Paris.

The American Veterinary Medical Association (AVMA) states that the neural tube of avian embryos has developed sufficiently for pain perception by 50% gestation, and so any bird embryos that have reached this stage or beyond should be euthanized using methods appropriate for hatched birds (AVMA, 2013). Since incubation is 27–28 days in seriemas, if the eggs are to be terminated, incubation should cease by day 13—preferably sooner.

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Personal Communications

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 Sherry Branch, SeaWorld Orlando, 2011
 Sara Hallager, Smithsonian National Zoological Park, 2012
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 Karen Povey, Point Defiance Zoo and Aquarium, 2007
 Dan Pearson, Toronto Zoo, 2009
 Mike Macek, St. Louis Zoo, 2010

Appendix G: Handrearing Protocol

Recommended hand-rearing protocol for seriemas (S. Hallager, personal communication)

Day	Diet	Enclosure	Miscellaneous
1–10	<p><u>Day 1–5: Feed 5x/day</u></p> <p>First feeding should be offered at 12–18 hours post hatch. Healthy chicks should attempt to grab offered food items (e.g., pinkies [halved or thirds], soaked dog chow, vionate, vitamin supplement, and calcium carbonate. Add cricket abdomens on day 2. If chicks are not attempting to eat, it may be a sign they are dehydrated. To ensure proper hydration, water should be given via a syringe (no needle) at every feeding, and all food should be dipped in water prior to feeding.</p> <p><u>Day 6–10: Feed 4x/day</u></p> <p><u>Day 7:</u> Add bird of prey diet.</p> <p><u>Day 10:</u> Add one-week-old mice w/o heads.</p> <p>(Night feedings are not necessary unless chicks are not growing properly. Chick weights should be recorded before the first feeding of each day from day 1–30.)</p>	<p>Brooder temperature should be 34.4–35 °C (94–95 °F), and can be lowered to 33.3 °C (92 °F) on day 3.</p> <p>Recommended dimensions for the brooder are 69.85 cm x 33 cm x 35.5 cm (27.5 in. x 13 in. x 14 in.).</p> <p>Floor should be carpeted and a feather duster hung in a corner to simulate the mother. Single chicks should be given a mirror. A towel formed in the shape of a nest will help the chick feel secure when placed in it.</p>	<p>Weight gains should be consistent after day 5. Daily weight gains of 10–15% are optimal.</p>
11–29	<p><u>Day 11–16: Feed 4x/day</u></p> <p>Day 12: Add whole two week old mice cut in half.</p> <p><u>Day 17–22: Feed 3x/day</u></p> <p><u>Day 23–25: Feed 2x/day</u></p> <p>Leave food in overnight</p> <p>Day 26: Decrease hand-feeding, but birds start eating on own.</p> <p>(Ensuring that chicks continue to defecate normally is important.)</p>	<p>A carpeted nursery area should be provided: 0.5 m x 1 m (19.5 in. x 39 in.).</p> <p>Area should contain a small/medium towel lined bowl or artificial nest.</p> <p>Three heat bulbs should be suspended from the ceiling so that 3 separate sections of the floor are kept at 35 °C (95 °F).</p> <p>Several feather dusters should be suspended near the heat bulbs.</p> <p>Single chicks can be given a mirror.</p>	<p>Chicks should continue to be encouraged to move about throughout the day. If outdoor temperatures are 24 °C (75 °F), chicks may be taken outside for exercise if they have started to walk. Once chicks have been given access to outside yards, they should be carefully monitored for the ingestion of foreign material that could result in impaction. At week 3–12 chicks should be moved into a wire cage with newspaper substrate and straw nest. Heat lamp added for warmth.</p>
31+	<p>Chicks should be on the adult diet after 31 days.</p>	<p>Chicks should be moved outside to a covered yard measuring 5 m x 15 m (16 ft x 49 ft), and the pen set-up should be similar to that of an adult. They should be housed in a heated shed at night.</p>	

Growth rates of four chicks: Days 1–30 (M. Macek, personal communication)

Day	Bird A Weight g (oz)	Bird B Weight g (oz)	Bird C Weight g (oz)	Bird D Weight g (oz)
Day 1	63 (2.2)	60 (2.1)	54 (1.9)	60 (2.1)
Day 2	62 (2.2)	64 (2.3)	55 (1.9)	63 (2.2)
Day 3	62 (2.2)	75 (2.6)	67 (2.4)	71 (2.5)
Day 4	75 (2.6)	86 (3.0)	80 (2.8)	86 (3.0)
Day 5	82 (2.9)	95 (3.4)	102 (3.6)	101 (3.6)
Day 6	95 (3.4)	110 (3.9)	123 (4.3)	125 (4.4)
Day 7	122 (4.3)	126 (4.6)	153 (5.4)	151 (5.3)
Day 8	138 (4.9)	148 (5.2)	183 (6.5)	174 (6.1)
Day 9	162 (5.7)	168 (5.9)	206 (7.3)	208 (7.3)
Day 10	178 (6.3)	184 (6.5)	236 (8.3)	231 (8.1)
Day 11	221 (7.8)	205 (7.2)	270 (9.5)	264 (9.3)
Day 12	244 (8.6)	225 (7.9)	292 (10.3)	291 (10.3)
Day 13	278 (9.8)	231 (8.1)	310 (10.9)	313 (11.0)
Day 14	300 (10.6)	261 (9.2)	335 (11.8)	340 (12.0)
Day 15	333 (11.7)	294 (10.4)	370 (13.1)	366 (12.9)
Day 16	347 (12.2)	315 (11.1)	390 (13.8)	402 (14.2)
Day 17	368 (13.0)	340 (12.0)	414 (14.6)	439 (15.5)
Day 18	403 (14.2)	359 (12.7)	444 (15.7)	476 (16.8)
Day 19	432 (15.2)	376 (13.3)	471 (16.6)	493 (17.4)
Day 20	465 (16.4)	410 (14.5)	493 (17.4)	517 (18.2)
Day 21	489 (17.2)	465 (16.4)	542 (19.1)	538 (19.0)
Day 22	512 (18.1)	478 (16.9)	528 (18.6)	568 (20.0)
Day 23	536 (18.9)	504 (17.8)	568 (20.0)	566 (20.0)
Day 24	622 (21.9)	510 (18.0)		598 (21.0)
Day 25	638 (22.5)	548 (19.3)		
Day 26	688 (24.3)	562 (19.8)	690 (24.3)	682 (24.1)
Day 27	712 (25.1)	602 (21.2)		
Day 28	754 (26.6)	622 (21.9)	700 (24.7)	716 (25.3)
Day 29	784 (27.7)	660 (23.3)		
Day 30	796 (28.0)	692 (24.4)		