

Breeding the Red-capped Cardinal

Paroaria gularis

by Gary Roulston
with a few notes by Robbie Harris

When most people think of Cardinals, an image of a crested finch-like bird comes to mind. The most commonly encountered species in American aviculture is the Red-crested Cardinal *Paroaria coronata* [formerly *Paroaria cucullata*] which has a crest, and is also called the Brazilian Cardinal. Cardinals are birds that I have had great interest in, and I have worked with Red-crested Cardinals for some years now.



Three Red-capped Cardinal Chicks being banded.

As an Australian immigrant I have always had an elevated image of Red-crested Cardinals, since they are highly prized and sought after in Australia. I can remember how strange it was on my visit to Hawaii watching these birds venture into park trash cans looking for food. They were scavenging whilst House Sparrows were dining on the floor at a nearby open-air restaurant. I think

it may have been that vacation that "jumped started" my interest in cardinals. Shortly after that experience I settled in America, and purchased my first pair of cardinals from a pet shop in Los Angeles in the early 1990s. Having great success with this pair, and their offspring, I was eager to find another species of cardinal to work with someday.

Back in 1999, we went to a Bird Mart, and to my surprise found some Red-capped Cardinals for sale. The vendor had one pair left and a cage with approximately one dozen extra males. I knew who the original importer of these cardinals was and could have purchased them directly from him for less money, but my first and last dealing with him was less than favorable. I decided that it was best to buy birds that could be viewed and hand picked rather than risk being shipped males instead of pairs, which had happened with some other species that I had previously ordered.

The vendor informed us that the importer had them surgically sexed. The vendor has a good reputation and guaranteed they were a pair. Experience with Red-crested Cardinals gave us some knowledge on the subtle differences to look for and to what a pair

should behave like. After spending some time observing the pair at the Bird Mart we decided to purchase them along with a spare male.

Individual birds of any species have their own behavioral traits, and without having a large quantity of unrelated birds to study, any conclusions that are made about a species can only be based on personal experience. Environmental factors such as housing, etc., can have a big impact on the bird's behavior.

Having kept Red-crested Cardinals for a number of years it is difficult to avoid comparing the two species, and since most people are familiar with Red-crested Cardinals, behavior differences may be of some interest. Some males are more aggressive than others. This may be true with Red-capped Cardinals, but it appears that they are more docile towards their mates. They are also less confiding and less curious about things you bring into the aviary. Red-crested's will come down right away to see what you have left them, Red-capped's will wait until you are a safe distance from the aviary before investigating.

Not being very musically

Photos by Gary Roulston and Robbie Harris



Adult parents of several clutches of young. The hen is wearing a red leg band.

inclined I can only say that Red-capped Cardinals produce a softer and more melodious song than the strong vocalizations of the Red-crested Cardinals during breeding season. The Red-crested song can be heard from some distance, while one has to be fairly close to hear the song of the Red-capped. It does not carry as far and they do not have the short monotonous call Red-crested Cardinals use during the breeding season.

Like most of their close relatives in the Genus *Paroaria*, Red-capped Cardinals do not have a crest. The lack of this attractive feature is compensated for by their color scheme. The contrast between the colors is enhanced by several factors. The dark areas on the back, wings and tail are glossy black rather than gray, as it is in the more familiar Red-crested Cardinal. The red on the head is retained even after several molts in captivity. Some species of birds when first imported are bright red because of their natural diet in their native habitat, and as they molt in captivity they lose the bright red to a duller red-orange. Our Red-capped Cardinals have retained that very attractive red coloring probably due to the diet we feed. It is likely that they are able to metabolize the necessary nutrients more efficiently to retain the vibrant colors. They have a black throat and an elliptical black band around their eyes that extends from the base of the bill to behind the eye. The Iris is a golden red color in adults, and, interestingly, a deep blue in juveniles. The bill is a horn color blending into gray/black towards the tip. The legs are gray and have a strong grip.

Housing

When the Red-capped Cardinals were first brought home they were placed in 6ft. x 2ft. x 2ft. flight cages in the bird room for quarantine purposes. At the time the weather was unstable, and it was in the best interest of the birds if they were kept indoors until spring came in and the weather was warmer. The Mediterranean climate here, near Los Angeles, allows

the keeping of many species outdoors year round if they are acclimated during the warmer months.

On April 28th the pair were set up in an outdoor aviary measuring 12 ft. long by 7 ft. wide by 8 ft. tall. They have this aviary all to themselves, as it is difficult enough to supply them with enough food to raise their young without adding the extra stress of competing for it with other birds.

During the construction of this aviary, efforts were made to prevent the entry of mice. The flight is wired using $\frac{1}{4}$ inch hardware cloth. A trench was dug around the perimeter, and a rat-wall was put in place. The rat-wall consists of galvanized sheet metal that extends to a depth of 20 inches with a lip riveted to the bottom that protrudes out eight inches. The depth was necessary to prevent gophers from tunneling under the aviary, possibly allowing the entry of mice. Doors fit tightly with a maximum clearance of $\frac{1}{4}$ inch. A safety service porch is built in to prevent the possibility of any escapes and allows the birds to be fed and watered without entering the aviary. This provides a double barrier to mice, as they would have to pass through two doors.

The north and east walls are solid to stop draughts and provide protection from the worst weather. A partly open 4-foot shelter is built on the east side. The roof of the flight is covered completely with clear corrugated fiberglass sheets allowing sunlight to enter while keeping the floor dry and protecting the birds from predator attack from above. Shade cloth is mounted underneath the fiberglass sheets to reduce the heat in the summer, as fiberglass has a tendency to magnify the sun's rays. The south and west are open to allow maximum sunlight in.

The outside of the aviary is hedged with Black bamboo *Phyllostachys nigra* and Pineapple guava *Feijoa sellowiana*.

Inside the aviary potted plants are placed around the walls and kept trimmed to four feet in height

providing foraging areas and allowing maximum room for flight. The plants used are rose varieties, Heavenly bamboo *Nandina domestica* and Black bamboo. The shelter walls are lined with Bottlebrush *Callistemon citrinus* cuttings which provide the nesting sites. The created effect is of a forest clearing.

The floor has a slight slope towards the front. Black plastic PVC sheeting is placed on the ground and covered with a 3-inch layer of sand. This allows for ease of cleaning, keeps the floor dry, and helps to prevent access to potential parasites in the soil.

Feeding

A basic blended seed mix is provided at all times, along with a second bowl of plain Canary seed. Very little of the mix is eaten, with the exception of the canary seed. Sprouted Canary seed and white millet are fed daily throughout the year. The white millet is eaten only in the sprouted state.

Greens (all grown in our "grass garden") are offered daily and include Sow thistle *Sonchus oleraceus*, Chick weed *Stellaria media*, Dandelion *Taraxacum officinale*, and Panic veldt grass *Ehrharta erecta*. Panic veldt grass is one of the most useful greens as it grows in our garden year round and provides fine seed heads that are also used for nest construction.

Egg food is provided every day in small amounts and the quantity is increased during the breeding season and when they are feeding young. Universal food and crushed mynah bird pellets are available at all times. They eat the smaller particles of each of these, but prefer the universal food.

When the birds are not breeding, live food is fed every other day. The amount of live food is increased and offered daily starting just before the breeding season in February. We provide House crickets *Acheta domestica* and House fly larva *Musca domestica*. The crickets are fed to the birds by placing them in a glass 10-gallon aquarium with a thin layer of

sand placed on the bottom. Fresh orange segments and cricket food are left in the aquarium so the crickets can continue to eat, which will provide more nutrition for the cardinals as they feed on them throughout the day. Although hesitant at first, the birds soon feel secure enough to enter the aquarium. They are able to view the surrounding area through the glass and are always alert for possible danger, which of course in the protected aviary environment isn't likely to show up.

The most economical way to feed the quantity of live food that we feed is to raise most of it ourselves. It is time consuming but enables us to supply the right size at the right time in the quantities needed. More time is spent raising the insects than it takes to feed them out. Fortunately I don't mind raising insects. It involves less work than maintaining cages of Zebra and Society finches, used for fostering *Estrildids*, which previously occupied the space now set up for feeder insects. (*A note: Gary is doing the "bug raising". Lately Gary has shown a great interest in all kinds of insects. If one ventures into the house, whether on our fresh grown vegetables, or through a door, Gary rescues it before I get to it with my shoe! Then he looks it up in his insect books, learns the name and other information on it, and then he carefully throws it off our outdoor deck — Robbie*).

Breeding

Several nests were constructed in the first season that we had the Red-capped Cardinals but no eggs were observed. On March the third in the year 2000, a nest was constructed and a few days later an egg was laid in it. Three eggs were laid in the first clutch, one every second day until the clutch was completed. The eggs have a buff base color and the large end of the egg is heavily flecked in light tan spots with smaller spots extending down to the point. Incubation started with the first egg and it hatched 13 days after it was laid. The second egg hatched two days later. The third egg failed to hatch, and after candling it was

opened up and found it to be infertile.

Males do not drive the females to nest in the same manner as do the Red-crested Cardinals. Their courtship is a more subdued event. Nests are usually placed around 6 feet from the ground in the brush that lines the aviary walls. Pairs usually chose two favorite nesting sites that they use alternatively for each clutch. Both sites have several things in common: They are situated in positions where they have a panoramic view of the aviary and the surrounding yard. They have brush above them and on either side, and the nest can be exited quickly.

The hen does most, if not all, of the incubation. They are light sitters and watch for the approach of humans, exiting the nest before you enter the aviary. The nest is constructed using grasses for the outer part and lined with palm trunk fiber collected from Mexican fan palms *Washingtonia robusta*, or Chinese windmill palms *Trachycarpus fortunei*. (We raise and keep various types of palm trees, and we gather up the fiber which is then offered to the cardinals just before breeding season.)

The nest is kept spotless and the materials are reused for subsequent nests. The clutch usually consists of two to three eggs. The young produce a gelatinacious fecal sack which the parents carry off and drop elsewhere in the aviary, well away from the nest.

If all three eggs hatch, the parents often have a difficult time raising all of the babies. The size difference places the second and third offspring at a disadvantage. A two-day-old Cardinal will be double the size of a hatchling. If there isn't enough food to go around, the first hatched will get most of it.

To compensate for this we often use homemade dummy eggs. Plastic hollow decorative eggs are purchased from a craft store. The 1-inch size is the closest match to Cardinal eggs. Using a utility knife a small flap is cut on one side and a hot-glue gun is used to fill the hollow. The flap is folded back down

and the egg is sanded to ensure that it is smooth. The glue, inside the dummy egg, gives the egg weight and the capacity to retain heat. It is then painted using non-toxic craft paint to match a real egg. A final clear coat prevents the paint from rubbing off. (*Note: Gary sent me off to the Michael's craft store with a cardinal egg. He asked me to find something about the same size. Michael's has quite a selection of small plastic eggs, and I did manage to find a package that matched the size Gary wanted. That night he worked on his plastic eggs, and by the next day when he asked me to pick, without handling, the real cardinal egg versus the plastic dummy egg, I could not. The eggs look that close, even in weight! — Robbie*).

It is important to establish the time of day the hen lays her eggs, usually early morning, then the substitute egg is swapped with the real one. It is interesting to note that the laying time has been consistent throughout the breeding season, but has varied from one season to the next. In the year 2000 it was around 7:00 A.M. and this year, (2001) it has been around 9:00 A.M.

The real eggs are placed in a cool place and turned several times a day to prevent the yoke from settling on one side. They are then placed back in the nest after the second egg is laid. This procedure has improved the survivability of more young. The eggs hatch after 13 days of incubation. The young are fed large quantities of live food by their parents. It is fun to watch both parents load up with insects after a new batch is provided for them. They will pick up one bug at a time and work it back to the base of their beak, then pick up the next and so on repeating the procedure until they have up to seven insects hanging out either side of their beak. Resembling Puffins, they return to the nest and feed the young. Once the young have eaten enough, the remaining insects are swallowed by the parents.

The most dangerous time in the young bird's life is when it is still

in the nest. In South America, where these birds originate, there are a large variety and number of predators. Rapid growth helps the survival of the young and they leave the nest at 12 or 13 days old. Our young are closed banded at 10 or 11 days old using sizes J and K bands, obtained from the National Finch and Softbill Society. The young exhibit "branching behavior" similar to many open cup nesting species from South America. They leave the nest before they are fully developed. The feet are well formed, as they are needed for gripping on to things upon leaving the nest. They find a roosting place away from the nest and will remain motionless if disturbed. At this stage they cannot fly very well, and tend to clamber around the aviary. It is a good idea to place low branches for them to climb on. If more than one youngster fledges you will find them in different parts of the aviary. In the wild this would assure the survival of some of them.

This behavior is also seen in other unrelated species such as owls. The young are left in the aviary for around 30 days until they are weaned. After the young leave the nest, the parents may want to start the next clutch, but this is prevented by destroying the nests as they are constructed. If they are allowed to re-nest then they will stop feeding the fledglings thinking that their work is over with.

Handfeeding

The decision to handfeed isn't taken lightly. When we start we know that we're going to be house-bound for at least a month, or until the young are weaned. It can be tiresome and monotonous work, and at the end of the breeding season we swear that this will be the last time. At the same time it can be very rewarding allowing you insights into the development of baby birds that you would not otherwise witness.

The ultimate goal of raising any cardinal baby is to produce offspring that will mature into well-socialized future breeders. To reduce the likeli-

hood of human imprinting, interactions with them are kept to the minimum, and they are placed in aviaries adjoining other cardinals as soon as they are weaned and eating on their own.

We have found that it is best to remove the eggs before hatching and hatch them in an incubator, if they are to be handfed. If the parents have fed them at all they will have developed a feeding response that is different than the one we need for handfeeding.

Sometimes the change in brooding temperature and the environment is stressful on babies. This has been true with some parrot species as well, where starting them right out of an incubator is easier on them.

After hatching, our young are placed in a small cup that is prepared ahead of time and left in the incubator. Care fresh animal bedding is glued onto a clean cut-down cup portion of an egg carton using non-toxic white glue. It is molded to shape and provides a good footing for the young chicks. This is then placed in a larger cup with some care fresh bedding in it for stabilization. The young are left in the incubator for 12 to 24 hours to absorb the yolk sac. Then they are placed, cup and all, in a brooder set at 97 degrees Fahrenheit.

For the first few feedings they are fed a liquid mixture of half Ziegler handfeeding formula and half Heinz No. 2 turkey and turkey gravy to which we add a little water. Ziegler handfeeding formula is wheat based and more easily digested by hatchlings than some of the corn based formulas. The Heinz baby food is high in protein and contains gelatin, which allows the formation of a fecal sack, which is important for good digestive health.

The feeding utensil of choice is a small, quality fine-tip artist paintbrush. This is dipped in the formula and placed in the open mouth. The young bird is allowed to swallow before the next dollop is offered. Using this procedure teaches the

young to develop a good feeding and swallowing response from the beginning. At three days old we begin to add cricket abdomens in conjunction with the formula every other feeding. Best results have been obtained by feeding every hour between the hours of 7:00 A.M. to 11:00 P.M. with another feeding at or about 3:00 A.M. for the first ten days.

It is important to keep a log-book. After each feeding, the time is logged in and any comments on the chicks are written. This makes it much simpler to keep on top of things when one or more people are hand feeding. It is also useful for comparing notes from one clutch to the next and a useful reminder of what worked last time, since hand-feeding is not a year-round job it is much better than relying on memory.

An ending note: All in all, with all our work, we have raised quite a few of these Red-capped Cardinals. Gary has written most of this article using "we" quite a bit, but truly when it comes to the finches and softbills, he is doing most of the work. He is forever brushing out his aviaries with various plants, some he has grown from cuttings, and others he has bought. As for some of these unusual grasses he feeds to the birds, some he has bought and worked with, others were found growing in different places. Many years ago, before we were married, when he first came to America from Australia, still visiting-but thinking of staying, he wanted to see the L.A. Zoo. I got him a private tour to see their breeding area, and as he walked through his mind was already working on setting up birds at our place. Later walking around the grounds at the zoo, he noticed a particular type of grass, growing as a weed there, but to Gary it was like a wonderful precious plant. He climbed up a hillside, as I sat on a bench, and he started to retrieve these "weeds." A security guard walked up to me and asked if I knew that gentleman up there; first I told him I never laid eyes on him before. But, then I quickly told the

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2000	Herbal respiratory support	Fewer breathing problems	World
1999	Probiotic/prebiotic blends	Improved probiotic (hence digestive) performance	World?
	Protein enhanced in-water supplement	Obesity control for fussy eaters	World
1998	Fibre enrichment	Improved performance in cases of severe digestive compromise	World?
1997	Non-smelly highly bio-available trace minerals	Improved fitness, fertility and disease resistance	World
	Herbal prebiotics / immune support / anti-microbials	Improved gut function, better disease resistance	UK
	Bio-available sulphur	Improved fertility, feathering and disease resistance	World
1994	High levels of amino acids	Faster, stress free molts, obesity control	World?
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For more information:
 The Birdcare Company
www.BirdcareCo.com
advice@BirdcareCo.com
 Tel: Int+44 1453 835330
 Fax: Int+44 1453 834302

USA distributor: Birds2Grow Aviaries
www.Birds2Grow.com
sales@Birds2Grow.com
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guard he was just clearing off some of the weeds. Gary was called off the hillside, and the security guard told him he could keep what he had already picked, but if he caught him up there again he would be thrown out. With that little tiny bag of weeds, Gary has now grown a whole garden of those grasses for his birds. (I figured he was crazy like me when it came to birds, so we married). When Gary drives places, and he spots just the right grasses that he could feed his birds, he will stop and dig some up (for he carries a "trusty" camping shovel with him at all times), and home he will come to plant it in his garden. He really puts his all into growing all the right foods. As for handfeeding, because I am up almost all night handfeeding lots of baby parrots on those "hourly" feeding, I do the midnight and wee morning feedings for Gary, so someone around here can get some sleep and have their mind together! Thank goodness, we both love the birds as well as all the work that goes with them!!!

Robbie 

DNA STORAGE PROJECT

James B. Taylor M.A.Sc. PEng.

As serious aviculturists we have expressed interest in preserving endangered avian species by the captive breeding and reintroduction of the offspring back to the wild. At the present time there are few opportunities to do this because of continuing environmental destruction and continued loss of habitat. The Avian Preservation Foundation of Canada has investigated a program that would allow aviculturists to take the first step in preserving many of these endangered species. We are negotiating a contract with the biotechnology company, HealthGene Inc., to collect and store genetic material from these endangered species with the aim of reconstructing these species in the future. At the present time it is possible but not feasible to reconstruct a species from its DNA. Recent advances in molecular genetics indicate that this will be feasible in the foreseeable future if the DNA is available. If this stored DNA is from a diverse enough gene pool, a viable population of a species could be reconstructed for reintroduction.

We need to act now to save genetic material from as many individuals of these species before so many have disappeared that it would limit the genetic diversity required for a viable population. We would expect to have to store this DNA for ten to twenty years to allow the technology to be developed to make this reconstruction feasible.

What we propose is that holders of endangered species collect either a blood sample or 5-6 chest feathers from as many individuals as possible from their collections and submit these samples to HealthGene for storage. As there are costs involved with sample preparation and storage, we ask that \$20 US/sample be included with each sample. HealthGene will be offering

quantity discounts to encourage submission of as many samples as possible. This money will cover storage charges for the first ten years. The Avian Preservation Foundation will generate the funds to cover costs beyond this time.

What species should be considered?

There are many species that are obvious candidates for this program: Spix Macaws, Echo Parakeets, Bali Mynahs, Caribbean Amazons, etc. All of the CITES Appendix I species should be stored. Many other species could easily become just as endangered. We don't know. No one could have predicted the demise of the Carolina parakeet or the Passenger pigeon. We will leave it up to aviculture to decide which species should be stored. Most are obvious and will depend on how much aviculture is willing to spend on preservation. We would hope that holders of CITES Appendix I species would be the first to join this program but conditions can change very quickly. It would be foolish to think that just because a species is common today that it could not become endangered tomorrow. Many species that were once common in aviculture have disappeared before anyone realized. If this were to happen then there might not be enough individuals left in captivity to reconstruct the species if it should become endangered in the wild.

How many samples are necessary?

The obvious answer is the more samples from as diverse a population as possible should be saved. I would think that you would want to save samples from a pair but not their offspring. As to other individuals, there is very little information available for most species on the

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