KEEPING AND BREEDING THE MOUNTAIN PARAKEET
Psilopsiagon aurifrons

by Graham Thurlow

The Mountain Parakeet or Golden-fronted Parakeet *Psilopsiagon aurifrons*, previously *Bolborhynchus aurifrons*, hails from South America; specifically Peru, Bolivia, Chile and Argentina, where it is a bird of coastal plain and high altitude, shrubby country.

These little parakeets are similar in size to a wild budgerigar (though not the show specimens we see nowadays) and while both sexes are overall green in colour, the males have yellow on the face which extends down to the throat and continues as a yellowish green suffusion onto the breast. As chicks start to feather up in the nest this difference in colour between the male and female becomes apparent, making sexing a simple matter.

I have two pairs of Mountain Parakeets housed in a flight 14ft x 8ft by 6ft high (approx. 4.3m x 2.4m x 1.8m), with a semi-translucent polycarbonate roof. There are some plants in the aviary including a robust clematis montana, an ornamental cherry and a couple of clumps of bamboo. The parakeets spend a great deal of time chewing the woody clematis stems, but have not killed the plant which continues to produce buds in the aviary, and flowers on stems growing outside the enclosure.

The birds also have access to an internal flight in my bird room measuring 8ft x 3ft (approx. 2.4m x 0.9m). The bird room is heated in winter to 55°F (12.8°C) and there is also a ceramic spot heater above the wire covering the flight, with a perch positioned below it. These parakeets appear hardy, however, and spend much time in the outside flight even in the coldest months, though they always choose to roost indoors.

Initially, my first pair of birds roosted in a nest box in the indoor flight, but an introduced pair of Java Sparrows *Padda oryzivora* soon commandeered this for breeding, and now none of the parakeets roost in a nestbox, despite there being a number of vacant ones available.

In her book, *Parrots: Their Care and Breeding*, Rosemary Low mentions a Danish aviculturist who kept Mountain Parakeets with finches and waxbills. Personally, however, I would hesitate to keep them with birds that were not willing or able to defend themselves, although aviary size is important when considering mixing species.

As mentioned above, my parakeets share their aviary with a breeding colony of Java Sparrows with which they mix well. There are occasional disputes over perches but, although they make much fuss, twittering with flared wings, the parakeets never show any real aggression; in fact they

defer to some of the more assertive Java Sparrows. Further, they have never shown aggression to newly fledged Javas.

Introducing a new parakeet to an existing trio has also proved uneventful. Introduction of a new cock bird to a trio consisting of a cock and two hens only resulted in a couple of days of musical perches until the original male accepted the new arrival. Introducing a new hen also went without incident. However I would be cautious about introducing a new bird to an established larger group.

Another huge benefit, apart from ease of sexing and their peaceful natures, is that these birds breed happily on a colony system. I bred from two pairs last year and there was never any squabbling over nest boxes, and the two pairs fed together amicably from the food tray with never a sign of bickering.

Feeding is relatively straightforward. Mine are offered, in separate pots, foreign finch mix, plain canary seed and budgie tonic mix, together with a small handful of sunflower seed every other day. Millet sprays are also routinely offered. In addition to dry seed, the birds receive sweetcorn and peas (thawed from frozen), celery, Little Gem lettuce and apple on a daily basis. I have tried pear *Pyrus* and carrot *Daucus carota*, but both were ignored. Additionally, in season they relish seeding grass, seeding dock *Rumex obtusifolius* (a particular favourite), sowthistle *Sonchus oleraceus*, the flowers, buds and berries of hawthorn *Crataegus* spp., together with the berries of honeysuckle *Lonicera* spp., Rowan/Mountain Ash *Sorbus aucuparia*, Pyracantha and Cotoneaster. I do not offer soaked seed when the birds are breeding, but do offer CéDé® eggfood and mealworms, the latter being taken with enthusiasm.

In the wild these little parakeets have been observed burrowing into earth banks, with a tunnel leading to a nesting chamber. The nest boxes favoured by my birds are an inverted 'L' shape; the entrance hole leading to an inner platform which, in turn, leads to a lower nest chamber (3in (approx. 7.6cm) below the platform) measuring 5½in x 6¼in (approx. 14cm x 16cm), in which I place wood shavings as a base for the hoped-for eggs. The clutch size has varied between 5 and 7 eggs but, to date my birds have never hatched more than 4 chicks.

Mountain Parakeets are coy about their mating procedure which takes place within the confines of the nestbox. Mating is not however, as private as it might appear as it is a noisy and frequent affair. Once a hen has started to lay, she does not, in my experience, emerge from the nestbox and must, therefore, be fed by the cock who spends a significant amount of time with her in the nest.

Once my birds start to show serious intent on breeding I do not disturb them and, therefore, I am assuming that the incubation period is

approximately twenty one days, with the chicks remaining in the box for approximately six weeks before fledging. My lack of interference results from an incident last year when, having not seen one of the hens for some time, and not hearing the call of chicks I checked the box. The cock first shot out like a cork from a bottle; the hen remained on the nest a little longer but left just as I replaced the box. There then followed an anxious half hour. The hen clearly wanted to return to her two newly hatched chicks, but was

Mountain Parakeets.

unable to fly from the nearest perch to the nest box, a distance of about three feet, a situation I put down to her continuous confinement in the box for over three weeks. I ended up catching her and placing her back in the box and, happily, there she remained. When she did eventually start to leave the nest she was able to fly strongly once again.

Adding strength to my view that the hen remains within her box for a prolonged period is the fact that the platform above the nest chamber was used as a toileting area with quite a build-up of faeces.

Last year my two pairs had a single clutch each, both producing two chicks, a cock and a hen in both instances. This year, to date, one pair has gone to nest producing three chicks; a cock and two hens. As each chick fledged they were the subject of much attention from the non-breeding pair which often tried to feed them. They had clearly been warned about accepting food from strangers, however, and declined these offerings.

To sum up, these small and peaceable birds are well worth offering a place in a collection and it would be a tremendous shame if we were to lose such charming parakeets from aviculture.

BREEDING THE AMAZILIA HUMMINGBIRD AT WELTVOGELPARK WALSRODE

by Hanne van Bavel and Diego C. Rubiano Franco

Hummingbirds are a family of new world birds, containing about 328 recognized species that inhabit different habitats in South America and southern North America. Most of these species are tiny - the smallest bird alive is in fact a hummingbird: the Bee Hummingbird, measuring 5 cm from head to tail and weighing less than 2 grams.

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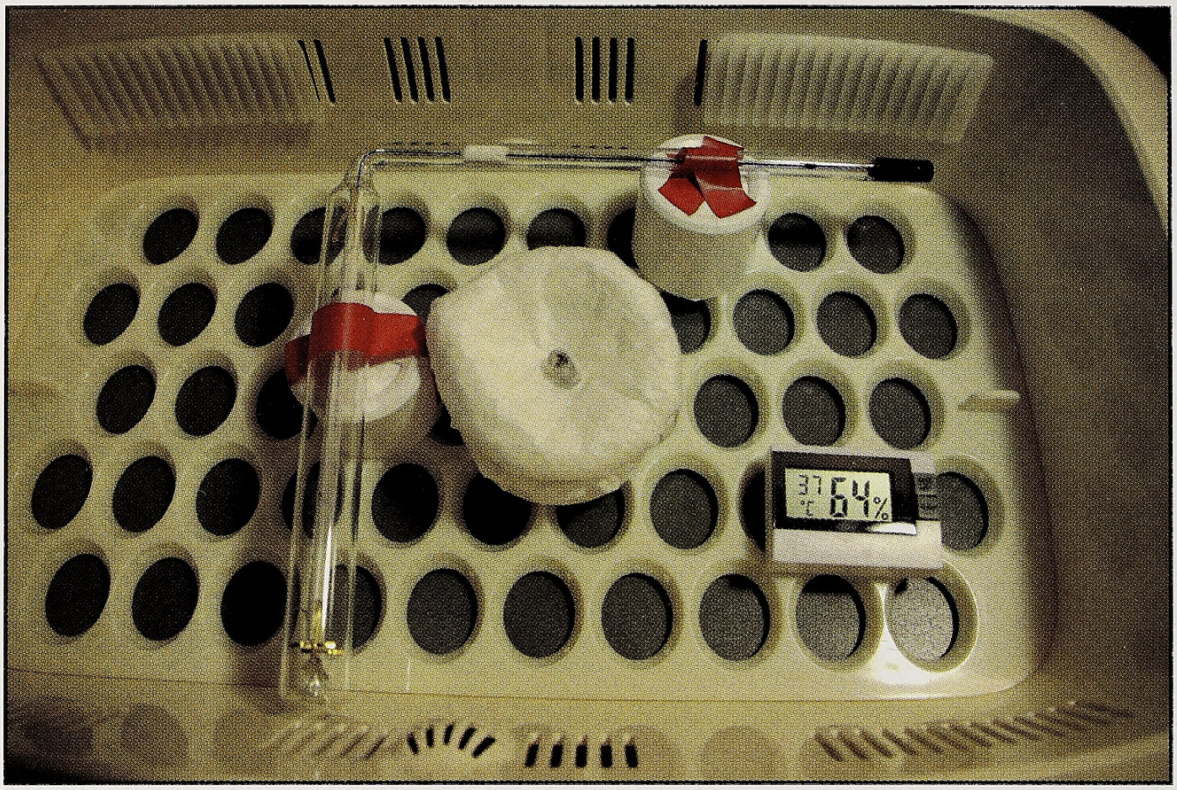
Adult Amazilia Hummingbird feeding.

Hummingbirds are well known for their extensively iridescent plumage and their main food source, nectar. Their bodies are adapted to their specific feeding habits; with their long, sometimes curved bill, they can access nectar in flowering plants, and their hovering flight allows them to remain seemingly 'motionless' in the air while feeding. Hovering arises by extremely rapid wing movement. Some species can flap their wings up to 80 times per second. Hummingbirds are solitary birds, often aggressively defending nectar sources. As a result, male and female hummingbirds will



Weltvogelpark Walsrode

Setup for hatching Amazilia Hummingbird eggs. The chick is just about to emerge.

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Closer view of the Amazilia Hummingbird chick hatching.

Weltvogelpark Walsrode

One day old Amazilia Hummingbird chick. The one euro cent coin, shown for comparison, has a diameter of 16mm.

Weltvogelpark Walsrode

A closer view of the one day old chick.

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One day old chick hatched in the nest.

only associate briefly to mate, and the female hummingbird will take care of the eggs and chicks on her own. Chicks are fed with small insects and nectar, and as they grow, the proportion of insects will diminish. In adult hummingbirds, insects only make up 10% of the diet.

Hummingbirds are rarely kept in zoos because of their specific needs. One of the better known species is the Amazilia Hummingbird (*Amazilia amazilia*), which occurs in Western Peru and Ecuador. This species measures 9 to 11 cm and weighs about 5g. Amazilia Hummingbirds have a green head and upper back, a rufous tail and belly and an iridescent throat ranging from golden to turquoise green. Their wings are black and their bill is mostly red. Males and females look very similar, but females usually look a little duller and have a larger black tip on their bill. Amazilia Hummingbirds prefer semi-arid to arid habitats with scrub, thorn forests and desert areas. They are also common in cultivations, parks and gardens, even within larger cities such as Lima. The species breeds all year round, with females usually laying two eggs in a cup-like nest consisting of plant wool, fibres and spider webs. After an incubation period of 16 days the almost naked chicks hatch, weighing approximately 0.5 grams.

Amazilia Hummingbirds have been bred in some institutions, but it

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Amazilia chick being fed.

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The hand-reared chick at two weeks old.

remains very difficult to maintain a sustainable population in captivity. In 2011, Weltvogelpark Walsrode had the chance to start an Amazilia Hummingbird breeding project. This was a fantastic opportunity for us, but of course it needed much preparation. For our hummingbirds, we designed a room where the light cycle, air inflow, temperature and humidity

Weltvogelpark Walsrode

The parent reared chick at two weeks old.

are artificially controlled. This room is divided into three parts: a kitchen for food preparation, enclosures for habituation and a large room for the breeding aviaries. Each of our breeding aviaries gives the bird access to two lamps for sunbathing, one pot with a fruit fly culture, one feeding tube with nectar, and one bath. Plenty of sticks and plants are available for the birds to sit down and rest, doors in between the aviaries allow for males and females to be easily put together for mating.

On the 30th of October 2011 it was finally happening: 6 female and 5 male Amazilia Hummingbirds safely arrived at Weltvogelpark Walsrode. After the quarantine period, the birds were moved to their individual breeding aviaries. All of the birds responded very well to the transfers. One of our females even started building a nest right away, resulting in the first egg on

the 8th of March 2012. This egg was followed by another two eggs on the 18th and 20th of March. Sadly these first eggs weren't fertilized, probably due to some fertility problems of the male or the pair did not harmonize very well. Once we recognized this, the female was paired with another male, which resulted in a fertilized egg on the 15th of May. At that moment we were confronted with another problem: all of our birds were very young, and none of them had any breeding experience. This is probably the reason why

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The chick being fed.

the female didn't incubate very well. As a result, the egg had to be put in an incubator. Obviously, this was not an optimal situation, but it was very fascinating to see an embryo develop in such a tiny egg. Unfortunately, the embryo died on the 10th day of development.

After a quiet period in June and July, we had another egg on the 15th of August 2012. Because the female didn't incubate at all, this egg had to be put in an incubator as well. After five days it was clear that the egg was fertilized, and 11 days later the first hummingbird chick at Weltvogelpark Walsrode finally hatched. Although the chick made a hole in the shell on its own, it was not able to hatch without our help and it weighed only 0.37 grams. The chick was hand reared in an artificial nest placed in a separate incubator. Initially, it only received some water, but after 24 hours, when the yolk sac was completely absorbed, we started feeding nectar and flies.

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The hand-reared fledgling.

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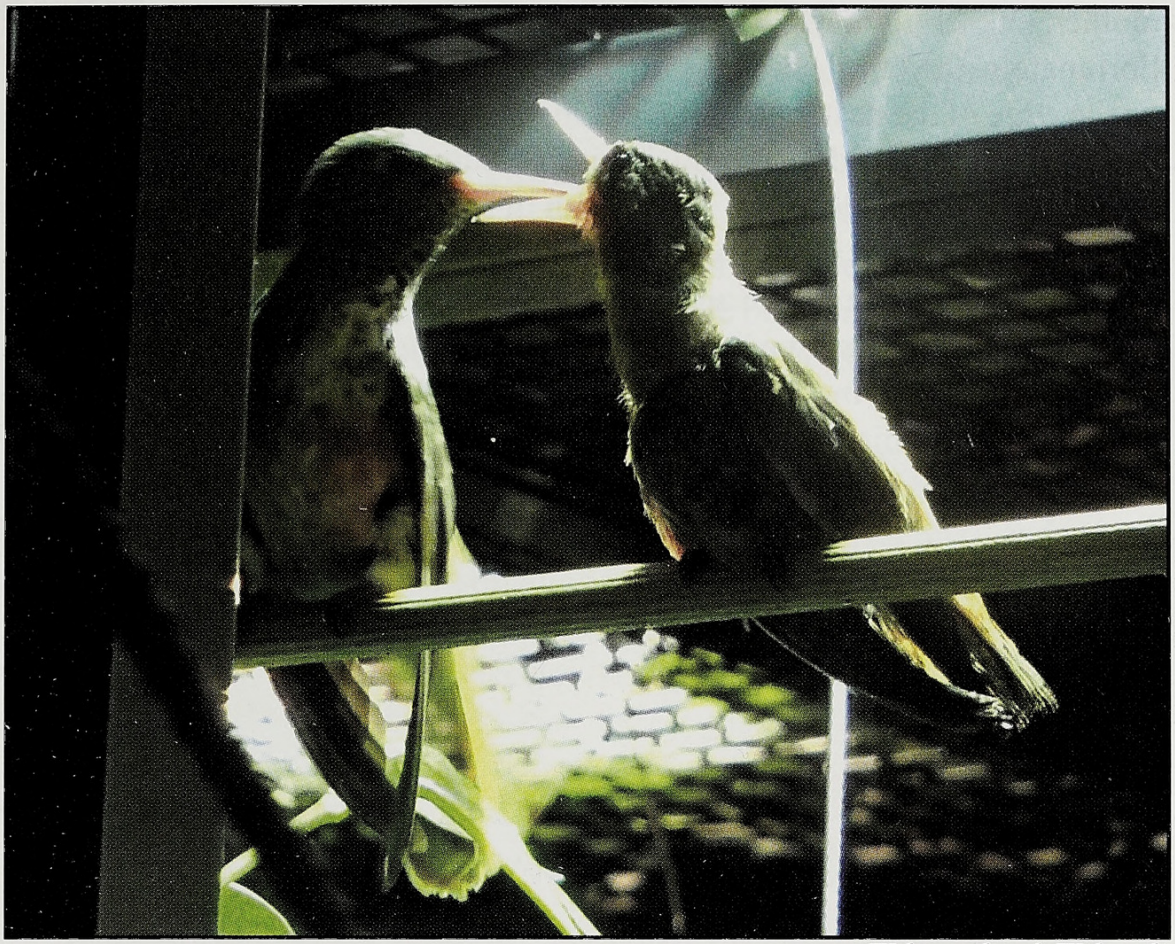
The parent reared chick just before fledging.



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The parent reared fledgling being fed.

The chick was fed every 20 minutes from 8.00 am to 11.00 pm and was left to rest during the night. Although the chick was begging very actively during the first two days, it looked very weak on the third morning and died a few hours later.

It took some time before we had another chance to breed these beautiful birds, but in November, one of our females started laying again. We were able to monitor the breeding behaviour by placing a camera above her nest. The female laid two fertilized eggs and incubated them perfectly. On the morning of December 8th, we were very happy to find one healthy looking chick in her nest. It hatched completely on its own on the 16th day of incubation. A few hours later it got even better: the second chick started hatching. This chick also hatched on its own, after only 15 days of incubation. The female took good care of both chicks. She was constantly catching flies to feed to her chicks and in between she was cleaning or incubating them. The chicks clearly received an enormous amount of flies, causing their crops to grow as big as their heads. Both chicks grew very fast and were begging actively. After a week, their eyes started opening and after 10 days the mother stopped incubating them during the night. Sadly, on the 12th day after hatching, one of the chicks got some food in its trachea when it was being fed by the

mother. We couldn't do anything, and the chick died within two minutes. Fortunately, the other chick kept on growing and after a while it was sitting on the edge of the nest, curiously looking at the world around it. During this period we started feeding the chick with a feeding tube, so it would recognize feeding tubes after fledging. On the 7th of January 2013, the chick took its first flight and made a clumsy landing on the floor of the aviary. During the next days it became better and better at flying and it started feeding from a feeding tube on its own. A couple of days after fledging, the chick was separated from its mother and Weltvogelpark Walsrode had its first fully grown hummingbird chick!

Two months after the first chick fledged, an egg was again abandoned by its mother. The fertilized egg was put in our incubator, and on the 14th of March, a chick hatched after 15 days of incubation. Once again, we tried the best we could to hand rear this tiny bird, and this time our efforts paid off. The chick was always begging actively and it grew very well. It only weighed 0.5 grams on day two, but its weight increased to 3.3 grams on day 15 and 4.9 grams on day 25. We fed it fruit flies soaked in isotonic water, supplemented with nectar. The amount of fruit flies increased every day: on the 3rd day it was fed 45 fruit flies throughout the day, and on the 15th day this amount had been increased to 445 fruit flies. After day 15 we started lowering the amount of fruit flies, since adult birds hardly need any insects. The amount of nectar was increased every day as well: 0.48 ml on the 3rd day, 5 ml on the 15th up to 8 ml on the 25th day. The chick fledged on April 4th 2013, 21 days after hatching. A few days later, when the chick was completely independent, it was moved to a small aviary, where it could practise its flying skills.

This chick wasn't the end of our breeding success. In fact, five more chicks successfully hatched and fledged, of which three were raised by their mother. The young females seem to catch up on their breeding and rearing experience, so that 4 young were successfully parent reared.

At the time of writing, there were 7 healthy chicks flying around in their individual aviaries. Weltvogelpark Walsrode is very proud of this accomplishment, and of course we hope our efforts to breed these little birds will keep paying off in the future.

Acknowledgements

The hand-rearing team comprised Diego C. Rubiano Franco, Laura Rìos Ortiz, Oliver Busse and Hanne van Bavel

BREEDING OF THE GOLDEN-BREASTED OR ROYAL STARLING *Cosmopsarus regius*

by Patrick Chartier

The African glossy starlings are classified under the generic name Lamprotornis. The Royal Starling can therefore be identified by the scientific name: *Lamprotornis regius* (regius meaning royal) or as *Cosmopsarus regius* (the Gold breasted Starling).

Adult Royal Starling perched at the nest box

In this article I will use the second name because this bird, and *C. unicolor*, the Ashy Starling, when kept in captivity, have needs that differ greatly from those of all the other species of African starlings. Their behaviour is different, and their diet is mainly insectivorous.

Howard and Moore, in their *Complete Checklist of the Birds of the World*, recognise two subspecies: *C. r. regius* and *C. r. magnicus*. I have personally observed many specimens in captivity and in the wild, without ever being able to identify a phenotypic distinction. According to Van Someren (1924), *C. r. magnificus* would be in the northern part of the range and would have the distinction of brighter colours, with more purple on the chest.

Thus *C. r. magnificus* would have, according to The Handbook of the Birds of the World, a range centered on Tsavo and the two subspecies may have resulted in sympatric speciation.

This bird is not subject to trade legislation or special restrictions.

Young Royal Starling in the nest at 15 days old.

Description:

This bird is an easily identifiable starling, with a very long tail, blue on the wings, green iridescence on the head, and a chest and belly of a remarkable golden yellow, above which is a bright crimson patch. The eyes are white and the legs and bill are black. The size is about 35 cm, females generally a little smaller than males, but a number of specimens are between the two.

The tail is long and tapered. The feathers are black with a bronze top, sometimes with green reflections, depending on the light. The primaries are dark brown with a violet copper edge; secondaries are purple except for the internal margins which are brownish. The outer primaries are notched.

There is no sexual dimorphism described in the literature, but with experience, it is possible to sex birds visually. Females are generally smaller, thinner and have a different physiognomy, less powerful than the male.

More objectively, there are tables of measurements, often based on small samples. There are fewer measurement tables for females. The most striking differences appear to be, as in many avian species and most of the passeriformes without phenotypic sexual dimorphism, the length of the skull, (the most usual measurement taken by professional ornithologists). Males range between 33 and 36mm (average: 33.3); females: 28-33 mm (30.6 mm); the length of the wings: males: 132-146 mm (average: 136.5mm), females: 123-133 mm (127mm); and the weight: male: 62g, female: 43g. These measurements are confirmed by the specimens which I have held that were

Young Royal Starling being weighed.

either genetically sexed or had reproduced.

The immature bird has head, neck and chin of a greyish brown, spreading down to the top of the breast, the colouration being darker on the lores and ear covers. These colours are typical of juveniles of the African starlings with iridescent plumage. The upper parts are dark brown with bright bluish-green tipped feathers. The bottom of the chest to the tail coverts are brownish yellow. The wings resemble those of adults, but duller with greyish-brown feathers. Juveniles attained the colouring of the adults when 3 months old.

The iridescent plumage begins to appear on the head and chest and dull areas of the wings (see photo p.79). The last parts of the plumage to change to iridescent colouring are the throat and chest. They then resemble adults, but according to Van Someren (1956), a comprehensive moult seems to be necessary to attain the intense colours of the adults.

The eyes are black during the first weeks of life and later become greyish-brown. When adult colour appears, the eye remains dark but becomes lighter each year. The legs and bill are very dark brown. In captivity, as I have noted personally, an adult which has not reproduced by mid-July starts to moult.

Young

Hatched naked and blind, they look like those from the other species of African starlings. Feathers start to appear on the 5th day.

Young bird being examined. The feathers on the breast are well formed.

Voice:

When kept in good conditions in an outside aviary, this bird emits a powerful hissing, simple and repeated almost constantly, but much more pronounced if in a group or a pair. This appears to allow them to remain in sound contact with other group members; it is especially evident in the morning and late in the day. If they are disturbed, a hoarse and repetitive call is made. When birds saw me enter the aviary, the first cry was much more powerfully emitted with contact whistling. This was perhaps to support the cohesion of the group when facing a disturbance. The contact call in flight translates as "cheeo-cheeo" or "weep-weep", the alarm call as "chiar" (Van Someren, 1956).

These vocalizations are also repeated constantly and allow the group to remain together (Archer and Godman, 1961).

Distribution, habitat and status

It is a common and endemic resident of desert areas, arid, semi-arid, shrub savannahs, and open bush with scattered shrubs, in the South of Ethiopia, Somalia, Eastern Kenya and Eastern Tanzania. Its distribution is mainly below 1000 m.

Ethiopia: the bird is not common, though common in the south and south east and the Rift Valley.

The iridescent plumage appearing on the head and chest.

Somalia: common in the north-west, extending to the east coast and south in the central-west area.

Kenya: locally common east of the Rift Valley up to 1200m, south to Samburu, Meru, Tsavo and along the Tana River to the coast north of Malindi. It is absent from the arid northern and eastern parts.

Tanzania: Northeast, westward to Masai Steppe, ranging in the south to Kilosa.

It seems nowhere to co-habit with the Ashy starling *C. unicolor* (Lewis and Pomeroy, 1989).

Some seasonal fluctuations in population density were observed at Tsavo (Lack, 1985), where the number of specimens present sees a peak from July to September.

With regard to Kenya, as I have noted personally, it is common in areas at certain periods and other times virtually non-existent. Migration, locally, seems to occur at the time of the rains.

An immature bird with adult colour coming through.

Behaviour

Cosmopsaurus regius is a gregarious bird, moving through the open dry bush; groups can be up to a dozen individuals. These family-sized groups meet throughout the year, except during the breeding season when couples isolate themselves (Van Someren, 1956).

The major focus of the groups is safety and the avoidance of predation; larger numbers give better visual coverage of potential dangers.

These birds spend most of their time on the ground, actively looking for

insects by hopping or running. These forays are often on bare ground, but also on flowers and foliage. They often hunt on the wing with great precision, catching all manner of insects. It is a lively and alert bird, and is sometimes joined by other starlings such as the Fischer's Spreo *Spreo fischeri*.

It can be shy around humans (except where they are the norm as around some inhabited lodges). As soon as they are disturbed, they fly a short distance to the nearest bushes. The flight is low, rarely more than 2 metres above the ground, flying from one bush to another or between the acacia trees. At mid-day, which is the hottest period, it perches, preening its plumage, whilst making a low chirping sound.

Food

They are primarily insectivorous but do consume some fruit. In Tsavo, 76% of 394 catches of food consisted of insects, of which 97% were collected on the ground (Lack, 1985); termites are also captured in flight.

The most frequently found stomach contents are beetles (Carabidae), termites (Termitidae), ants (Formicidae), fruits of *Commiphora* and *Dobera*, plants and grains of sand (Lack and Quicke, 1978).

The young are usually fed larvae of butterflies, moths, grasshoppers and beetles (Van Someren, 1956).

Reproduction

Many observers report that this bird is a co-operative breeder. Thus, Van Someren (1956) noted three adults feeding a brood of four young with butterflies and larvae of scarab beetles, and removing faecal sacs. He concluded that a male and two females were involved. Polygamy is seen regularly in different species of starlings.

Co-operation has been confirmed by Huel (1981) and by Kibwesi, who observed five nests around which five to nine adult birds were observed and at least five birds were feeding the same brood. One nest consisted of two birds, one was determined as a female by laparotomy and it appeared that only one female was incubating. Other members of the group brought building materials and fed the female on the nest. After hatching, she begged for food, which she then fed to the young. This soliciting was demonstrated by shuddering slightly raised wings, opening the beak and calling.

Two friends and I have also managed captive breeding, but have never observed such social behaviour. It is risky to leave several specimens together, especially if they have not known each other for a long time. I have always taken great care in trying to put a group together with frequent observations of the birds, but it is sometimes impossible for some groups to create social bonding.

I have only once seen in captivity, in fifteen years of observation, a reproductive pair tolerating the presence of another individual - a young female from the previous year. In captivity there is a possibility of double broods.

Nest

The nest is usually made in a tree hole 3-7 metres off the ground; either natural, or dug by barbets (Capitonidae) or woodpeckers (Picidae) and abandoned. A nest was observed in a Platycelipheum voiensis at 1.5 m from the floor (Huels, 1981). It is also possible that other sites are used such as the cavities in termite mounds. These cavities are filled with different materials like dry grass, hair, feathers, leaves, roots, dried wood, etc. (Van Someren, 1956; Archer and Godman, 1961). The female tends to add fibrous materials to the nest during the incubation period.

Eggs

The clutch is usually two to six eggs, which are elongated, pale bluish green with small reddish-brown markings, laid daily (Jackson and Scalter, 1938). Their size is 25.0-28.8 x 17, 2-19, 0 mm (19), averaging 4.7 g in weight (Schonwetter, 1938).

Time of breeding

Somalia: From April to June. Two possible clutches (Archer and Godman, 1961).

Kenya: during the two rainy seasons, short and long: March-May and November-December (Brown and Britton, 1980).

Ethiopia: March-May (Benson, 1946).

Incubation

It is only carried out by the female for about 14 days. 15-20 minute incubation periods are interspersed with absences of 5-10 minutes. During this period, the male feeds the female in the nest. Females in my possession were keener to incubate when the outdoor temperature was low.

Development and care of the young

The male feeds the young in the nest and removes their faecal sacs. There may be a significant disparity in the size of the young in a brood of four. The average weight at twelve days is 45.8 g (captive birds, Bell, 1984). Feeding visits are frequent: 48 in 2 hours, 16 by the reproductive female, 32 by four other adults (Huels, 1981).

In captivity

The information presented here is from literature, observation and experience.

Building the aviary

The bigger the aviary the greater chance that the birds will be able to behave naturally. This reduces stress giving an increased chance of successful reproduction.

The aviary should be correctly sited in order to offer maximum sunlight during the greater part of the day. The Golden-breasted Starling is a thermophilic bird and dislikes damp weather. Like most birds of semi-arid and arid areas, it can withstand temperature fluctuations if the humidity is not too high. It is better if they can warm up somewhere, so a heat lamp, put in the sheltered part of the aviary, is recommended during grey or damp weather in the autumn and winter. In the sunniest areas, covering part of the aviary with PVC to give protection from the wind is enough for the birds to withstand the winter.

After two years of careful acclimatisation during which they were wintered in a temperate area, the starlings then wintered well outdoors, when given a dry and wind proof shelter. All the perches were protected from rain and possible wind in exposed areas. The birds therefore prefer a "continental" climate but can withstand cold if kept dry in a humid maritime climate, especially with good food, good hygiene and sound housing conditions.

The material used for the floor is sand, which can be easily cleaned and is replaceable: it does not encourage parasites. It also mimics the soil of the natural area. This sand is placed on a lattice in the form of a fine mesh, covering the whole of the surface right up to the blocks that form the foundations of the aviary. This does not prevent planting, as holes were simply cut through the mesh. This mesh is designed to prevent the entry of pests. Also 30cm zinc plates placed around the top of the aviary at an angle of 40 degrees to the horizontal deter pests. Pine bark can be spread on the ground, and the acidic PH has an antiseptic role but will not harm the birds which spend a lot of time on the ground.

Perches should be changed regularly as birds frequently wipe their beaks on them. The whole of the aviary should be disinfected regularly, with a sprayable product, non-toxic to the birds and whose action is long lasting: Ceetal Agristeryl was used at home.

This starling is not destructive to plants; aviaries should be planted with a canopy, a more 'natural' habitat and pleasant surroundings. Laurel or ivy *Hedera canariensis* 'Gloire de Marengo' are plants most often used in my aviaries, especially so as they are evergreen.

The food is placed in feeders on trays placed on smooth metal poles, to avoid contact with rodents, and food containers should be cleaned and disinfected regularly. Water can be given high up or on the ground. These birds enjoy a bath so water should be changed daily. They appreciate the rain and ruffle their plumage, calling enthusiastically. A tray of fine and dry sand allows them to indulge in dust baths, which are much appreciated by this species.

The orientation of the aviary is essential - due south if possible. During sunny periods they will sunbathe frequently, raising their wings and fluffing up the feathers on the back and chest, as this allows heat to enter, bringing the parasites to the surface where they can be disposed of more easily.

The sides of the aviaries can be double meshed as a protection. Fishing line arranged around the aviary deters raptors and is aesthetically pleasing; it can be attached to poles at the height of the aviary and fixed to the ground, 30cm from the wire. This does not hurt the raptors, but frightens them. The surprised raptor generally does not return. This system was approved by a falconer and professional ornithologist.

They are sensible birds (like starlings in general) with a temperament that enables them to adapt well to captivity. However, they are sensitive to some factors, such as differing weather conditions, and they need special care by competent and experienced aviculturists. Being active, curious and lively birds they need points of interest such as low vegetation, roots and grass. Although I keep my birds in pairs, it is possible to keep them in large aviaries, as seen in zoological gardens, where groups can be kept. Many feeding stations will be required to prevent competition.

They can be aggressive when breeding, but Royal Starlings are probably the least aggressive of the entire genus Lamprotornis. In an aviary of 5 x 3 m, I have also successfully bred Crested Partridge *Rollulus rouloul*.

Food

They are starlings who are primarily insectivorous and so the daily intake of fruit is much less than with other starlings. Available to my birds were:

A quality insectivore food – the basic food element. If possible, vary the types or brands. Check their composition, including fat and iron.

Many types of pellet, some are consumed.

Extruded food, little consumed.

A mixture of exotic seeds, also very little consumed. Birds toyed with them and this has the disadvantage of attracting unwanted rodents.

Sweet apples like golden delicious are the favourite, sour apples are hardly ever eaten.

Raisins are offered regularly.