

# MUNIAS AND MANNIKINS

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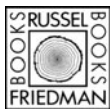
Robin Restall

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# MUNIAS AND MANNIKINS

ROBIN RESTALL



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For thirty years, his friendship has made my life richer and his example has guided me to become the birdman I am today. His gifts of personally directed, witty doggerel have afforded many merry moments. Here is an example, received after I had written to him about the difficulties I was having with the Magpie Mannikin and its relationship with the Bindura Bamboo:

*Lonchura fringilloides, one of Africa's drab boidies,*

*Originally ate the seeds of Bindura Bamboo.*

*It then found that rice, was rather nice,*

*Said "these new seeds supply my needs, in future they will do too".*

In writing this book, his encouragement made it possible and his help made it significantly better.

Now I wish to dedicate it, in all humility, to Derek Goodwin.

# INTRODUCTION

An international advertising agency is perhaps the last place where one would look for a specialist in finches. And yet, here I stand, 35 years of my professional life far removed from the world of birds, but with more than 45 years of my private life immersed in the world of finches. My job has taken me all around the world – I have lived in many countries in most continents and have had to travel constantly from country to country. For a birdman this has had both enormous advantages and great disadvantages. On the positive side, I have watched birds in some 20 countries and if I had ever kept a life list it would surely be lengthy. I have met ornithologists of every class and status, zoologists and aviculturists. I have also seen many bird markets and met trappers of every kind. So the input has been extremely varied and gratifying. On the negative side I have rarely been able to get involved in any long term studies, my travels always inhibiting continuity.

The longest I have ever lived in one place has been my time in Hong Kong, where this book was written, from my arrival in 1989 to my retirement to Venezuela in 1995. When my family and I arrived in London from Tokyo, we moved into an old Victorian terraced house with a tiny back garden. Before long, I had built a bird room and an aviary and had begun to study some new birds. I resolved to obtain only finches not recorded in the avicultural literature, about whose habits little or nothing was known. In this I was partially successful, often compromising my goals out of affection for some particular species. Within a year I had acquired a few rare and virtually unknown munias from New Guinea and gradually the genus *Lonchura* came to dominate my bird interests. Thus I returned to a fascination of my childhood when, as a boy of ten, a pair of Tricoloured Munias *L. malacca* were the first birds I ever kept. Soon an ambition to paint every plumage of every munia had developed into the idea for this book. Then came the transfer to Hong Kong, and the opportunity to see munias in the field. Over the next seven years I concentrated all of my bird activities on this fascinating, albeit not very dramatic, genus. This book is the result.

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## ACKNOWLEDGEMENTS

In the five years it took me to write this book I visited many countries looking for munias in their natural habitat, in bird markets, and in the collections of both serious aviculturists and bird trappers. I also looked at specimens in museum collections, read thousands of references and looked at more books than I can remember. I corresponded with every kind of bird enthusiast imaginable, and a few I would prefer not to imagine. While doing all this, many people were very helpful and I am much indebted to them for their help – in some cases, help so generous and useful as to be overwhelming. To anybody I may overlook here I apologise; it is unintentional.

Among those particularly memorable are Russell Kingston and David Holmes in Australia; Dr Philip Clancey, Fred Barnicoat, Eric Clewlow and Neville Brickell in South Africa; Fred Castillote in the Philippines; Charuvarn Vanasin, Philip Round and Dr Colin Ogle in Thailand; Dr Atichart Suntharos in Vietnam; Prof Dr Jurgen Nicolai, Martin de Rooter and Siegfried Kirschke in Germany; Don Hadden, formerly in Bougainville; Ryozo Kakizawa of the Yamashina Institute in Japan; Patrick Tay and Teo Ah Soon in Singapore; Deepak Warakagoda in Sri Lanka; Victor Mason on Bali, Herwin Purwahariyanto and Derek Holmes in Indonesia; Isaiah Bigilale of the National Museum at Port Moresby in Papua New Guinea and Jenny and Roger Hicks, formerly in Papua New Guinea; Anil Bhatia in Bombay, India; Dr Gerloff Mees formerly at the Leiden Museum in the Netherlands, and Dr René Dekker now at Leiden; Dr Mary LeCroy at the American Museum of Natural History in New York, USA, and Graham Cowles of the Natural History Museum at Tring; Miguel Lentino of the Phelps Museum and Clemencia Rodner in Caracas; Carol Gokce, librarian at the British Museum (Natural History); many aviculturists in the UK including Graham Harper, Malcolm Hough, Eileen 'Tess' Hisley, Michael 'Mick' Plose, Graham Tulk, Bryan Peck, Ron Miller, Ian Hinze and especial thanks to Oreste Piotto and Colin Rowe, the two most competent and successful breeders of munias I know. Linda Santosa in Indonesia was indefatigably helpful in arranging for me to receive munias in Hong Kong from various parts of Indonesia. Alison Miller in England typed the manuscript for the first five years, with endless revisions, and maintained a level of cheerful willingness that merits beatification. Then I acquired my own Apple computer and took over the endless revisions and additions (and realised what an endless toil a manuscript like this can be!). Dr Luis Baptista of the California Academy of Sciences not only helped and advised in many ways but transformed most of my tape recordings into sonograms and, in so doing, indoctrinated me into yet another fascinating aspect of bird study. Derek Goodwin translated endless letters and reprints of papers from German to English, maintained an invaluable level of wisdom and advice, and encouraged me when I needed it most. There are some wonderful people in the world of birds and these are a few of them.

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# TAXONOMY AND RELATIONSHIPS

Munias, or Mannikins? It is the convention to refer to some of the African and all of the New Guinea species as mannikins, and most of the Asian ones as munias. In this book I follow this usage although it is difficult to avoid regarding the two terms as being interchangeable, and both are English synonyms for the scientific *Lonchura*.

The munias have sometimes been subdivided into both supergenera and subgenera. Delacour (1943) gives a comprehensive review of the divisions with various groupings listed and a list of synonyms. He considered there to be three supergenera, *Padda* which embraced the Java and Timor Sparrows, *Amadina*, Cut-throat and Red-headed Finch, now regarded universally as falling within the Estrildidae, and *Lonchura* which contained all the munias, divided into four subgenera. These were *Heteromunia*, *Euodice*, *Lonchura* and *Munia*.

Subsequently Wolters (1957), Steiner (1960) and Guttinger (1970 and 1976) gave further conclusions. Peters' *Check-list of the Birds of the World* (Paynter 1968) uses the nomenclature and sequence – with the relationships implicit – most widely used today. Paynter recognizes two genera *Padda* and *Lonchura*. Goodwin (1982) merges *Padda* with *Lonchura*. Sibley and Monroe (1990) recognise *Heteromunia* (Pictorella Mannikin), *Lemuresthes* (Madagascar Mannikin) and *Padda* in addition to *Lonchura*. Having studied these birds all my life and quite intensely for the last seven years, I find no good reason to subdivide them in this book. Having studied most of the species in the wild and under controlled conditions, I am certain there are no clear lines apparent between each subgenus and several species arguably belong on either side of lines that had been drawn. The new field of genetic analysis, apparently imperfect since each researcher's results differs in detail from the next, will no doubt eventually show the true relationships in due course. Until then it seems pretentious of me, and of little utility, to conclude evolutionary relationships based on superficial morphological details, inconsistent criteria, or received wisdom and so I use the genus *Lonchura* throughout. The supergenera and subgenera are included with the scientific synonyms that are listed in each species account.

In terms of English language names it is not possible to please everybody. I have generally given each species the name that seems most widely recognised, and then listed all the other names that appear in the literature. I have given every subspecies a common English name as well so that terms of reference may be constant and consistent.

To put the *Lonchura* in perspective it may be helpful to first look briefly at the finches as a whole. Traditionally, everything was placed in one of two families. The Emberizidae, embracing not only the buntings and cardinals, but also the tanagers and the true finches, rating each as subfamily, and the Ploceidae. This latter included weavers, sparrows, parasitic whydahs, parrotfinches and mannikins, rating each as a subfamily. More recently, the most widely accepted structuring has been four neatly defined families; the Emberizidae (buntings and allies), Fringillidae (true finches and allies), Ploceidae (weavers and sparrows), with the waxbills, parrotfinches, grassfinches and munias forming the Estrildidae.

This was fine until Sibley *et al.* (1985 and 1988) published the findings of extensive work based on protein and DNA analyses. The implications are still so startling that few yet have grasped the nettle and recognised the redrawn the lines which, for example, place the accentors and wagtails in the Fringillidae. Sibley and Ahlquist then switched to apes and humans and stirred up such controversy in the United States that their methods were called into serious question (e.g. Sarich *et al.* 1988, and Britten 1989), and the controversy is still raging. In Sibley and Monroe (1990) the estrildids are placed in yet another family, the Passeridae (sparrows and allies).

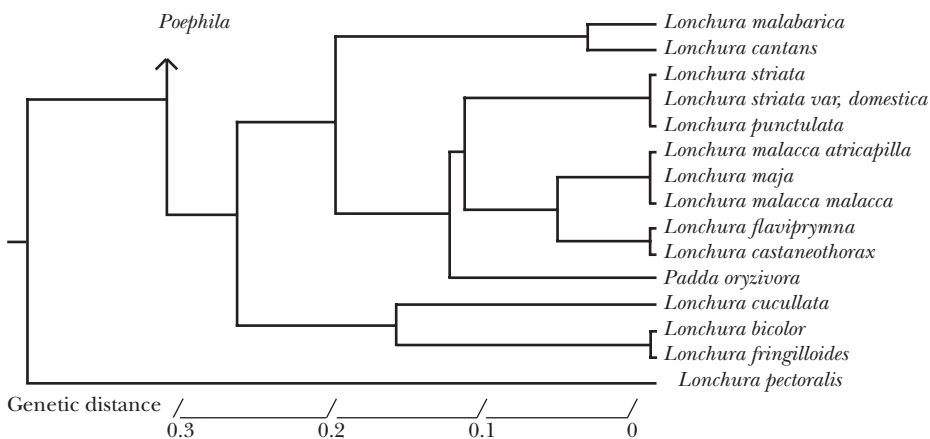
Delacour's (1943) seminal work was the basis of all subsequent revisions for the next few decades. When I first became seriously interested in estrildids it was the first major paper I read. Delacour's work, although obviously vulnerable in some detail, was noteworthy in that it reduced a plethora of genera to a manageable number and unified several species. But Delacour was a lumpner and combined several forms that today are widely accepted as being distinct species. In contrast I find myself to be a splitter and I take comfort in Christidis (1987) and Corbin (1977) who point out that there is a genetic distance between subspecies. My preference springs from a desire to see all behavioural observations located in origin precisely so that data can be as comparative as possible. To me the value of separating debatable species such as *L. malacca* and *L. atricapilla* is that field data can be related to its proper geographic location and a full comparative picture of a bird, its behaviour, diet, etc., can be built up. This is true also for recognising subspecies. If the forms are lumped some relevant, and perhaps quite localised behaviour from a single location, may be misguidingly taken to apply to the species as a whole.

The essential weakness in Delacour's revision was that he used a combination of morphology, ecology and ethology to support his case and he was not entirely consistent in how he used these different criteria. He arbitrarily unified some species like the two silverbills, *L. malabarica* and *L. cantans*, in one case and two of the pale-headed munias, *L. maja* and *L. flaviprymna*, in another. A few students who were more familiar with the birds in life leapt upon these details to carry out structured comparative studies (e.g. Harrison 1964) and thereby modify Delacour's structure, so beginning the breakdown of Delacour's revision.

In the years between Delacour's paper and the monumental work of Derek Goodwin (1982) many very able and talented workers such as Steiner (1960), Immelmann and Immelmann (1967), and Guttinger (1970) studied the estrildids and offered the results of their own studies. I commend the student of estrildid history to refer to the definitive list of references at the time of writing, given in Sibley and Ahlquist (1990).

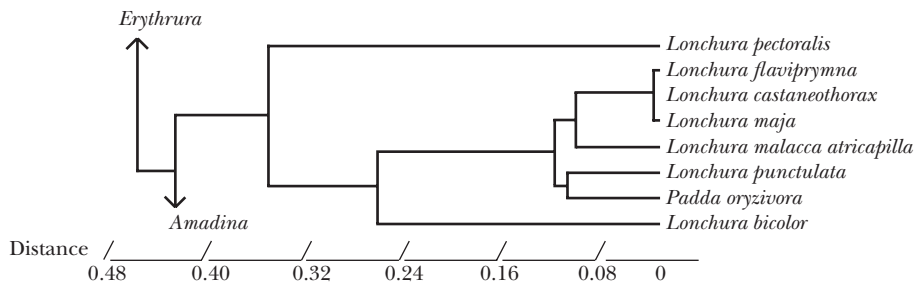
Since Goodwin, a great deal of work has continued, mostly in Germany, studying and breeding individual species. General field work continues, and in particular many publications have appeared based on field work in Indonesia and Papua New Guinea. The extent to which the work of Sibley *et al.* is valid or not I am not qualified to comment on, but I suspect it will turn out to be highly significant as other researchers experiment with molecular engineering, protein analyses and DNA studies. We have become accustomed to the wonders of forensic science in our daily media, from police work in deciding, for example, the parentage of a child, to the reconstruction of chromosome chains of a mammoth unearthed in Siberia. It seems obvious that there are techniques available that can definitively resolve the genetic relationships between living creatures. We are most likely to be confused by social and political issues when we talk about races of *Homo sapiens* or our genetic relationships to the apes, but when we look at birds we can hope to be a little more objective.

The study by Kakizawa and Watada (1985) at the Yamashina Institute in Tokyo is particularly interesting. The authors analysed the genetic variation of 42 species of estrildid by means of protein electrophoresis. They found that by measuring the distances between the gene count they could define the closeness of relationships and suggest a distance in evolutionary terms. Of the many charts showing all these details, one termed a dendrogram is the easiest to read, as it shows at a glance both generic relationships and gives an evolutionary dimension.



(After Kakizawa & Watada 1985)

Christidis (1987), using a much smaller selection of species, found both *Amadini* and *Erythruri* to be in *Lonchurinae*. He found a clear separation between *L. atricapilla* and *maja* in contrast to the findings of Kakizawa and Watada. But he also found *maja*, *flaviprymna* and *castaneothorax* to be extremely close.



(After Christidis 1987)

## References

Britten (1989), Christidis (1987), Corbin (1977), Delacour (1943), Goodwin (1982), Guttinger (1970), Guttinger (1976), Harrison (1964), Kakizawa & Watada (1985), Immelmann & Immelmann (1967), Morris (1958), Paynter (1968), Sibley & Ahlquist (1985, 1990), Sibley & Monroe (1990), Sibley *et al.* (1988), Sarich *et al.* (1988), Steiner (1960), Wolters (1957).



# NATURAL HISTORY OF MUNIAS AND MANNIKINS

## GENERAL DISTRIBUTION

The munias are widespread throughout the Afrotropical, Oriental, Australasian and Melanesian regions. They range from West Africa to the Arabian Peninsula and through Asia to China, southwards to New Guinea and Australia and even beyond to some of the Pacific islands where one species is found on the island of Ponape (Pohnape) in the Carolines. They are not found naturally elsewhere, although some species have been introduced further afield by accident or by design.

## HABITAT

Essentially munias are birds of arid savannah and open grassland, and the more primitive species (in evolutionary terms), Pictorella Mannikin *L. pectoralis*, the silverbills *L. cantans* and *L. malabarica*, and Madagascar Mannikin *L. nana* are still found in such habitat. But the genus *Lonchura* is still radiating and adapting. It has responded to opportunity by evolving far-ranging species such as White-rumped Munia *L. striata* and Scaly-breasted Munia *L. punctulata* that populate continuing habitat over thousands of kilometres, modifying marginally in coloration and minor physical details. In areas where the geography is essentially non-munia habitat, but offers locally suitable opportunities such as on the island of New Guinea, the genus has produced a variety of species, sibling species and distinct subspecies, the relationships of which can only be properly sorted out by the kind of genetic analysis referred to in the previous chapter.

Munias are also found in grassy country where the grasses are short, on land cleared by man for arable use, abandoned land where weeds and feral millets grow, and they have occasionally moved into areas inhabited by humans. Some, such as Javan Munia *L. leucogastroides* in Singapore and White-rumped Munia on Hong Kong island, have recently adapted to become common garden birds. Magpie Mannikin *L. fringilloides* has a strong relationship to bamboo and it seems that the distribution of the species may reflect that of the species of bamboo it relates to. Other munias may have bamboo connections, White-rumped Munia and White-spotted Mannikin *L. leucosticta* are two examples, but the bill of White-rumped Munia is a typical munia shape while that of White-spotted Munia is comparatively small. Not enough is known of the bamboo relationships to draw reasonable hypotheses. Considering how widespread and common the genus is, it is surprising how poorly its biology is understood.

## MORPHOLOGY

Munias range in size from that of the large Java Sparrow *L. oryzivora* to the diminutive Madagascar Mannikin, by coincidence the only two species with red in their bills, although the red of Madagascar Mannikin is not very noticeable.

Goodwin (1982) pointed out that the bills of estrildids tend to increase in size disproportionately as the birds get larger. I have not seen any behaviour to suggest that this disproportionately greater size is to take advantage of larger or harder seeds. The exception is that of Magpie Mannikin, which has apparently evolved a rather large and long bill to deal with the seeds of the Bindura Bamboo *Oxytenanthera abyssinica*. From personal observations I have no doubt that bill size in munias has a function almost exclusively to do with social behaviour, primarily sexual attractiveness, and only secondarily in aggression, if at all. Male munias tend to have heavier bills than females, a subtlety usually lost to the human observer but one presumably recognised by female munias.

Goodwin (1982) also pointed out that Allen's rule, that extensions of the body tend to be smaller in colder regions, appears to apply within the Estrildidae. The only example of a munia I can find to support this is Alpine Mannikin *L. monticola* which has a noticeably smaller bill and thicker plumage. There are two species that have variation in bill size from one subspecies to another; these are White-bellied Munia *L. leucogastra* and Hooded Mannikin *L. spectabilis*. There are no comparative studies to throw light on why this might be. I have kept two distinct races of the former in captivity but was unable to detect any comparative food preferences.

Many species have large feet, with the central toe as long or longer than the tarsus and significantly longer if the toenail is added. This is a clear adaptation to feeding on and in grasses and sedges, when seeds are taken directly from the plants. A bird will fly at the stems just short of the head, feet outstretched with toes wide and ready to grasp. On impact, the stems usually bend, with several stems coming together, before the bird grasps at and usually clutches several stems at the same time. The long toes and equally long claws make this comparatively easy.

Those species with larger feet, such as Chestnut Munia *L. atricapilla*, usually inhabit marshy grassland, more typically the areas along river edges and marshy country favoured by tall grasses and sedges. Those munias with smaller feet such as silverbills are more likely to feed habitually on the ground, taking fallen seeds. They tend to be birds of more arid habitat, open steppe with scattered bush and scrub, montane grassland or man-occupied lands such as agricultural areas and gardens.

Immelmann (1982) described a wild Chestnut-breasted Mannikin *L. castaneothorax* feeding by reaching out from a grass stem on which it was clinging and grasping with its bill and pulling seeding heads towards it which it then held with its foot while it ate the seeds. Several seeding heads became held in this manner to be released when the bird flew off. I watched several Grey-headed Mannikins *L. caniceps* feeding like this in Papua New Guinea and saw Chestnut Munia do the same in the Philippines. Baptista (1990) describes the Grand Mannikin *L. grandis* using its bill in an unusual manner when he saw it running the bill in one single wipe along the length of a panicle of seeding grass, taking several of the soft green seeds in one go. I have observed this same behaviour in Chestnut Munia in Sulawesi when a feeding bird, having already taken some seeds from a panicle, ran its bill along the rest of the stem thereby taking several seeds at once. The grass was a low-growing species of the *Digitaria* type.

Another aspect that Goodwin (1982) notices is that estrildids with comparatively longer pointed bills also tend to be ground feeders. This generalisation does not hold good for munias. A typical ground-feeding munia that fits this concept is Pictorella Mannikin *L. pectoralis*, but Magpie Mannikin *L. fringilloides*, which has proportionately the longest bill of any munia, is said to seldom feed on the ground (Clement *et al.* 1993). Other ground-feeding species, such as silverbills have short, conical bills.

## PLUMAGE AND COLOUR

### Adult Plumage

Fresh adult plumage is often brightly coloured and shiny, more so in second-year birds than those in first-year adult plumage which, in contrast, might be without gloss. I have seen a large number of Five-coloured Munias *L. quinticolor* that had highly glossy edges to the breast and flank feathers that reflected brilliantly in the sunlight. A quartet of Streak-headed Mannikins *L. tristissima* that moulted into second-year plumage while in my care also had the edges of the breast and flanks feathers silky shiny, causing the the underparts to appear in some lights to be scalloped with a paler colour. The African mannikins have patches of metallic gloss, green or blue depending on the species, on the head, wings or breast. Javan Munia will show a purplish gloss on the black of the breast, and Timor Sparrow *L. fuscata* can also have a purple gloss to the brown of the breast. Black-breasted Mannikin *L. teerinki* has a brown gloss to the head and breast, and Grand Mannikin of New Guinea may also have a green gloss to the head feathers. Some species, particularly those in the Chestnut Munia group, have glossy, fine trailing tips to rump, uppertail-coverts and central tail feathers, while others may show paler edges to the feathers of the nape and mantle, especially in new plumage. The Australian races of Chestnut-breasted Mannikin, and the south-east Asian Chestnut Munia *L. atricapilla sinensis* are outstanding examples.

In some species the difference between birds in first adult plumage and adults of two years or more is more than a degree of shine or feather extensions, both of which may be affected by wear or diet. Two examples where the difference between these plumage phases is significant are the Javan Munia and the Black-breasted Munia, and these are illustrated in the identification plates.

### Juvenile Plumage

Juvenile munias begin to change the coloration of their soft parts quite soon after fledging. The mandibles are horny-dark upon fledging but soon begin to change once the bird is feeding independently of its parents, although it is known to take up to three months in the case of some Pale-headed Munias *L. pallida*. The lower mandible lightens in every species except those that have an all-black bill when adult. Legs and feet tend to become a little paler as the juveniles change to adult plumage with the exception of those species that have black legs and feet, and the irides, at first dark brown, brighten to become chestnut or deep ruby.

If a series of juvenile munias of a single species from one location is examined carefully, it will be seen that they vary slightly in coloration from one another, whilst all are clearly the same species. In selecting examples for the identification plates, the juveniles I have illustrated are representative guides and should not be regarded as definitive plumages for species-diagnostic differences. One noticeable exception is Black-and-White Mannikin *L. bicolor* where there is a marked average difference between the juveniles of the different races, and another is Chestnut Munia where there are also significant differences between juveniles of some of the races.

The moult from juvenile to adult plumage appears to take place usually between 5 and 7 months from fledging. There are plenty of records of birds in captivity moulting at anything from 3 months to almost 12 months, but about 5 months is normal.

### **Bill Colour**

Immelmann did a lot of work on the significance of bill coloration in Zebra Finches *Poephila guttata*. In his work on imprinting in the Zebra Finch (1962a), which included extensive use of Bengalese, bill colour was a key factor. From this it is possible to infer that the dark bill in fledgling munias functions as an aggression and sexual attraction inhibitor.

In that study, Immelmann also found that bill coloration had most significance in flocking behaviour. I have noticed that the bicoloured-billed birds tend to clump and roost together, as do pale-billed birds, but I believe the all-pale bill has a stronger influence, in that bicoloured-billed birds will more freely clump with pale-billed birds than vice versa.

### **SEXUAL DIMORPHISM**

Only a few munias are sexually dimorphic, that is to say, the sexes having noticeably different body size (as opposed to different coloration or dichromatism). The most notable example is that of Grand Mannikin, where males are usually significantly larger than females and the difference in bill size may be such that the depth (i.e. height) of a male's bill can be 20% more than that of a female. Java Sparrow is a less dramatic but more consistent example; the base of the bill and the eyelids of a male in full breeding condition are noticeably more swollen and redder than those of the female.

In many species the head of the female tends to be rounder and narrower, males being broader at the forehead and at the base of the culmen. There is often a ridge of the slightly more swollen base of the culmen of a male that can usually be felt by the tip of the finger and nail if a bird is examined in the hand.

The Queensland Finch Society (1987) noted that munias can be sexed by the depth of the concavity of the base of the bill, that of females being deeper than in males. I have been able to verify this by personal observation on several occasions but the difference is usually only a millimetre and it is not so constant as to be a reliable indicator. I also often find a difference in the width of the base of the bill which is slightly greater in males than females. Typical measurements would be 8mm for a female and 9mm for a male.

Overall length and wing length may also represent sexual differences, hence these measurements can be used as well in determining the sex of an individual bird. When measuring newly-caught birds in the field I have noticed a consistent grouping of measurements for males, and another for females, but when faced with a choice from very few birds this is not very helpful, for there are not only large females and small males in every population, but a bird of a few years of age might be as much as 10% larger in some measurements.

As a generalisation it seems that males average up to 10% larger. For example, males of a given population of a given species of a given age might average 110mm in total length (from tip of bill to tip of tail in a straight line) and 52mm in length of wing (the closed wing measured from the shoulder to the tip of the longest primary). In contrast, the length of the female might measure 105mm, and the wing 48mm.

The difference in shape and size of tails is usually overlooked. When measuring birds, it is an additional set of measurements worth taking for future reference, since it may prove to be useful for the diagnosis when sexing several birds. Amongst the cases where I have found that this applies, there is a distinct difference in the length of the tail of the male compared to that of the female Scaly-breasted Munia from Kalimantan. The distance from wing tip to tail tip of the dozen or so females measured was invariably 30mm, while the same measurement in a similar number of males was 35 or 36mm. I also found a similar constant difference in some Chestnut Munias and was subsequently able to sex them in this way. In African Silverbill a series of comparative measurements showed that the central tail feathers of the males were not only consistently longer than those of the females, but were narrower as well. In other species with comparatively long and somewhat pointed tails, such as Indian Silverbill and White-rumped Munia, the tail measurement may also be significant.

### **SEXUAL DICHROMATISM**

There is much more sexual dichromatism (different coloration of the plumage) in munias of a given age than the literature records. The details will become apparent under the notes for individual species. When adult birds in fresh comparable plumage are together, males of species with black heads tend to have the black a purer black, shinier than that of the females which tend to have the blacks slightly browner. This distinction is usually lost on old museum specimens.



## NESTING

Munia nests are naturally roundish bundles that range from neat and compact to untidy and straggly, with the entrance hole at one side, or they are a distinct oval with the entrance at one end. The entrance may have a very slight overhang or porch, or it may have a pronounced porch that effectively obscures the entrance. Nests are made of grasses, strips torn from bamboo or palm leaves or other leaves, rootlets, fibres and similar thin lengths of pliable material. There is not a great deal of detailed information of nests in the wild, and the nests of many species appear to be virtually unrecorded. The literature often refers to the nest of a given species as being a 'typical munia globe' or similar phrase, but this is unfortunate and unhelpful. Nests between species can be quite different in structure and content, and the more detailed any description, devoid of clichés, the better.

The nesting behaviour of munias in captivity should not be taken as representative of natural behaviour in the wild as they will nest in boxes with holes, half-open boxes, wicker baskets, or even rolls of wire mesh in captivity. This is more an indication of the adaptability of the genus in general, and in particular of the adaptability of some species, than an insight into how nests are built.

From their willingness to accept covered, hole-in-side nest baskets in captivity, Goodwin (1982) offers the hypothesis that many estrildids not presently known to do so, may occasionally make use of other species' nests. The only example I have personally found of this practice was in Bali, where a pair of White-headed Munias *L. maja* had taken possession of the nest of a Streaked Weaver *Ploceus manyar*. It seems possible that many species of *Lonchura* may opportunistically take over the covered nest of another species if available.

In most, if not all species, the male brings the nesting material to the nest, while the female inside works it into place by pushing. This pushing may extend to a kind of weaving when a length of grass may be pulled back into the structure and thus loops, catching hold, but the munias are not authentic weavers. In the case of nests built amongst reeds by species such as Chestnut-breasted Munia, when the structure becomes anchored by having some living stems go through the sides of the nest and leaves of the living plant become entwined with the nest material, the effect is similar to that wrought by a true weaver-bird. The African mannikins usually include feathers or down when lining the nest, but the Asian species - seldom do. Three Asian species that have regularly included strands of material, such as feathers, strips of newspaper and other soft items in the nest structure and lining, are White-bellied Munia, Streak-headed Mannikin and Timor Sparrow.

Michael Plose (pers. comm. 1987) in England, noticed that when his captive Grey-crowned Mannikins were breeding, the bird flying to the nest always carried a short length of coconut fibre in its bill. I am not sure how widespread or typical this behaviour is. No doubt observations on munias in captivity are imperfect anyway because there may not be any suitable nesting material available once the birds are known to be sitting on eggs, and such behaviour might be inadvertently prevented. In my aviary, coconut fibre was always in short supply due to demand, as were short lengths of raffia. Also, items as fine as a piece of coconut fibre only a few centimetres long would be easy to miss being noticed by all but the most dedicated observer.

The estrildids of the genus *Estrilda* are known for building 'cock's nests', that is a smaller nest cavity on top of the nest and part of the total nest structure. This only occurs habitually in *Estrilda* species. It does not appear to be a characteristic of *Lonchura* but there are instances worth mentioning as further study might have evolutionary implications. I have personal experience of three instances when a cock's nest seems to have been built by a munia, all birds being studied in captivity. The first is a pair of Timor Sparrows that nested in a lovebird nest box. When the birds deserted their clutch of four eggs for the second time I took down the box and thoroughly examined the inside. There was a perfect and well-used cock's nest. I would occasionally enter the bird room during the day, and the male would leave the nest instantly, but the female stayed inside. Upon discovering the double cavity in the structure I watched the birds carefully and concluded that the male had been sitting in this sentinel nest while his mate had been sitting on the eggs in the inner chamber. I had a similar experience with a pair of Java Sparrows apparently building a double tiered, double chambered nest in an artificial log I constructed out of Spanish oak bark. The case of the Timor Sparrow tends to support Goodwin (1982) in his belief that the prime function of the cock's nest would be to thwart a predator.

When breeding Javan Munias in England, one pair appeared to have built a cock's nest as part of the structure which was in a bank of hay. The Queensland Finch Society (1987) states that a roost nest will sometimes be built above or below the breeding nest, but there is not enough information to infer whether these might be cock's nests in the meaning discussed here.

## Eggs

Munias lay white oval eggs, usually wider at one end, but there is considerable variation of shape within a species and even within individual birds. Young females producing their first clutch may lay smaller and more rounded or perfectly oval eggs. Incubation averages 13 days and the clutch is normally brooded by males and females alternately during the day, and probably by the female only at night although the male may roost in the nest with her. Eisner (1963) in her major study of the Bengalese, observed that more males hatch in the spring while more females hatch in the autumn. How this would relate to the breeding patterns of White-rumped Munia is difficult to extrapolate. It is not known if this is normal for other or even all *Lonchura*, or what the significance might be.

## Nestlings and fledglings

Nestlings are born naked with their eyes closed. The skin varies from dark to pink depending on the species. They call to be fed and this becomes a clamour as they grow and compete for the parent's attention. They appear to be fed on demand, the call, when it has been recorded, being a repeated *chi-chi-chi-chi* or similar. Young munias are fed by both adults by regurgitation. The young beg in a prone posture, twisting and turning the head up and pointing it at the parent. The parent inserts its beak into the gape and pushes, the youngster clearly grasping the bill and pushing in the opposite direction. The food is regurgitated with a pumping action.

Each species has a distinctive pattern of black and white markings on the palate, with white nodes at the edges of the gape. Eisner (1963) found considerable variation in the palate markings of the Bengalese, but the extent to which there might be variation within a wild population is not known. Two records (Sproule 1994 and pers. obs.) of the palate marking of Five-coloured Munias suggest that there might be more variation than taken for granted. The patterns may change during the period that the chick is in the nestling stage (Payne 1973 and Goodwin 1982), and frequent records of the palate of a nestling Pearl-headed Mannikin over the nestling period (Baptista *in litt.*) show an evolution of the pattern. It seems that the age of the nestling should be noted when the palate marking is recorded. One of the characteristics distinguishing the African mannikins from the Asian munias is held to be the double horseshoe palate marking of the former, but I have found a double horseshoe marking in the palate of Five-coloured Munia from Indonesia. It is relevant that not all species have had the palate markings recorded.

The nestlings usually fledge on the same day even though they may be at slightly different stages in development or age. They are encouraged by the parents to return to the nest to sleep, at least for the first few nights after fledging. When watching a loose colony of Chestnut Munias in the gardens of a hotel near Manado, Sulawesi, I observed the feeding of a crèche of new fledglings. On two occasions there was no doubt that young birds, all recent fledglings from three or four different nests, were being fed by an adult that was not necessarily the parent of the birds being fed. I have referred to this (Restall 1995a) as 'crèche feeding'.

## BEHAVIOUR

Little is known, and even less has been published, of munia behaviour in the wild. Most of the little that we know, including much of this chapter, is from the study of individual species in captivity.

### Wing-raising

African mannikins will raise the wing on the far side of the body, both when being fed and when threatened by another bird, when the wing-raising bird is unwilling to give way or flee. Australian Pictorella Mannikins will raise the wing on the far side of the body to a parent when begging for food. Fledgling Pearl-headed Silverbills will quiver their wings in solicitation of feeding. I have recorded (Restall 1995a) the same wing-raising by a first-year adult Philippine Scaly-breasted Munia *L. punctulata cabanisi* when it felt threatened by a slightly larger munia of a different species, on another two separate occasions by Chestnut Munia *L. atricapilla brunneiceps* under similar circumstances, and also in Indonesia by a fledgling Chestnut Munia *L. atricapilla jagori* when competing with siblings to be fed.

## References

Eisner (1963), Goodwin (1982), Hall (1962), Immelmann (1962a, 1969 & 1982), Immelmann *et al.* (1968-72), Moynihan & Hall (1945), Morris (1957), Queensland Finch Society (1987), Restall (1989 & 1995a), Sproule (1994).

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# **PLATES**

**1-16**



## PLATE 1: SILVERBILLS AND AFRICAN MANNIKINS I

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### 2 African Silverbill *Lonchura cantans* Text and map page 60

See also Measured Drawing on plate 18.

- 2a *L. c. cantans* adult From West and central Africa.
  - 2b *L. c. inornata* adult From extreme northeastern Africa and the Arabian Peninsula. Touch of dark red in the uppertail-coverts and edges of the tail not noticeable in the field.
  - 2c *L. c. orientalis* adult From East Africa. Darker on face and upperparts.
- 

### 4 Pearl-headed Mannikin *Lonchura griseicapilla* Text and map page 66

- 4a *L. griseicapilla* adult From East Africa.
  - 4b *L. griseicapilla* juvenile
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### 3 Indian Silverbill *Lonchura malabarica* Text and map page 63

See also Measured Drawing on plate 19.

- 3a *L. malabarica* adult From Israel to northeast India and Sri Lanka.
  - 3b *L. malabarica* juvenile
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### 5 Bronze Mannikin *Lonchura cucullata* Text and map page 68

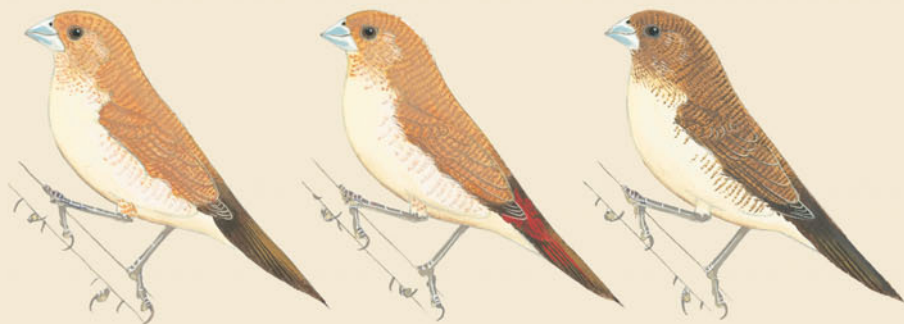
See also Measured Drawing on plate 20.

- 5a *L. c. cucullata* juvenile
  - 5b *L. c. cucullata* adult From West Africa. Green on flanks.
  - 5c *L. c. scutatus* adult From East Africa. Usually an absence of significant green on flanks. Barring on rump, upper- and undertail-coverts much finer.
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### 1 Madagascar Mannikin *Lonchura nana* Text and map page 59

See also Measured Drawing on plate 17.

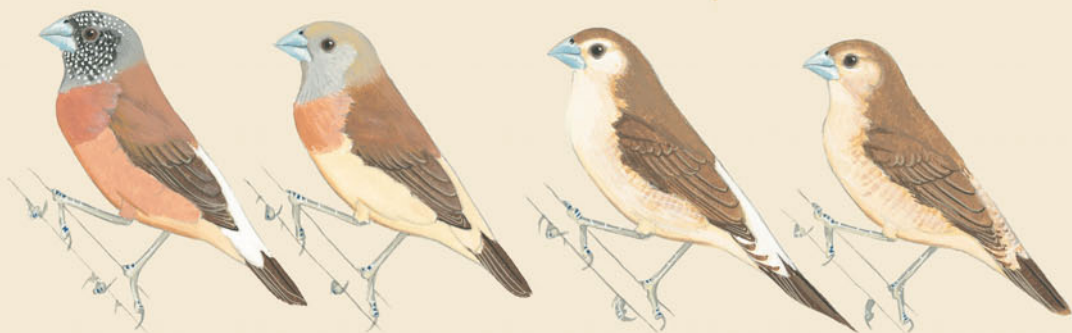
- 1a *L. nana* juvenile
  - 1b *L. nana* adult Madagascar and the Comoros. Reddish on base of bill.
  - 1c *L. nana* adult Dark type found in captivity.
  - 1d *L. nana* juvenile Dark type.
-



2a

2b

2c

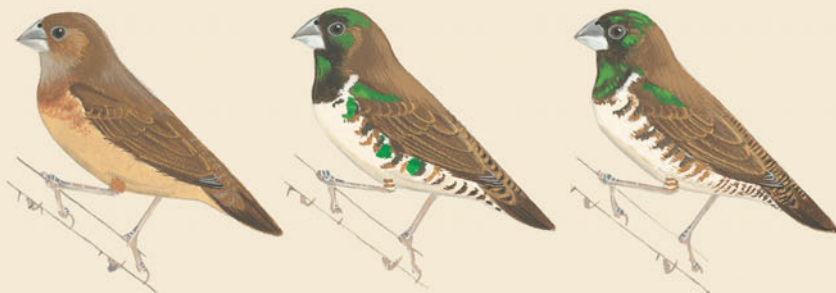


4a

4b

3a

3b



5a

5b

5c



1a

1b

1c

1d

## PLATE 2: AFRICAN MANNIKINS II

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### 6 Black-and-White Mannikin *Lonchura bicolor*

Text and map page 71

See also Measured Drawing on plate 21.

- 6a *L. b. nigriceps* **juvenile** Paler and browner on back and wings, paler ear-coverts, chin and throat.
  - 6b *L. b. bicolor/stigmatophora/poensis* **juvenile** Dull earth-brown above, greyish below.
  - 6c *L. b. bicolor* **juvenile** From Mt. Nimba, Liberia. Richer brown on breast and creamier below.
  - 6d *L. b. poensis* **adult** From Central Africa, Cameroon to northern Angola. Green gloss on black plumage. Black-and-white barring on rump, uppertail-coverts and wings.
  - 6e *L. b. bicolor* **adult** West Africa, Senegal to eastern Nigeria and Mt. Cameroon. Green gloss on black plumage. Absence of any barring on the wings or rump. There may be one or more pale vestigial spots on the tertials.
  - 6f *L. b. bicolor* From Mt. Nimba, Liberia. No barring on the wings or rump. Three white spots on innermost tertials.
  - 6g *L. b. stigmatophora* **adult** From northern shore of Lake Victoria to southern Ethiopia. Dull black on head, brownish-black on mantle, only a slight purple or bluish gloss.
  - 6h *L. b. woltersi* **adult** From southwest Katanga and northwest Zambia. Purple or bluish gloss on black plumage. Dark brown back and wings.
  - 6i *L. b. nigriceps* **adult** From East Africa. Rufous-brown back and wings. White quills to scapulars.
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### 7 Magpie Mannikin *Lonchura fringilloides*

Text and map page 74

See also Measured Drawing on plate 22.

- 7a *L. f. fringilloides* **adult** From West Africa to western Uganda. Broad patches of black on sides of breast and brown on flanks. *L. f. pica* from East and south-east Africa has less black and brown on sides of body and has the mantle slightly paler brown.
  - 7b *L. f. fringilloides* **juvenile**
-