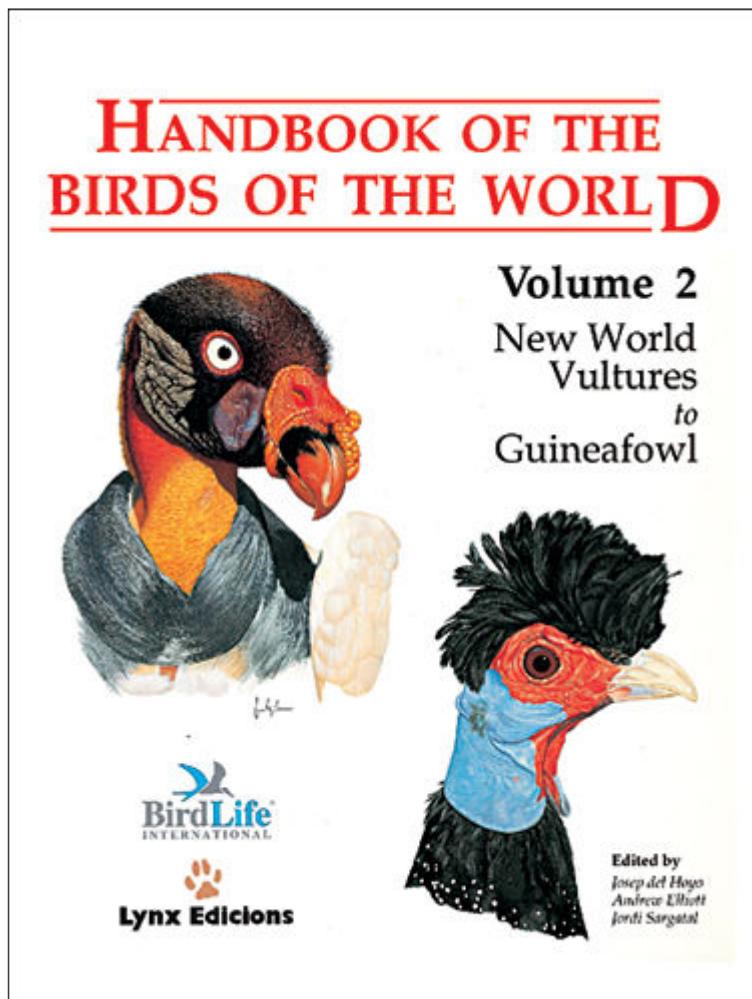


## **Handbook of the Birds of the World**

### **Volume 2**

New World Vultures to Guineafowl



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Class	Aves
Order	Galliformes
Suborder	Phasianii

## Family **Numididae (Guineafowl)**

- Medium-sized, plump terrestrial birds, with small head, and extensive bare skin on head and neck; most species with crest or bony casque.
- 40-72cm
- Afrotropical Region.
- Wide variety of habitats, from dense rain forest to semi-desert.
- 4 genera, 6 species, 19 taxa.
- 1 species threatened; none extinct since 1600

### Systematic

The guineafowl have traditionally been considered a subfamily of an expanded version of Phasianidae, but recent studies based on differences in DNA indicate that family treatment is appropriate for the group. According to DNA sequences the Numididae diverged from the Phasianidae lineage some 38 million years ago.

The Family Numididae is endemic to Africa, and its closest relatives are apparently to be found in Phasianidae and Cracidae. It seems most likely that the guineafowl originated in the savanna zones of Asia, from a francolin-like phasianid, which probably colonized Africa some time around the middle to late Miocene. The changes in the distribution patterns of vegetation over geological time, determined by fluctuations in the climate and also by geological activity, influenced the taxonomic development of the ancestral guineafowl by causing a considerable degree of radiation. This, in turn, has led to the various representatives of the family occupying practically all of the biotopes found in Africa in the present day.

All four of the genera currently recognized within the guineafowl were clearly differentiated by the Pleistocene. Of the four, *Agelastes* is probably the most primitive. Its two species constitute a superspecies. The little known Black Guineafowl (*Agelastes niger*) was formerly awarded a separate genus, *Phasidus*, but in the early 1960's a detailed comparison of this species and the White-breasted Guineafowl (*A. meleagrides*) led to the conclusion that the two species were closely related, and should be united in a single genus.

Over the years, the Helmeted Guineafowl (*Numidida meleagrifrons*) has been subdivided into some 30 subspecies, but at present only nine are generally recognized, due to extensive intergradation. Two or sometimes three of these races have actually been considered separate species by some authors, and, while there is only limited support for this approach, there are three fairly clearly defined subgroups, with the nominate form occupying East Africa, the *galeata* group in West Africa, and the *mitrata* group in southern Africa. As in many similar cases, it is essentially a matter of personal preference as to whether these groups are treated as megasubspecies or allospecies but zones of intergradation and the element of caution both argue in favour of the former.

The Plumed Guineafowl (*Guttera plumifera*) and the Crested Guineafowl (*Guttera pucherani*) form another super-species. Some authors have preferred to recognize three species in the genus *Guttera*, dividing the Crested Guineafowl into two, with the promotion of the race *edouardi*, but once again extensive interbreeding, both in the wild and in captivity, has shown that they should be considered conspecific, although they have perhaps moved some little way towards speciation. About 15 subspecies have been described for the Crested Guineafowl, but currently only five of these are usually accepted.

While there is a certain amount of disagreement at the specific and subspecific levels, the four genera appear to be rather well defined, even if their relationships with one another

are generally none too clear. Although the Helmeted Guineafowl has been known to hybridize with the Vulturine Guineafowl (*Acryllium vulturinum*) in captivity, the resultant young are sterile.

### Morphological Aspects

Although the guineafowl constitute a distinctive group within the Galliformes, in structure and morphology they are generally rather similar to most other members of the order.

In the guineafowl, size appears to be related to the density of the vegetation in the habitats typically occupied by each species. Thus, the White-breasted, Black and Plumed Guineafowl, the species that frequent the areas with the thickest vegetation cover, are the smallest, with average wing lengths of about 20.5 cm for the first two species, and 22.5 cm in the last. The Crested Guineafowl, which inhabits areas with medium to high vegetation density, has a mean wing length of 24.5-26 cm, whereas the equivalent figure for the Helmeted Guineafowl of open or relatively open habitats is 25-28 cm.

Finally, the largest species, the Vulturine Guineafowl, occupies open, arid ground and has a mean wing length of 29.5 cm.

Like other Galliformes, guineafowl are rather corpulent birds. The oval body is voluminous, exaggerating the bird's relatively small head. In all species, both the head and the neck are virtually featherless, and the bare skin is often beautifully coloured. The bare skin appears to play an important role in thermoregulation. It is also contorted into a whole series of adornments, including cartilaginous gape wattles, notably in the Plumed Guineafowl, folds of skin, for instance on the ind-neck of the Crested Guineafowl, warts on the cere, and cartilaginous bristles. As their vernacular names suggest, the Helmeted Guineafowl has a bony "helmet", whereas the Plumed and Crested Guineafowl have bushy crests.

The long, incredibly slender neck of the Vulturine Guineafowl has almost certainly developed in order to enhance the bird's visibility over vegetation. The aspect is strikingly exaggerated by a series of long, elegant ornamental plumes which hang down over the breast and upper back.

All these adornments are amongst the most distinctive features of the different species or, in some cases, subspecies. The many races of the Helmeted Guineafowl are generally separated on the length and shape of the bony casque and of the gape wattles, and also on the presence or absence of cere bristles and filoplumes on the hindneck.

The bill is usually short and stout, with the upper mandible curved. It is particularly feeble in the Black Guineafowl, but, in contrast, appears really quite robust in the Vulturine Guineafowl, an effect again enhanced by the very thin neck.

The wings are rather small and rounded, clearly belonging to non-migratory birds. They are designed for short bursts of rapid flight, enabling the birds to make a quick escape when danger threatens, but are quite unsuitable for any form of sustained flight. This is again typical of galliform birds, as is their style of flight, involving an explosive take-off and a series of rapid, powerful wingbeats, followed by a glide down into cover. In line with the limited flying abilities of the guineafowl is their short tail, composed of 14-16 rectrices. The exception is the Vulturine Guineafowl, which has a relatively long tail, particularly the central tail feathers.

The tarsus is strong and generally fairly short, although once again the Vulturine Guineafowl is an exception, as it has rather long tarsi. The legs and feet, with three front toes, a single hind one and strong claws, are perfectly adapted to a terrestrial lifestyle, and reflects the fact that guineafowl mostly move about by walking.

*Agelastes* is the only genus in which birds sport spurs; these sprout from the tasometatarsus as in the junglefowl(*Gallus*), not from the hypotarsal ridge as in most other Phasianidae.

Males of *Agelastes* can have one or two spurs per leg, as also do a few females. The Vulturine Guineafowl commonly has a strange series of spur-like bumps along the rear face of the tarsus, the function of which is unknown. They are generally longer in males than in females, and vary individually both in size and in number, with up to six recorded. *Agelastes* again differs from the other guineafowl genera by having the tarsal scales imbricated and in rows, as in the francolins. The other genera have the tarsi covered with pentagonal scales which are not lined up in rows.

Plumage is generally black or dark grey, although in all species, except the two members of the apparently primitive genus *Agelastes*, this is heavily spotted or vermiculated with white. There is sometimes a bluish tinge to the plumage, which is typically produced by the feather spotting being bluish white, rather than pure white, but there are fairly extensive areas of rich blue on the underparts of the Vulturine Guineafowl.

In all species, sexual dimorphism is limited merely to males being slightly larger than females, with no evident differences in plumage, which is in line with their tendency towards monogamy and also the participation of the male in the care of chicks. During the breeding season, there is slight protuberance in the cloaca of males, at any rate in the Helmeted Guineafowl. However, there is no seasonal variation in plumage in any of the species.

Juvenile plumage tends to be rather similar to that of the adult, but generally drabber, often with a certain amount of brownish barring. However, the juvenile White-breasted Guineafowl, in addition to appearing generally duller than the adult, has the plumage pattern more or less inverted, since it is the belly that is white, not the upper breast or upper back, as in the adult. Most of the rest of the plumage is brownish black, but recent evidence indicates that the feathered head and neck almost certainly retain the patterned natal plumage until the bird moults into full adult plumage, as is the case in other guineafowl. The juvenile Black Guineafowl likewise shows a white belly.

There is very little information available about moult in the Numididae, but the Helmeted Guineafowl is known to undergo a complete post-breeding moult, with the flight-feathers apparently replaced in serially descendant order.

## Habitat

The natural distribution of the guineafowl is restricted to sub-Saharan Africa, except for an isolated population of the Helmeted Guineafowl in north-west Morocco. Between them, the different species occupy almost all available habitat types, from dense rain forest to arid steppe and semi-desert. They can be found from sea-level up to considerable altitudes, and the Helmeted Guineafowl even occurs at 3000m.

The White-breasted, Black and Plumed Guineafowl occupy areas of tropical forest, essentially in the equatorial belt. They are generally restricted to undisturbed primary forest, although the Plumed also occurs in very mature secondary growth, while the White-breasted has been seen in selectively logged forest.

The secretive nature of these species, together with the difficulty of their observation, means that even basic knowledge on habitat use remains rather limited.

In terms of habitat preference, the Crested Guineafowl can be considered somewhat intermediate, as it occurs in secondary and riparian forest and also along the forest edge. Much the most widespread member of the family, the ubiquitous Helmeted Guineafowl, in addition to its isolated Moroccan population, is found in almost any form of open country from the Sahel zone southwards. Its most typical habitats include relatively open savanna and mixed areas of savanna and bush, sometimes interspersed with cultivation, but it is also common in savanna woodland and along forest edge. Finally, the Vulturine Guineafowl is the species that occurs in the driest, most open habitats. It is typically found in rather arid zones,

including mixed *Acacia* and *Commiphora* scrub and semi-desert, although it does also occur in woodland, thickets and even montane forest.

As can be seen, there is a certain amount of overlap between the habitat preferences of the different species, and in some cases more than one species can occur in a particular areas. For instance both the Vulturine and White-breasted Guineafowl coincide with the Crested Guineafowl, although in very different habitats, separated almost by the full breadth of Africa. Nevertheless, in such cases of overlap, the different species do not tend to associate with one another, and only rarely do they mix.

The proximity of water-holes, or other sources of drinking water, seems to be a limiting factor in the distribution of guineafowl, with the exception of the Vulturine Guineafowl. This species has an exceptionally long caecum constituting over 23% of the entire length of the intestines, and this may permit it to regulate and limit water loss. Another requirement, for all species, is the presence of suitable trees for roosting in at night.

### **General Habits**

All guineafowl species have highly terrestrial lifestyles. They fly only rather infrequently, normally either up onto their roosts at night, or in order to escape from predators, although in the latter case they often prefer to run off at great speed.

They are gregarious for most of the year, but when the breeding season approaches, the flocks disperse, so that only solitary individuals or pairs are seen, or the odd small group perhaps composed of non-breeders. The flocks are governed by a complex social structure, and research on the Helmeted Guineafowl has shown that, at least in this species, individuals can remain in the same flock over a period of several years.

Group size, outside the breeding season, varies quite considerably with the species, from the Black Guineafowl, which normally forms groups of under ten individuals, to the Helmeted Guineafowl, which can gather in large flocks of over 200 birds, although this species usually occurs in much smaller flocks of 15-40 birds. The other species form flocks of intermediate size. There is no evidence to suggest that flocks have strictly defined territories, and the ranges of two neighbouring groups can overlap to some extent. Nevertheless, if, for example, two flocks of White-breasted Guineafowl meet, a fierce fight is likely to ensue. In contrast to this, several flocks of Helmeted Guineafowl can coincide at drinking sites, particularly good feeding areas, preferred dusting sites, or roosts, but these flocks will only defend their own particular territories on rare occasions, for instance where the population is exceptionally dense.

The various different species of guineafowl have to be constantly alert to the threat posed by their many potential predators, although there are different ways of dealing with such threats when they actually materialize. For instance, when a predator approaches a flock of White-breasted Guineafowl, they separate and scatter until the danger has passed, when they regroup with the help of a cheeping call. In contrast to this rather passive strategy, a flock of Helmeted Guineafowl will sometimes perform communal defence against a predator.

The evidence available suggests that all species roost in trees at night, on the whole communally. Helmeted Guineafowl sometimes use traditional roosting sites over such long periods that the accumulation of dried out droppings on the ground below has been known to build up to over 30 cm deep! However, similar persistence has not been recorded for the other species. Thus, the White-breasted Guineafowl, for example, seems simply to choose a roost-site every evening in whatever area it happens to be at the end of the day, without there being the slightest evidence to suggest that such sites may be reused. The Plumed Guineafowl uses a different tree each night, whereas the Crested Guineafowl may regularly roost in the same general area. On occasions when there may be no suitable roosting trees in the vicinity, the

Helmeted Guineafowl, at least, will look for some sort of substitute, and this species has even been observed roosting on telegraph poles.

Despite their apparent reluctance to fly, guineafowl are highly mobile birds, and they tend to spend the greater part of the day roaming about their territories, searching for food. For instance, White-breasted Guineafowl spend at least 60% of the day feeding, 20% preening, 11% in trees or flying, and the rest of their time engaged in other assorted activities.

The daily routine of activities in the Helmeted Guineafowl, the best known species, is rather well established, varying little from one day to the next. The roosting site is occupied in the evening, and the birds remain there until dawn, when they set off for their drinking holes, already starting to feed on the way. Often, they move about in "Indian file", with all members of the flock following on behind the dominant male. During the hottest hours of the day, they give up feeding and concentrate on drinking, and sand- or dust-bathing, which frequently takes place at traditionally favoured sites. Then they pass on to the business of preening and oiling. After this they head for a suitable area in the shade of some vegetation, where they rest, using various devices to reduce body temperature, including gular-fluttering, and also holding the wings away from the body and moving them from time to time for ventilation. As the heat of the day begins to ease off, the birds renew their activity and, having revisited the drinking hole, carry on feeding until it is time to return to the roost. Other activities that are performed somewhat less regularly include basking in the sun, seeking better shade and daytime roosting, as well as courtship display and even attempted copulation. In the feeding areas disputes sometimes break out, and these become increasingly common as the breeding season approaches.

### **Voice**

Guineafowl are gregarious species that inhabit areas with vegetation that is thick enough to make visual contact between the different members of a flock rather difficult. They overcome this problem by means of a full vocal repertoire, which enables a sufficient degree of communication to meet their ordinary needs. For this reason, most activities have associated vocalizations, which can vary according to the different forms of behaviour involved.

When a White-breasted Guineafowl comes across a plentiful supply of food, it will often communicate its discovery to the rest of the flock by means of a call known as "food muster", summoning its companions to share the food. The contact calls and leaf scuffing typically used by this species can be heard about 30 metres away, although some of its other calls are louder. Apart from feeding and contact calls, other typical call types recorded in various species include, not surprisingly, those to signal alarm and others used in moments of aggression.

There are some differences between the sexes in vocalizations. For example, females of both the Vulturine and Helmeted Guineafowl have a "buck-wheat" call, which they most typically use during the breeding season, on occasions when they are separated from their partners.

### **Food and Feeding**

The evidence available suggests that all Guineafowl are omnivorous opportunists. The composition of their diet at any particular moment is dictated by the local abundance of the various different food types, with the result that their daily wanderings in search of food can vary considerably, in terms of both time and direction.

Overall, the diet is very varied, and plant matter taken includes roots, bulbs, seeds, fruits, leaves and flowers. In some cases, the Crested and Helmeted Guineafowl, in particular, come into conflict with local farmers for their attacks on crops, although the overall effects of their presence in cultivation may not actually be detrimental. Animal food consumed consists

mainly of invertebrates, including a very wide array of insects, and also small molluscs, arachnids and millipedes; a few vertebrates are also eaten, for instance small frogs and toads. Birds also take in variable quantities of grit, which enable them to grind down their food more efficiently.

Some species, most notably the Helmeted Guineafowl, seem to prefer to feed on insects, when they are sufficiently abundant, and the crop of one individual examined, for example, was found to contain something in the region of 5100 harvester termites (*Hodotermes mossambicus*), which together weighed 243 grams. Nevertheless, in this same species it has been found that there is a tendency for considerable individual variation in feeding intensity, and crop contents can vary markedly between different members of a single flock.

In general, it is essential for Guineafowl to have access to some source of drinking water, which they tend to visit regularly. The exception, the Vulturine Guineafowl, of more arid zones, appears to be totally self-sufficient in this department, and it does not even seem to take the opportunity to drink when it comes across standing water, even at the height of the dry season.

All species feed almost exclusively on the ground, although the Crested Guineafowl has, on occasions, been seen feeding on fruits in trees. Similarly, the Vulturine Guineafowl occasionally climbs into low trees or bushes to feed on fruits, for example of *Salvadora persica* and several species of *Commiphora*. The Helmeted Guineafowl often strips the seeds off grass, or crops such as sorghum and millet.

Birds look for food as they walk along, pecking here and there, when they come across anything edible. They frequently use the feet to dig food out from under the ground, and with their strong claws they scrape away at the soil and the leaf litter. They may scrape with both of the feet alternately, or with only one foot, and call the while they peck at the food item that is unearthed. Only if the soil is soft enough will they also scrape about and even dig with the bill.

The curved bill enables the birds to reach and dig out underground bulbs and roots, which, in addition to forming a complementary source of nutrition, may be important in constituting an extra source of water, particularly during dry seasons.

The amount of food consumed by each individual seems to be inversely proportional to the distance covered during foraging. Thus, in areas with a rich supply of food birds tend to move slowly over fairly short distances, but where food is scarce they normally move much more quickly about over a much greater area.

As is the case of most birds and mammals in the tropics, feeding activity seems to be most intensive in the early morning, just after the birds have left their roosts, and again in the mid-afternoon and early evening. This is, of course, a consequence of the necessity to avoid the worst of the midday heat, when the birds invariably move into the shade to rest, and occupy themselves with plumage care and other comfort activities.

An interesting aspect of the feeding behaviour of the Numididae is that, as well as being gregarious, they also associate with other species of birds or mammals, in order to improve their rate of foraging success. For instance, the Crested Guineafowl sometimes follows arboreal monkeys, feeding on the remains of food that the monkeys drop onto the ground. While the same association with monkeys has not been recorded for the forest-dwelling White-breasted and Black Guineafowl, the former has been seen feeding on the remains of food possibly dropped on the ground by monkeys or chimpanzees (*Pan troglodytes*). The same species is known to associate with certain forest passersines that feed on the ground or in the lower canopy, for instance pitas (*Pitta*), turdids (*Alethe*, *Cercotrichas*) and bulbuls (*Bleda*); in such cases, it is thought that the Guineafowl is probably looking for insects that may be disturbed or dropped by the birds.

The Helmeted Guineafowl regularly associates with a variety of other animal species. In many areas, it habitually feeds and drinks alongside baboons (*Papio cynocephalus*), and both species often try to steal bits of food from each other. Another, probably even commoner, association is with Swainson's Francolin (*Francolinus swainsonii*), whereas less frequently this species also joins Sacred Ibises (*Threskiornis aethiopicus*) and even introduced Common Mynas (*Acridotheres tristis*); mammals with which it sometimes associates include rhinoceros, antelope, lion and mongoose. Obviously, at water-holes, it occurs alongside many more species, but this can not really be considered a true association.

### Breeding

Very little is known about the breeding habits of most members of the Numididae, and in some cases the size and colour of the eggs constitute virtually the only information available. Thus, details regarding courtship display, the roles of the sexes, the incubation period, overall levels of success, and so on, can only be interpolated tentatively from the best known species, the Helmeted Guineafowl.

The seasonality of breeding does not appear to follow particularly well set patterns, and the genera *Agelastes* and *Guttera* can breed at any time of the year. Nevertheless, there do tend to be certain seasonal peaks which are apparently related to the rains. Thus, the White-breasted Guineafowl seems to prefer the end of the rains, whereas the Black Guineafowl probably breeds mostly in the driest months of the year. The other four species generally show a greater or lesser tendency to nest during the rains. An interesting case is that of the Crested Guineafowl, as its population living in the vicinity of the equator, where there are two wet seasons in the year, nest all year round.

The first signs of breeding can be in the form of increased frequency and intensity of aggressive behaviour, in particular fights between rival males, and the splitting off from the flock of pairs that have been established. Male Helmeted Guineafowl can associate briefly with a series of various different females, each in its own turn, over the first four to six weeks. After this period, the pair stabilizes and then remains firm until the end of the breeding attempt. As a result of this system, the business of establishing and maintaining the pair-bond causes considerable expenditure of energy by the male, and this is reflected by a loss of weight amounting to about 11%. Although there is no clearly defined territory, at any rate in the case of the Helmeted Guineafowl, throughout this initial period males are perpetually chasing each other and fighting, and frequent communication, both vocal and visual, between partners is essential for the maintenance of the pair-bond.

Courtship feeding is known to occur, at any rate in the Helmeted, Crested and Vulturine Guineafowl, and it is particularly ritualized in the last of these species. All three are monogamous, although males sometimes attempt to mate with other, unattended females. The Plumed Guineafowl is probably monogamous too, while individual males of the Black Guineafowl have been seen with two females.

No nest has ever been found for either the White-breasted or the Black Guineafowl, but they may well be similar to those of the other members of the family, which are very simple affairs. Essentially, the nest is a shallow depression in the soil, sometimes at the base of a tree or in long grass. It may be lined with a few dry leaves, perhaps a little grass, and sometimes the odd feather.

All species have pale eggs, ranging in colour from dirty white and cream to reddish or brownish, sometimes with a limited amount of spotting. The eggs are oval, with one end sharp and the other rounded. The shell is particularly thick, and its surface is pitted, with a dense covering of pores. It is said that the characteristics of the Guineafowl egg would enable it to survive undamaged through a grass fire. Clutch size is normally of 4-19 eggs, but even larger clutches have been recorded, although these probably refer to cases of more than one female

layer in the same nest. There is no record of any species ever laying more than a single clutch per season.

At any rate in the Helmeted Guineafowl, and probably also in the Crested Guineafowl, incubation is carried out entirely by the female, and during this period she hardly leaves the nest at all, while the male stands guard nearby, never letting his partner out of his sight. Incubation begins once the last egg has been laid, and lasts from 23 days in *Guttera* and *Acryllium* to 24-28 days in *Numida*.

Chicks, or keets, hatch synchronously, a common tendency in birds with nidifugous chicks, as it reduces the danger of predation. The precocial chicks are led away from the nest almost immediately, but, although they are capable of feeding themselves, they still require the guidance and protection of their parents for some time, and the male shares the tasks of chick-care with the female, at least in the Helmeted Guineafowl. In particular, during the first 12 days of the chicks' lives, the male takes on the burden of all the day-time brooding, while the female gradually recovers her strength and the weight she has lost during the formation and laying of the eggs, and also the entire process of incubation. At night, it is the female's turn to take on the entire responsibility of brooding the chicks, and the male goes off to roost with the rest of the flock. When the chicks are feeding, they are normally accompanied by both adults, but it is the female that acts as leader of the family group. At 15-20 days old, the chicks are already able to fly up onto roosts that are two metres off the ground.

When danger threatens, both adults take part in the defence of the chicks, the Helmeted Guineafowl often performing a frontal display with the wings spread and a growling threat, before launching into an attack. Guineafowl face a whole host of potential predators at the various different stages of breeding. For instance, various monkeys, genets and wild cats sometimes steal eggs, and the last-mentioned can even kill adults at the nest. Both the Black Crow (*Corvus capensis*) and the Lanner Falcon (*Falco biarmicus*) are known to take Helmeted Guineafowl chicks occasionally.

Once the breeding season draws to a close, the family group is merged into a much larger flock, consisting of other similar family groups and some non-breeding birds. Within this larger flock, the unity of the family group tends to persist, and the young birds remain in the company of their parents for at least two or three months more.

It has been calculated that, in an average population of Helmeted Guineafowl, during a normal breeding season, about 30% of the birds do not breed, although it is not known whether or not this percentage refers exclusively to immature birds. These non-breeders hang about in flocks in the habitual feeding areas, and later join up with the breeders when they return with their young. Although flocks are fairly stable, each individual does not necessarily return to the same flock that it belonged to before the breeding season.

## Movements

All species of Guineafowl are sedentary, and their movements are limited to the local ones that they perform daily, over variable circuits, in search of food and water. Although they are mainly terrestrial, they are surprisingly mobile on their feet, and the area in which they forage can vary quite considerably from one day to the next, when foraging success is low. Indeed, apart from the Helmeted Guineafowl, which is known to use traditional roosts, birds may start and end each day in quite different places.

The long, winding route followed daily by flocks of White-breasted Guineafowl, for example, takes them, on average, over an area of about 0.9km<sup>2</sup>. The speed at which the birds move about is directly related to foraging success, varying from 10m/h to 203m/h, with an average of 115 m/h. In the Helmeted Guineafowl, it appears that larger flocks tend to cover greater distances daily than smaller ones, although the relative proximity of roosting and

drinking sites are also major factors. In this species, home range has been found to average about 8.8 km<sup>2</sup>, although it is actually extremely variable depending on the habitat type.

### **Relationship with Man**

The relationship of man with Guineafowl goes way back into ancient times, mainly through the domestication of the Helmeted Guineafowl. Over the centuries, this species has probably been domesticated by several different peoples independently at different times.

The earliest reference to Guineafowl comes from murals of the Fifth Dynasty of Egypt in the Pyramid of Wenis at Saqqara, which date to about 2400 BC. The Phoenicians and Greeks are also known to have kept domesticated Guineafowl, the latter from at least as early as about 400 BC. Only slightly later, in the fourth century BC, the Moroccan race *sabyi* of the Helmeted Guineafowl was considered a sacred bird on one of the islands of the Aegean. Subsequently, the Romans regularly kept birds of both this and the nominate race for food, and they carried both forms to all parts of their enormous empire. However, it seems that with the fall of the Roman Empire the species disappeared from Europe, and after this there was a long period in which it does not appear to feature in historical records, apart from an odd record of some captive birds in Athens, in the tenth century AD. In the fifteenth and sixteenth centuries, the Portuguese explorers and navigators brought back individuals of the West African race *galeata* to Europe, and the species was regularly kept once again.

The repeated domestication of this species over many centuries has led to its presence practically all over the world, usually in domestic form, but in many cases with feral populations too. Such feral populations arose where a proportion of the domestic stock escaped and managed to establish more or less stable populations in the foreign habitat. This was the story, for example, on many islands in the west Indies, such as Cuba, whither the species was brought in 1508. Much of the importation of Guineafowl to parts of Europe and especially America was effected by ships transporting slaves, and so many birds were imported that by the beginning of the eighteenth century feral populations had become established on most of the larger islands in the Caribbean. The species has also been introduced in several areas closer to home, for instance south-west Arabia, Madagascar, the west of Cape Province in South Africa, and several of Africa's outlying small islands. On the other side of the world, in Australia and New Zealand, there have been a multitude of instances over the years, at least since about the 1860's, of domestic birds escaping or being released, but they have invariably failed to become established, although in some areas birds live on the vicinity of farms in a semi-domesticated state.

Guineafowl feathers have traditionally been highly prized as ornaments by the chiefs and witch doctors of some tribes. In some areas, the birds were regarded as symbols of fertility, due to their profuse production of eggs, and these, in turn, were used in rites of initiation for young girls or newly-weds, or other, similar ceremonies.

Although Guineafowl feathers were also used as adornments for women's hats in Europe, and the eggs came to form a part of a few local traditions in central Europe, man's main use for Guineafowl has been as a source of food. Both the eggs and the flesh have been much appreciated by man probably since his first contact with them. The major consequence of this has been the breeding of Guineafowl, invariably the Helmeted Guineafowl, on an industrial scale, and nowadays there are a great many farms dedicated to the production and commercialization of Guineafowl. Proof of their wide culinary acceptance is supplied in the form of the surprisingly large number of recipes specifically for Guineafowl that exists all round the world.

Within the natural ranges of the Guineafowl, problems frequently arise due to a conflict of interests between man and the birds. Once again, it is mainly the Helmeted Guineafowl that is implicated, as this is the species that occupies the most similar habitat, and

most readily occurs in cultivation. While farmers tend to consider the birds a plague, it seems that they should really be regarded as allies. While they will take a certain amount of some kinds of grain, the damage they cause to maize is virtually nil. At the same time they eat large quantities of destructive insects and also weeds, and thus collaborate significantly in the production of a healthy crop.

The Helmeted Guineafowl had recently been put to a new, rather revolutionary use in the USA, where it is now being employed in the control of infections spread by parasites, in this case those that produce Lyme disease. The parasites are spread by deer ticks, and until recently all attempts to control them had failed, but the release of the Guineafowl in the infected area has proved very effective.

The generic name *Numida*, which also gives the name to the family, refers to the ancient North African stage of Numidia, and illustrates the fact that from the point of view of the Romans the birds arrived from Numidia. The specific names *meleagris* of the Helmeted Guineafowl and *meleagrides* of the White-breasted Guineafowl are derived from the Greek hero Meleager, who hunted the great boar sent by Artemis to ravage Calydon. Upon his death, his sisters were so grieved that they were turned into birds, the *meleagrides*, and their tears were transformed into white droplets all over their mourning dress. The birds that the Greeks referred to by this name were surely Guineafowl, although it is equally sure that they were not White-breasted Guineafowl!

### **Status and Conservation**

Of the six species of Guineafowl, one is currently considered to be threatened, while the remaining species appear to be relatively secure. As a result of the recent Conservation Assessment and Management Plan, which reviewed the status, threats and conservation requirements of all galliform species except the cracids, the situation of those species that are not considered to be threatened can now be viewed with a good deal more confidence.

Both the Helmeted and Vulturine Guineafowl are reckoned to have total populations numbering over a million individuals, and in the case of the former there are likely to be many millions. Populations of the very little known Black Guineafowl and also the Crested Guineafowl are both thought to be in the hundreds of thousands, and that of the Plumed Guineafowl in the tens of thousands. The one threatened species, the White-breasted Guineafowl, probably still numbers over 58.000 birds, but it is in constant decline.

The chief threats to the family as a whole seem to be habitat destruction and, in some cases, excessive hunting levels. Both of these factors are most serious in the cases of the forest species, and this is generally reflected in the population figures, as the species with the highest populations are those of open areas, while those of forest generally present much lower figures and are thought or known to be declining. Nevertheless, there are negative factors operating even on the Helmeted Guineafowl, the most serious of which is the increasing use of pesticides, which are likely to have adverse effects on the species in the long run. The Moroccan race *sabyi* of this species has declined drastically, for unknown reasons, and it may, in fact, already be extinct.

The main concern, however, must undoubtedly be for the prospects of the White-breasted Guineafowl, which is classified as Endangered, and is currently reckoned to be on of the most severely threatened species in the entire African continent.

The species is an inhabitant of one of the richest of African forests, the Upper Guinea Forest, which is famous for the large number of endemic forms it holds. This expanse of rain forest formerly spread over some 333.600 km<sup>2</sup>, but it has suffered widespread devastation starting in the nineteenth century, and now occupies under 13% of the original area. Worst still, the habitat that remains is heavily fragmented into rather small pockets, which are spread over five different countries.

The other major problem that besets the species is excessive hunting pressure, in the form of both shooting and snaring. Such pressure has probably already led to some local extinctions and it threatens to bring about others in the not too distant future, especially in Liberia and Ghana. While many species are capable of withstanding a moderate level of hunting pressure, when this is combined with habitat loss and fragmentation, such large species can be systematically wiped out from each small pocket of forest until they disappear from whole areas. The situation is made all the worse by the ready availability of guns and cheap cartridges throughout Liberia, Ivory Coast and Ghana.

In Sierra Leone, the White-breasted Guineafowl occurs only in the Gola Forest, where it was first recorded in the late 1960's. There were very few subsequent records until an exhaustive avifaunal survey on this important site in 1988-1989 discovered that the species in fact occurs regularly throughout the forest. In the area around Mogbai, for example, it was recorded at densities of about 10-15 birds/km<sup>2</sup> in primary forest. Although it is also found in logged forest, it occurs at much lower densities of only 1-2 bird/km<sup>2</sup>. The Gola Forest is protected with three reserves totalling some 748 km<sup>2</sup>; the limited hunting pressure that the species faces here suggests that this might be the healthiest population of all.

Due to many years of political unrest, the status of the species in Liberia is not well known, but as the forest is thought to be disappearing at a rate of about 5% per year, the situation is not encouraging. Indeed, the species is now considered rare, and to have disappeared from most of the country. It was thought to be extinct on Mount Nimba due to the opening up of the area for iron ore mining in the late 1950's and early 1960's, but it has recently been resighted there. There are also some fairly recent records from the Sapo National Park and the Grebo National Forest, but heavy hunting pressure may have eliminated the species from the latter.

In Ivory Coast, the species has not been seen anywhere outside the Taï National Park since the 1970's; like the Gola Forest, the Taï can be considered one of the most important areas of forest in the whole of Africa, with a total of 4060 km<sup>2</sup>, including a buffer zone of 660 km<sup>2</sup>. Recent surveys have revealed that the species is uncommon to rare, with an overall density of 16 birds/km<sup>2</sup>, which has been extrapolated to give an estimated total population for this park of some 30,000-40,000 birds. While some hunting seems to occur, the scale of this is not yet known, although there is reason to believe that it may be fairly limited. Apart from survey work and proposals for protection, one of the major steps towards the conservation of the species involves the first significant studies of its biology and ecology, studies which were carried out in the Taï Forest from 1989 to 1991.

The remaining countries that fall within the White-breasted Guineafowl's range are Guinea and Ghana, but the population that was thought to occur in the south of the former has probably now been extirpated. In Ghana, too, the species was assumed extinct for some years, as there were no records at all between 1963 and 1985, but several recent records in different areas, including some parks, have proved that this is not the case. Nevertheless, the rampant deforestation and hunting that pervade these areas suggest that the outlook for the species in Ghana remains bleak.

The key to the survival of the White-breasted Guineafowl seems to be very clear. If large tracts of primary forest can be preserved relatively undisturbed, with hunting pressure reduced to a minimum, the species is unlikely to disappear. For this reason, every effort should be made to promote the strict protection of the Gola and Taï Forests, while the same could also be said for all other areas where the species is still known to occur in Liberia and Ghana. The preservation of these essential sites would assure the future of this and many other threatened species.

### **General Bibliography**

Cracraft (1981), Crowe (1978a, 1978b, 1985), Crowe & Snow (1978), Ghigi (1936), Hastings Belshaw (1985), Mainardi (1963), Peters (1934), Raethel (1988), Rutgers & Norris (1970), Sibley & Ahlquist (1990), Sibley & Monroe (1990), Sibley *et al.* (1988), Stock & Bunch (1982), Urban *et al.* (1986), Verheyen (1956).

Genus *AGELASTES* Bonaparte, 1850

**White-breasted Guineafowl**

*Agelastes meleagrides*

French: Pintade à poitrine blanche

German: Weissbrust-Perlhuhn

Spanish: Pintada Pechiblanca

**Taxonomy.** *Alegastes meleagrides* Bonaparte, 1850, no locality = Ghana. Forms superspecies with *A. niger*. Monotypic.

**Distribution.** SE Sierra Leone through Liberia and Ivory Coast to W Ghana.

**Descriptive notes.** C. 40-45 cm; c. 815 g (in captivity). Head and upper neck bare; lower neck, breast and upper back pure white; rest of plumage black; 1-2 spurs. Female similar to male, but averages smaller. Juvenile generally dull brownish black, with some reddish brown feathers on wing and body; apparently retains juvenile down on head and neck, dark sepia with pale ochre stripes; lacks whit collar, but belly pure white; spurless.

**Habitat.** Dense primary rain forest, with apparent preference for drier areas; also found in nearby patches of selectively logged forest, especially older regrowth, but presence of primary forest seems essential. Normally roosts in thin, shrubby trees in understory of forest.

**Food and Feeding.** Mostly invertebrates, including termites, ants, crickets, millipedes, worms, beetle larvae (Chrysomelidae), spiders and small molluscs; also takes berries and seeds fallen off forest trees. Forages on ground, walking slowly along and stopping frequently to scratch in amongst soil and leaf litter with feet. When one bird finds abundant source of food, will often summon other flock members to join in.

**Breeding.** Oct-May, perhaps peaking at end of wet season Nov-Jan, but may breed throughout year. Nest undescribed. Clutch c. 12 eggs. Eggs reddish buff with white pores ; 45 x 35 mm. Chicks have down greyish brown patterned with pale ochre, and dark sepia on the head and neck. No further information available.

**Movements.** Sedentary. Short local movements over c. 0.9 km<sup>2</sup>.

**Status and Conservation.** **ENDANGERED.** Mace-Lande: Vulnerable. One of the most severely threatened species in Africa. Total population estimated at over 58,000 birds; undergoing major decline due to destruction and fragmentation of habitat, and also excessive hunting pressure. Probably occurred in S Guinea in past. In Sierra Leone, restricted to Gola Forest, where protected in three sizeable reserves; major survey in late 1980's found density of 10-15 birds/km<sup>2</sup> in primary forest; hunting pressure possible lower here than anywhere else in species' range, partly because a cartridge costs more than the value of the bird, so hunters tend to concentrate on larger game; trapping also considered to be relatively unimportant. Has disappeared from most of Liberia; thought to have been eradicated on Mt Nimba in late 1950's and early 1960's, due to opening up of area for mining, but recently rediscovered; fairly recent records from Sapo National Park and Grebo National Forest, but may now have been eliminated from latter by intense hunting. In Ivory Coast, restricted to Taï National Park, where recent research and surveys carried out; density of 16 birds/km<sup>2</sup> giving possible overall population of 30,000-40,000 birds for park. In Ghana, was thought to be extinct, with no records after 1963, but several recent sightings: in 1985 at Bia; in 1988 in Mini-Suhien National Park; and in 1989 in both Bion-Tano and Tano-Anwia Forest Reserves, and further S at Enchi; nevertheless, deforestation and hunting particularly excessive throughout this zone, and future of species in Ghana remains precarious. Highly susceptible to pressure of hunting and deforestation; disappears from logged areas, or at best occurs at much lower densities, e.g. 2 birds/km<sup>2</sup> in Gola Forest; presence in secondary growth may require close proximity of undisturbed primary forest. Further surveys urgently required for more precise appraisal of

total population size and requirements; other main recommendation is effective protection of maximum number of areas where species still occurs; campaigns to inform public and terminate hunting also highly desirable. CITES III in Ghana.

**Bibliography.** Allport (1991), Allport *et al.* (1989), Bannerman (1953), Bechinger (1964), Collar & Andrew (1988), Collar & Stuart (1985, 1988b), Colston & Curry-Lindahl (1986), Davies (1987), Dutson & Branscombe (1990), Francis *et al.* (1992), Gartshore (1989), Gatter *et al.* (1988), Grimes (1987), Hall (1961), Mackworth-Praed & Grant (1970), McGowan, Carroll & Ellis-Joseph (1994), Taylor (1988), Thiollay (1985a), Urban *et al.* (1986)

## **Black Guineafowl**

*Agelastes niger*

French: Pintade noire

German: Schwarzperlhuhn

Spanish: Pintada Negra

**Taxonomy.** *Phasidus niger* Cassin, 1857, Cape Lopez, Gabon.

Sometimes retained in monotypic genus *Phasidus*. Forms superspecies with *A. meleagrides*. Monotypic.

**Distribution.** SE Nigeria to N Angola (Cabinda), and eastwards N of R Congo to extreme NE Zaire.

**Descriptive notes.** C. 40-43 cm; c. 700g. Head bare, with short crest of black down; rest of plumage black, but centre of belly browner; 1-2 spurs. Female similar to male, but averages smaller. Juvenile has belly white; spurless.

**Habitat.** Dense primary rain forest, with possible preference for dense undergrowth; also occurs at forest edge in Gabon, and in abandoned cultivation in forest clearing in N Angola, but in Cameroon apparently restricted to forest interior.

**Food and Feeding.** Basically insects, with beetles, ants and termites recorded; other invertebrates such as millipedes and small frogs. Plant matter includes hard seeds, green leaves and fruits (e.g. of palm trees). Forages on ground, scratching with feet.

**Breeding.** In NE Zaire, breeds in almost any month, but mainly during drier months Dec-Feb; elsewhere little known, and birds captured Dec-Feb in Congo, and Sept in Angola were not in breeding condition. Nest undescribed. Eggs pale reddish brown, sometimes tinged yellow or violet; c. 42 x 34 mm. Chicks mainly dark rufous and black above.

**Movements.** Sedentary.

**Status and Conservation.** Not globally threatened. Mace-Lande: Safe. Total population may number 100,000-500,000 birds. Probably declining due to habitat loss and hunting pressure. Far more extensive range than congeneric *A. meleagrides* is main reason that present species is considered to be secure, although virtually no recent information available from most of range, e.g. in Zaire and Central African Republic. Alarming rapidity with which forest is destroyed in some parts of Africa suggests that before too long detailed study of ecological requirements of species would be highly desirable, with a view to establishing suitable protected areas within its range; effective control of hunting seems necessary, at any rate in parts of range, in combination with campaigns of environmental education.

**Bibliography.** Ash (1990), Bannerman (1953), Chapin (1932), Lippens & Wille (1976), Mackworth-Praed & Grant (1970), McGowan, Carroll & Ellis-Joseph (1994), Pinto (1983), Rodewald *et al.* (1994), Sargeant (1993), Thiollay (1985a), Urban *et al.* (1986).

Genus *NUMIDA* Linnaeus, 1766

### **Helmeted Guineafowl**

*Numida meleagris*

French: Pintade de Numidie

German: Helmperlhuhn

Spanish: Pintada Común

Other common names: West African/Grey-breasted Guineafowl (*galeata*); Tufted Guineafowl (*mitrata*); Reichenow's Guineafowl (*reichenowi*)

**Taxonomy.** *Phasianus meleagris* Linnaeus, 1758, upper Nile, Nubia, Sudan.

Races *galeata* and *mitrata* sometimes considered separate species; also, though less frequently, *reichenowi*. Over 30 races described: traditional races *marchei*, *callewaerti* and *blancoui* now included in *galeata*; *major*, *inermis*, *omoensis*, *macroceras*, *neumannii*, *toruensis*, *intermedia* and *uhehensis* included in *meleagris*; *ansorgei* included in *reichenowi*; *maxima*, *frommi*, *rikwae* and *bodalyae* included in *marungensis*; *papillosa* included in *damarensis*; and *transvaalensis* and *limpopoensis* included in *coronata*. Nine subspecies currently recognized.

### **Subspecies and Distribution.**

*N. m. sabyi* Hartert, 1919 – NW Morocco, between R Oum er Rbia and R Sebou.

*N. m. galeata* Pallas, 1767 – W Africa, E to S Chad and S to C Zaire and N Angola.

*N. m. meleagris* (Linnaeus, 1758) – E Chad E to Ethiopia, and S to N Zaire, Uganda and N Kenya.

*N. m. somaliensis* Neumann, 1899 – NE Ethiopia and Somalia.

*N. m. reichenowi* Ogilvie-Grant, 1894 – Kenya and C Tanzania.

*N. m. Mitrata* Pallas, 1767 – W & E Tanzania S to E Mozambique, and W through Zambia and Zimbabwe to S Angola and N Botswana; Zanzibar and Tumbatu I.

*N. m. marungensis* Schalow, 1884 – S Congo Basin S to W Angola, and E in Zambezi Basin to Luangwa Valley, Zambia.

*N. m. damarensis* Roberts, 1917 – S Angola to Botswana and Namibia.

*N. m. coronata* Gurney, 1868 – E South Africa.

Introduced to many parts of the world, e.g. Cape Verde Is, SW Arabia, Madagascar and West Indies.

**Descriptive notes.** 53-63 cm; 1150-1600g. Head and neck mostly featherless, with bare skin blue to bluish white; characteristic horncoloured bony casque and variety of mainly red facial appendages, with black filoplumes on hindneck; plumage mainly blackish grey, with white spots and vermiculations. Female similar to male, but averages smaller. Juvenile plumage generally dull dark brown with feathers tipped reddish cream; casque, wattles, etc. smaller; retains original down on heads almost until adult plumage assumed. Races separated mainly on configuration of appendages on head and neck, including: density and extent of filoplumes on hindneck; form and colour of cere; sharp, size and colour of wattles; presence and form of cere bristles; size and shape of casque; and also breast colour.

**Habitat.** Wide variety of habitats mainly in open country, ranging from forest edge through savanna woodland to thorn-scrub, steppe and subdesert; particularly common in savanna with areas of cultivation interspersed. Local distribution limited by availability of drinking water, and suitable roosting sites, normally in trees or bushes. Occurs from sea-level up to above 3000m. Often found in large numbers at water-holes.

**Food and Feeding.** Omnivorous. Plant food generally more important overall by volume, especially seeds, but also tubers, bulbs, roots, berries, flowers; feeds in cultivation, especially on fallen grain, causing some local conflict with farmers. Invertebrates only constitute

average c. 12% of annual total by volume, but are preferred food when sufficiently abundant; mainly insects, particularly grasshoppers and termites, but wide variety recorded; also takes snails, ticks, wireworms, millipedes, etc. Forages on ground scratching with feet; also strips seeds from grass heads; ticks may be picked off back of warthogs (*Phacochoerus aethiopicus*)

**Breeding.** Season almost always in or just after rains; mainly Nov-Jan in S Africa; mostly May-Jul in W Africa; Mar-May in Morocco. Monogamous, but pair-bond not maintained outside breeding season; in early part of season, male can attempt to mate with several different females. Nest is simple scrape in ground, lined with grass and feathers; usually situated in areas of long grass, and hidden under bush or tussock of grass, or in dense cover. Normally 6-12 eggs, rarely up to 20, laid on successive days; nests with large number of eggs (20-50) are probably always result of laying by more than one female; replacement laying not recorded. Eggs usually yellowish to pale brown with darker specking, but sometimes almost white; 44-58 x 36-42 mm. Incubation, starting when clutch complete, 24-28 days, by female only; hatching synchronous; chicks have down cinnamon-buff with dark streaks; can fly weakly at 14 days; fledging c. 4 weeks; chicks reach full adult weight by 30 weeks old; family groups join larger flocks when chicks 1-3 months old. Chick mortality generally rather high. Probably only one brood.

**Movements.** Sedentary. Home range of flock varies in size with habitat: averages smaller (0.8-1.8km<sup>2</sup>) in primary woodland, larger (7.6-21.2km<sup>2</sup>) in upland secondary woodland in Nigeria. Extent of local movements seems to be closely linked with proximity of roosting sites to sources of drinking water.

**Status and Conservation.** Not globally threatened. Mace-Lande: Safe; race *sabyi* possibly endangered. Total population probably numbers well over 1,000,000 birds; widespread and locally abundant; generally stable. Most races common to abundant, but some are severely affected locally by hunting and egg-collecting. However, because of wide habitat tolerance, species remains highly resilient; nevertheless, degradation of habitat, especially through use of pesticides, is major potential threat. Race *sabyi* may already be extinct; thought to number maximum 100 birds. Has undergone drastic decline for unknown causes; recently, only three records from 1970's, and no recent evidence of breeding. Formerly common in Forest of Mamora, whence no recent records; was also common on plateaux to S and SE, but now apparently confined to small area of Middle Atlas, if survives at all; thorough study needed, to establish current situation, and identify causes of decline, with a view to attempting to ensure survival of subspecies.

**Bibliography.** Angus & Wilson (1964), Ayeni (1979, 1980, 1981, 1983, 1984), Ayeni et al. (1953), Benson (1960a), Berry & Crowe (1985), Brown & Britton (1980), Cramp & Simmons (1980), Crowe (1978c, 1979) Duffy (1992), Elbin et al. (1986), Farkas (1965), Ginn et al (1989), Grafton (1971), Langrand (1990), Lever (1987), Mackworth-Praed & Grant (1957-1973), Maclean (1993), Maier (1982), Maier et al. (1983), Marx & Soltz (1988), McGowan, Caroll & Ellis-Joseph (1994), Mentis et al. (1975), van Niekerk (1979, 1980, 1985), Penzhorn et al. (1991), Pinto (1983), Rutgers & Norris (1970), Siegfried (1965a, 1965b, 1966), Skead (1962), Steyn & Tredgold (1967), Urban et al. (1986) Weise & Basson (1967), Wolff (1976).

Genus *GUTTERA* Wagler, 1832

**Plumed Guineafowl**

*Guttera plumifera*

French: Pintade plumifère

German: Schlichthauben-Perlhuhn

Spanish: Pintada Plumífera

**Taxonomy.** *Numida plumifera* Cassin, 1857, Cape Lopez, Gabon.

Forms superspecies with *G. Pucherani*. Races intergrade in NE Congo. Two subspecies recognized.

**Subspecies and Distribution.**

*G. p. plumifera* (Cassin, 1857) – S Cameroon, N Congo and CN & S Central African Republic, S through N & W Gabon to N Angola (Cabinda).

*G. p. schubotzi* Reichenow, 1912 – N Zaire E to W Rift Valley, S into forests W of L Tanganyika.

**Descriptive notes.** c. 45-51 cm. Bare skin of head and neck grey, including gape wattles and small occipital fold of skin; long black crest; plumage black spotted white, but lacking vermiculations; primaries chestnut, outer margin of outermost secondaries white. Female similar to male, but averages smaller. Juvenile has black down on head and neck; shorter crest; upperparts grey barred blackish; breast dusky with spotted and barred whitish. Race *schubotzi* has patches of orange skin in front of ear and on hindneck.

**Habitat.** Mainly restricted to primary forest; also occurs in very mature secondary growth.

**Food and Feeding.** Omnivorous; plant matter, such as seeds, roots, shoots, fruits and leaves; animals, especially invertebrates, including snails, slugs, millipedes, spiders and wide variety of insects, e.g. cockroaches, beetles, grasshoppers, crickets, Hemiptera, termites and ants. Forages on ground, scratching in soil and leaf litter with feet.

**Breeding.** Laying dates variable, and probably not seasonal, although drier months apparently avoided. Probably monogamous. Nest is small scrape on forest floor lined with dry leaves. Two clutches of 9 and 10 eggs. Eggs pale buff with many darkened pores; 47.5-53.3 x 37-39.9 mm. Incubation c. 23 days; chicks have down mainly buffy with dark longitudinal stripes.

**Movements.** Sedentary.

**Status and Conservation.** Not globally threatened. Mace-Lande: Safe. Total population may number 10,000-100,000 birds. Generally appears to be rather uncommon, and probably unevenly distributed within its range. Apparently in decline as consequence of habitat loss and hunting pressure. Research needed on ecology of species, in order to establish requirements, and ultimately enable effective protection of sufficient area of prime habitat.

**Bibliography.** Bannerman (1953), Carroll (1988), Chapin (1932), Green, A.A. (1984), Lippens & Wille (1976), Louette (1981), Mackworth-Praed & Grant (1970), McGowan, Carroll & Ellis-Joseph (1994), Pinto (1983), Sargeant (1993), Thiollay (1985e), Urban *et al.* (1986).

## Crested Guineafowl

*Guttera pucherani*

French: Pintade huppée

German: Kräuselhauben-Oerlhuhn

Spanish: Pintada Moñuda

Other common names: Kenya Crested Guineafowl (*pucherani*); Crested Guineafowl (*edouardi*)

**Taxonomy.** *Numida Pucherani* Hartlaub, 1860, Zanzibar.

Forms superspecies with *G. plumifera*. Formerly considered to constitute two separate species, with recognition of *G. edouardi* (Crested Guineafowl), which included all of present races, except nominate *pucherani* (Kenya Crested Guineafowl); but thorough analysis of morphological characters concluded that the two were conspecific. Several other races described: *sethsmithi*, *schoutedeni*, *pallasi*, *chapini* and *kathleenae* now included in *verreauxi*; *lividicollis* and *symonsi* included in *edouardi*; and *granti* included in *pucherani*. Five subspecies normally recognized.

### Subspecies and Distribution.

*G. p. verreauxi* (Elliot, 1870) – Guinea Bissau E to NW Cameroon; E Congo E through Zaire to W Kenya, and S to W & E Angola and W Zambia.

*G. p. sclateri* Reichenow, 1898 – NW Cameroon.

*G. p. pucherani* (Hartlaub, 1860) – SW Somalia W to EC Kenya, and S to C Tanzania, Zanzibar and Tumbatu I.

*G. p. barbata* Ghigi, 1905 – SE Tanzania S to E Mozambique and W to Malawi.

*G. p. Edouardi* (Hartlaub, 1867) – E Zambia; Mozambique to NE South Africa (S to CE Natal).

**Descriptive notes.** 46-56 cm; male 721-1573 g. Bare skin of head and neck greyish blue, with patches of red or pale yellow on throat and around eye; iris red; well developed occipital skin fold; fairly long, bushy black crest; plumage black, spotted bluish white; primaries brown, outer margin of outermost secondaries white. Female similar to male but averages smaller. Juvenile generally duller, finely barred black and white; bare skin much drabber. Races differ in colour of bare skin, especially in presence and extent of red on throat; also iris colour, brown in *verreauxi*; colour and form of occipital fold; shape and extent of crest; and presence and extent of black collar. Only nominate race has red skin round eye; *edouardi* lacks any red, and has whitish patch covering occipital fold; *sclateri* has crest short at front.

**Habitat.** Forest edge, secondary forest and gallery forest; also in forest-savanna mosaic. In NW Zambia, found in dense stands of pure *Cryptosepalum* woodland. Sometimes enters primary forest, where may coincide with *A. meleagrides*. Recorded up to 2200 m in Itombwe Mts, E Zaire.

**Food and Feeding.** Omnivorous. Plant food includes seeds, fruits and berries of Rubiaceae, Amaranthaceae, Compositae, Malvaceae and Leguminosae; also shoots, stems, green leaves, bulbs and roots, e.g. of manioc. Animal food mainly invertebrates, including variety of insects (larval and adult beetles, grasshoppers, Hemiptera, flies, ants and termites), millipedes, spiders and small snails. Mainly forages on ground scratching in leaf litter and debris with feet, but has been seen eating fruit up trees; also follows troops of monkeys, feeding on fruit that they drop.

**Breeding.** Laying mainly during rains, but throughout year in equatorial zone; Nov-Feb in S Africa. Monogamous. Nest is scrape on ground with sparse lining, mainly of dead leaves and grass; usually well hidden, beside log or tree roots or under a bush. Normally 4-5 eggs, occasionally up to 7; clutches of 10-14 recorded in South Africa, but almost certainly with 2 females laying in same nest. Eggs deep buff to pinkish or white; 50-55 x 37.8-43.5 mm.

Incubation c. 23 days, probably by female alone; chicks have down mainly buffy with dark longitudinal stripes; can fly at c. 12 days; fledging c. 30 days. Breeding success thought to be poor in general, as very few obviously immature birds seen in flocks during dry seasons.

**Movements.** Sedentary. Covers considerable distances during daily wanderings.

**Status and Conservation.** Not globally threatened. Mace-Lande: Safe. Total population may number over 100,000 birds. Shy habits and difficulty of observation may suggest species is less common and widespread than it really is; locally common in E South Africa. Populations apparently stable overall, but may be affected locally by habitat loss and hunting. In Nigeria increasing urbanization and also agricultural expansion, with planting of cocoa, oil palms, rubber, etc.; this, in conjunction with excessive and uncontrolled hunting, has led to certain reduction in range of species.

**Bibliography.** Ayeni (1979), Bannerman (1953), Berry (1972), Brooke (1984), Brown & Britton (1980), Crowe (1979), Ginn *et al.* (1989), Grimes (1987), Hill (1974), Lippens & Wille (1976), Louette (1981), Mackworth-Praed & Grant (1957-1973), Maclean (1993), McGowan, Carroll & Ellis-Joseph (1994), Pakenham (1979), Pinto (1983), Rutgers & Norris (1970), Thiollay (1985e), Urban *et al.* (1986), Wilson (1965).

Genus *ACRYLLIUM* G.R. Gray, 1840

**Vulturine Guineafowl**

*Acryllium vulturinum*

French: Pintada Vulturine

German: Geierperlhuhn

Spanish: Pintada Vulturina

**Taxonomy.** *Numida vulturina* Hardwicke, 1834, West Africa; error = Tsavo, Kenya.

Monotopic.

**Distribution.** S Ethiopia, NW & SW Somalia and arid parts of N & E Kenya, S to R Pangani (NE Tanzania)

**Descriptive notes.** c. 60-72 cm; 1026-1645 g. Larges Guineafowl. Noticeably long neck, legs and tail; bare skin of head and neck pale bluish grey, with patch of short, dense chestnut down on nape; well developed black and white hackles; plumage mainly dark grey, with white spots and vermiculations, and rich blue on underparts; commonly one or more spur-like bumps on each tarsus. Female similar to male, but averages smaller. Juvenile retains some of streaked natal down on head; hackles obvious; plumage generally greyish brown, with rufous brown, buff and black barring and mottling; blue areas of plumage less intensely coloured; lacks tarsal bumps.

**Habitat.** Generally found in drier and more open habitats than other Guineafowl, especially semi-arid *Acacia/Commiphora* thorn-scrub and grassland with trees and bushes; arid and semi-arid plateau country. On Mt Marsabit, Kenya, found in montane forest; also in tall riverine *Acacia* woodland, when foraging; in areas of sympatry with *Guttera pucherani*, presents species sometimes enters dense thickets. Exceptionally ranges as high as 1900 m.

**Food and Feeding.** Seeds and leaves of grasses and herbs; berries and fruit (*Commiphora*, *Ficus*), roots, bulbs, green buds and shoots. Also takes variety of insects, scorpions, spiders and small molluscs. Forages on ground, scratching with feet; occasionally climbs up into bushes and low trees (e.g. *Salvadora persica*, *Commiphora*) to feed on berries and fruits. Unlike other Guineafowl does not appear to require drinking water, and even when water available in dry season, species does not drink.

**Breeding.** Probably breeds in or just after rainy season; laying peaks in Jun and Dec-Jan. Nest is simple scrape on ground, situated in cover of fairly dense grass, rock or bush. Up to 13-15 eggs, laid on successive days; eggs creamy white or pale brown, 49.5-55 x 37.3-41 mm. Incubation c. 23-25 days; chicks have yellowish buff down with dark brown mottling.

Movements. Sedentary.

Status and Conservation. Not globally threatened. Mace-Lande: