

Social organization of a flock of Helmeted Guineafowl (*Numida meleagris*) at the Krugersdorp Game Reserve, South Africa

J. H. VAN NIEKERK 

Department of Environmental Sciences, College of Agriculture and Environmental Sciences, P. O. Box 392, University of South Africa, Pretoria 0003, South Africa

Abstract The social organization of marked Helmeted Guineafowl (*Numida meleagris*) was studied in the Krugersdorp Game Reserve (Gauteng Province, South Africa) during March 1982 to February 1984. Flock members (7–10 guineafowl) did not associate randomly. Helmeted Guineafowl must live in a sociable flock to survive in the wild. The highest ranking male (male A) formed the pivot of the daily activities of the flock, such as determining foraging direction. High ranking males (males A and B) associated closely to repulse conspecific intruders. Breeding females associated more often with the high ranking males during the breeding season. Although a pecking order was established among males, the frequency of agonistic actions within the flock was very low, which suggests that agonistic interactions are limited to maintain cohesion. Adult females remained between the dominant male and the juveniles to minimize victimization. The second highest ranking male (B) took center stage while the dominant male and his female left temporarily to breed and then the rest of the flock clustered around him to maintain the cohesive nature of the flock. Most adults assisted with the brooding of the chicks of the highest ranking male. Flocking is, among other functions, a predator surveillance strategy that enables the Helmeted Guineafowl to forage under conditions with very limited ground cover and to maximize food finding during winter.

Keywords *Numida meleagris*, social organization, dominance, cooperation

Introduction

The Helmeted Guineafowl (*Numida meleagris*) is endemic and widespread throughout most of Africa (Crowe, 1978a). Skead (1962) produced a classic paper on the general habits of Helmeted Guineafowl. Recently, considerable attention has been devoted to certain aspects of Helmeted Guineafowl, including

food (Mentis et al., 1975), population ecology (Crowe, 1978b), evolution (Crowe, 1978a), anatomy (Crowe and Crowe, 1979), acoustic behavior (Maier, 1982), population decline (Pero and Crowe, 1996), pesticide impact (Little et al., 1997) and habitat use and home range (Ratcliffe and Crowe, 2001).

Our current understanding is that the Helmeted Guineafowl flock is basically a group of birds that remain together for at least one breeding season and that members follow a dominant male during foraging in the non-breeding season (dry season, May to September in the Krugersdorp Game Reserve). One function of this behavior is to maximize the discovery of underground food resources that occur in patches (Van Niekerk, 1979, 1980, 2002; Crowe and Elbin, 1987). Ecological constraints are lifted as rain falls (October in the Krugersdorp Game Reserve) and the members engage in sequential mate selection

Received 9 November 2009; accepted 15 January 2010

 J.H. Van Niekerk

E-mail: enterprize1@telkomsa.net

activities. Monogamous pairs form and males protect their females and chicks (Crowe and Elbin, 1987). According to Elbin (1979) the prime reproductive system is the family unit (mother, father and offspring) as revealed by studies conducted on free-ranging Domestic Guineafowl in Pennsylvania (USA). In short, behavioral studies have concentrated on seasonal events and the reproductive system of Helmeted Guineafowl (Skead, 1962; Elbin, 1979), while this paper focuses on the behavioral patterns of individuals and how they contribute to the maintenance of the flock. More specifically the purposes of this paper are: 1) to describe the cyclic re-grouping of members within the flock to maintain cohesion and flock stability and 2) to describe patterns of co-operation within the flock that have not been the focus of previous studies.

Study area and methods

This study was conducted in the 1400-ha Krugersdorp Game Reserve (KGR) (26°05'11"S, 27°42'35" E), in Gauteng Province, South Africa. From March to July 1981, seven flocks (8–15 members) in a designated area were trapped using walk-in funnel traps. A total of 52 Helmeted Guineafowl were fitted with metal rings and numbered patagial tags, representing at least 40% of all members in each flock (Van Niekerk, 1983, 2009). Adults were sexed through cloacal examination (Siopes and Wilson, 1973). These flocks were visited weekly from April 1982 to March 1983 and then monthly from April 1983 to February 1984. With the aid of a mounted telescope all marked guineafowl were noted on standard maps while the author traversed a fixed route during late afternoons, totaling ~150 hours of observations.

Periods of 45–60 min were spent in close proximity to one flock that was selected randomly for intensive study during each visit from April 1982 to March 1983, totaling about 60 hours of observations (Van Niekerk, 2009). In late afternoons the study flock was mainly located in a small area (400 m²), which made it possible to place permanent beacons that would allow for the estimation of distances between members. The association time between individuals and all interactive behavioral patterns (such as pecking) were recorded. Individuals were regarded as associated when they foraged close to one another (30–100 cm apart with no other guineafowl between them) for 60 s or more. Social spread (m) is the direct distance between the two furthest members

through the flock (excluding breeding pairs). Where information was lacking, facts were gleaned from a similar unpublished study of a flock of 10 Helmeted Guineafowl that visited a private garden near Constantia (33°59'45"S, 18°26'06"E) in Cape Town. This study (January 1992 to May 1994) was done by Erika van der Merwe, who distinguished individuals on the basis of casque size and shape (Prinsloo et al., 2005). Females and males were distinguished on the basis of fights (only males engage in fights) and calls (only females emit a "buckwheat" call). Agonistic displays refer to chases, pecks, humpbacked postures and head-bobbing by high ranking males in the direction of a low ranking member or incoming conspecific intruder.

Results

Cyclic events

During the breeding season (October–March) the seven flocks remained in small separate breeding territories (0.5–1 ha), but joined neighboring flocks during the non-breeding season (April–September) to form larger flocks (~30 individuals) that foraged across a larger area (71 ha). Juveniles from the different flocks were pooled from April onwards, which was a period when flocks moved further away from cover as their offspring grew from chicks to the juvenile stage (Siegfried, 1966). This was necessary since food resources had been depleted (Van Niekerk, 2002; Van Niekerk, unpublished). Despite the apparent joining of neighboring flocks, the marked flocks returned to their respective roosts during the late afternoon. In fact, the colored patagial tags revealed that the separate flocks remained in their respective subgroups even while they were with the larger congregated flock.

Flock size and structure

The mean monthly size of all flocks in the study was 7.75 (SD = 3.02, $n = 33$, range = 7–14) (Van Niekerk, 1985). The study flock basically consisted of three adult males (A, B and C), three adult females (D, E and F), four to six offspring and two non-permanent females that sometimes visited the flock for two or three days at a time. At least two other flocks had two or more adult males and females, but during the 1981/82 breeding season not one marked flock succeeded in raising more than one brood of chicks.

Table 1 Number of agonistic interactions of members of the study flock arranged in a sociogram

Dominant members	Subordinate members						Juveniles	Total
	A (Highest ranking male)	B (Second highest ranking male)	D (A's female)	C (Non-breeding male)	E (B's female)	F (Non-breeding female)		
A (Highest ranking male)	–	6	0	3	1	1	2	13
B (Second highest ranking male)	–	–	0	4	1	0	3	8
D (A's female)	–	–	–	0	1	1	0	2
C (Non-breeding male)	–	–	–	–	0	0	0	0
E (B's female)	–	–	–	–	–	0	0	0
F (Non-breeding female)	–	–	–	–	–	–	0	0

Social ranking and spatial position of members in the study flock

Male A was the highest ranking male because 1) he was at the top of the pecking order (Table 1), 2) he initiated foraging direction and the rest of the flock followed him, 3) he was the first to court and breed in two consecutive breeding seasons and 4) he was the member that initiated action to chase intruding guineafowl from other flocks that had moved into the breeding territory (Van Niekerk, 2002; Van Niekerk, unpublished). During the non-breeding season (April–October), the other two males remained close to him, with females and offspring further behind. The non-breeding male often ran towards male A and performed a submissive display in front of male A (Van Niekerk, 1985).

Females usually remained between the adult males and their offspring. No rank order was observed among females. The non-breeding female was often observed in a tree above the flock from where she emitted a “buckwheat” call, which is a typical female call (Maier, 1982).

Close-knit unit

The study flock remained a permanent group and members were often found close together throughout the study period. The social spread of the flock was 25–40 m during the period before the chicks arrived and 5–10 m just after their arrival (Fig. 1). In fact, there was a significant negative correlation between social spread and mean flock size ($r = -0.79, p <$

0.01). The shorter distance during the brooding phase (January–February) was a direct consequence of clustering around the chicks (1–10 days old). The chicks moved along with the flock, often directly beneath the adults and made body contact with various adults that emitted a soft “swe swe swe” contact call. When approached by humans ($n = 10$), the Black-backed Jackal (*Canis mesomelas*) ($n = 6$) and the Savanna Baboon (*Papio ursinus*) ($n = 8$), some adult members scattered in different directions while the entire flock produced an inferno of panic calls to distract the intruders (Maier, 1982). The chicks also scattered and hid in nearby grass. As the chicks reached juvenile age, they formed a separate subgroup right behind the flock, about 1–3 m away. This distance increased as they reached sub-adulthood during the non-breeding season (April–September). This was the time when a troop of baboons was seen killing one sub-adult and probably more, as the

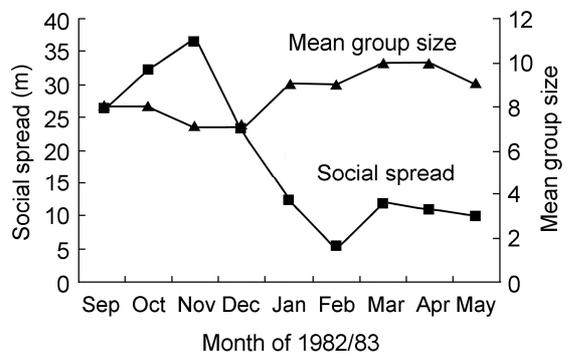


Fig. 1 Social spread correlated with mean group sizes of the study flock based on four observations per month

number of sub-adults dwindled from six to three during the first year. The 1981/82 offspring remained with the flock for at least 18 months.

Flock stability

The study flock did not dissolve when male A and female D paired off to breed nearby for a period of ~28 days during December 1981, who remained only about 20 m from the area where the rest of the flock usually foraged. In fact, the remainder of the flock continued to forage in a territory of ~0.5 ha around the nest. Male A was not regularly observed in the flock during incubation, but did arrive from time to time without his female, who was incubating their eggs. During the 1981/82 breeding season male B and female E paired off to produce chicks after A and D returned to the flock with their chicks in January 1982. However, this second brood perished within one month.

A comparison of the agonistic displays by the two high ranking males (A and B) towards members or intruders and low ranking members (such as hump-backed displays and chases) demonstrates that B was less agonistic than A in the presence of A. Once A paired off to breed and moved further away from the flock, B showed more agonistic displays and assumed the role of dominant male. The rest of the flock clustered around him during the absence of A. The position of A was restored once he returned to the flock in March, when both males were present together again (Fig. 2).

The study flock remained together during at least two breeding seasons up to March 1983. The chicks of the second breeding season joined the offspring from the previous year in a subgroup. Female D disappeared during March 1982, but was replaced by a new female during the following breeding season. The Constantia group showed a similar degree of stability over a two-year period.

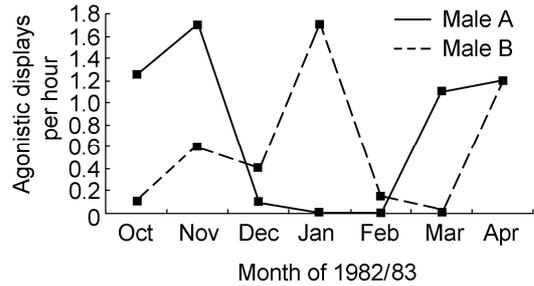


Fig. 2 Alternate frequencies of agonistic displays by the two highest ranking males in the study flock based on 45 hours of observations, totaling 62 displays

Associations within the study flock

Table 2 demonstrates that adult males clustered together just prior to and during the first part of the breeding season. In fact, when intruding conspecifics approached these males stood together side by side and moved together in the direction of the imposters. These bonds became less prevalent during the period from the arrival of the chicks to the non-breeding season (Table 3), when the high ranking males spent more time with the chicks (Table 4). Breeding females (D and E) spent more time with their own males than with the non-breeding male (respectively $\chi^2 = 656.7, df = 2, p < 0.01$ and $\chi^2 = 1201.1, df = 2, p < 0.01$; Table 3). This is expected in a monogamous mating system. However, the second ranking male (male B) spent more time with his female than the highest ranking male (male A) did during flocking (Table 3). The non-breeding male spent most of his time with the higher ranking males (A and B) and to a less extent with the breeding females (D and E) ($\chi^2 = 502.47, df = 3, p < 0.01$), but did not engage in any courtship behavior (Table 3). Similarly, the non-breeding female (F) spent most of her time with the higher ranking males and also did not perform any courtship behavior. Her association with the

Table 2 Association patterns of adult members of the study flock in % and time (min) from September 1982 to January 1983

Members	A (Highest ranking male)	B (Second highest ranking male)	C (Non-breeding male)	F (Non-breeding female)	E (B's female)
B (Second highest ranking male)	11.05% (74)	-	-	-	-
C (Non-breeding male)	20.90% (134)	15.60% (100)	-	-	-
F (Non-breeding female)	13.10% (84)	6.50% (42)	9.30% (60)	-	-
E (B's female)	2.80% (18)	7.90% (51)	6.50% (42)	0.00% (0)	-
D (A's female)	4.30% (28)	0.00% (0)	0.40% (3)	0.00% (0)	0.70% (5)

Table 3 Association patterns of adult members of the study flock in % and time (min) from February 1983 to May 1983 while observed in the flock (pairs were absent from time to time)

Members	A (Highest ranking male)	B (Second highest ranking male)	C (Non-breeding male)	F (Non-breeding female)	E (B's female)
B (Second highest ranking male)	3.19% (73)	–	–	–	–
C (Non-breeding male)	9.15% (209)	11.82% (270)	–	–	–
F (Non-breeding female)	9.63% (220)	5.85% (143)	9.06% (207)	–	–
E (B's female)	1.97% (45)	33.75% (771)	1.13% (26)	0.21% (5)	–
D (A's female)	10.02% (229)	3.54% (81)	0.61% (14)	0.00% (0)	0.00% (0)

Table 4 Association patterns of one brood of chicks and adult members in the study flock in % and time (min) from January 1983 to May 1983

Month	A (Highest ranking male)	B (Second highest ranking male)	C (Non-breeding male)	D (A's female)	E (B's female)	F (Non-breeding female)
Jan	42.86% (60)	0 (0)	7.14% (10)	0 (0)	7.14% (10)	42.85% (60)
Feb	23.23% (56)	10.80% (26)	17.02% (41)	0.40% (1)	20.34% (52)	28.20% (68)
Mar	30.95% (78)	16.66% (42)	13.10% (33)	12.30% (31)	20.64% (52)	6.35% (16)
Apr	39.81% (67)	39.22% (66)	14.30% (24)	6.55% (11)	0 (0)	0 (0)
May	28.98% (20)	43.40% (30)	20.28% (14)	7.25% (5)	0 (0)	0 (0)

breeding females (D and E) was virtually non-existent (Tables 3) ($\chi^2 = 631.6$, $df = 3$, $p < 0.01$).

Cooperative brooding

Table 4 shows the time flock members spent with male A's chicks. The mother (D) was the least caring (Table 4). The father (A) and the second ranking male (B) spent the most time with the chicks. The non-breeding male and female spent more time with the chicks than the breeding females ($\chi^2 = 205.8$, $df = 5$, $p < 0.01$). In the Constantia flock, an adult male member, which was not the father, often spread his wings over the chicks to shield them from intruders such as dogs and humans. In the same flock, the off-spring of the breeding female from the previous year helped with incubation when the mother got up to feed.

Leadership succession

Male A remained the highest ranking male for at least two breeding seasons and produced chicks during both. He was never challenged (involved in physical battles) by a male within the flock. However, in the Constantia flock, a new male and female joined the original flock from the nearby Kirsten-

bosch Botanical Gardens. When they joined, a bloody physical battle that lasted for days ensued between the new male and the original highest ranking male. Blood oozed from their bare facial parts as they pecked at each other's wattles. The new male did not succeed and remained on the periphery of the flock during the next 10 months. During the start of the next breeding season, the new male launched a renewed attack on the highest ranking male and succeeded. The old male and his female retired to the side of the flock while the new male started initiating foraging direction with the rest of the flock following.

Discussion and conclusions

The study flock was not a number of Helmeted Guinea fowl that associated randomly. The members remained around the dominant male and followed him as he initiated foraging. Although a pecking order could be established among males, the frequency of agonistic actions was very low, which suggests that agonistic interactions are limited to ensure cohesion. The function of the pecking order was not to dispel adult members from the flock but simply to maintain a rank hierarchy. The second highest ranking male took center stage with the rest

of the flock associated around him in order to maintain the cohesive nature of the flock when the dominant male and his female left to breed. This alternate responsibility was important to prevent eviction from the territory or a take-over from neighboring dominant males. The two high ranking males foraged away from the females during the non-breeding season, but still in the same flock, in order to repel conspecific intruders, but during the breeding season they spent more time with their females (Table 3). In other words, it was a monogamous mating system. No polygamy or promiscuity was recorded; that is, the two high ranking males did not flirt with each other's females or flirt with females that joined from neighboring flocks. Prolonged squabbles for adult females could lead to flock instability. There was no evidence of sequential mate selection. Flirting by paired males was recorded by Elbin et al. (1986) elsewhere.

On arrival of parents and chicks, the highest ranking male spent more time with his chicks than the mother, who spent relatively little time with her chicks (Table 4). This is ascribed to the females foraging actively to restore bodily condition after breeding (Crowe and Elbin, 1987). During this time, the adult non-breeding male and female spent more time with the chicks of the dominant male than their own mother did (Table 4). Since the history of the flock was not known, these helpers could be offspring from a previous year since they were at least two years old when observations started. In the Constantia study, it was demonstrated that offspring from a previous year helped their mother with incubation.

The small social spread during the brooding stage illustrates that most members form a close-knit unit to protect the chicks. It could be argued that formation of a cluster is a response to an urge to associate closely when predators close in, because chicks are easy prey (Fig. 1). However, the fact that all adults 1) helped to distract predators, 2) emitted soft "swe swe swe" contact calls and 3) associated closely with the chicks, illustrates that co-operative nurturing indeed took place.

Unlike free ranging Domestic Guineafowl, where the family is the primary reproductive and brooding unit (Elbin, 1979), this study shows that wild Helmeted Guineafowl base their survival on co-operation in a flock with a number of adult Helmeted Guineafowl. Some adults did not pair off to breed, whereas breeding appears to be the prerogative of the highest

ranking male, followed by the second highest ranking male. However, intrinsic/extrinsic triggers could determine how many guinea fowl pairs form from a flock (Van Niekerk, unpublished). Extrinsic factors could be predator pressure and rainfall, while intrinsic factors could include how many offspring remained in the flock from the previous year (cf. Crowe, 1978b).

Among Crested *Dendroperdix sephaena* and Coqui *Peliperdix coqui* Francolins, the mother and father produce a brood and when their offspring reach sub-adulthood (7–8 months old) they are repelled from the covey (Van Niekerk, 2001; Van Niekerk and Van Ginkel, 2003). Among Red-necked *Pternistis afer* and Swainson's *P. swainsonii* Spurfowls, the father occupies a territory and adult females that enter are courted and inseminated. The mother raises her chicks without the assistance of the father, but the chicks are also repelled when they are about seven to eight months old (Van Niekerk et al., 2009; Van Niekerk, unpublished). In comparison, Helmeted Guineafowl live in flocks and their offspring remain in the flock for at least 18 months. Pairs break away from the flock to breed and return to the flock with their chicks. The non-breeding flock members assist in raising the chicks.

Although Helmeted Guineafowl live in flocks, the breeding pairs actually fare less well than Coqui or Crested Francolin pairs in terms of reproductive efficiency. Efficiency is the mean number of juveniles from a brood expressed as a percentage of the mean clutch size. The mean clutch sizes are 12 for Helmeted Guineafowl, 5.8 for Swainson's Spurfowl, 4.8 for Crested Francolin and 5.0 for Coqui Francolin (Hockey et al., 2005). Reproductive efficiency is 38.2% for Helmeted Guineafowl, 36.6% for Swainson's Spurfowl, 41.8% for Crested Francolin and 44.0% for Coqui Francolin: $\chi^2 = 45.5$, $df = 3$, $p < 0.01$ (Van Niekerk, unpublished).

Clearly, if the flock is compared to the family system of the francolins, it is not necessarily advantageous for a higher juvenile output. In fact, flocking as a protective unit strategy becomes less convincing if one considers that in the case of the francolins only two adults look after their offspring, while in the case of spurfowls only the mother raises the chicks. However, unlike the francolins and spurfowls, Helmeted Guineafowl move widely in open country where the vigilance potential of more members minimizes surprise attacks and so enhances chick survival (Treisman, 1975). Secondly, flocking

is an effective strategy to repulse conspecific intruders from encroaching on their established territory. This last point became especially evident when the non-breeding members remained in the territory and protected it during the absence of the highest ranking male.

To summarize, cooperation within the flock was revealed by: 1) males that joined to repel intruders, 2) the second highest ranking male taking center stage in the flock while the highest ranking male was absent, 3) shared brooding functions among adult members and 4) predator evasion, especially when chicks were nurtured jointly.

Acknowledgement I thank Alan Kemp for technical assistance.

References

- Crowe TM. 1978a. Limitations of population in the Helmeted Guineafowl. *S Afr J Wildl Res*, 8:117–126
- Crowe TM. 1978b. The evolution of guinea fowl (Galliformes, Phasianidae, Numidinae). *Ann S Afr Museum*, 76:43–136
- Crowe TM, Crowe AA. 1979. Anatomy of the vascular system of the head and neck of the helmeted guinea fowl *Numida meleagris*. *J Zool*, 188:221–233
- Crowe TM, Elbin SB. 1987. Social behaviour of Helmeted Guineafowl *Numida meleagris*. *S Afr J Wildl Res Suppl*, 1:55–57
- Elbin SB. 1979. Social organization in a group of free-ranging Domestic Guineafowl. MSc dissertation, Pennsylvania State University, Pennsylvania
- Elbin SB, Crowe TM, Graves HB. 1986. Reproductive behaviour of Helmeted Guinea Fowl (*Numida meleagris*): mating system and parental care. *Appl Anim Behav Sci*, 16: 179–197
- Hockey PAR, Dean WRJ, Ryan PG. 2005. Roberts- Birds of Southern Africa, VIIIth edn. The Trustees of the Johan Voelckler Bird Book Fund, Cape Town
- Little RM, Crowe TM, Peall SKC. 1997. Pesticide residues in Helmeted Guineafowl *Numida meleagris* livers collected in deciduous fruit farms in the Western Cape province, South Africa. *S Afr J Wildl Res*, 27:1–4
- Maier V. 1982 Acoustic communication in the Guinea Fowl (*Numida meleagris*): structures and use of vocalizations, and the principles of message coding. *Zeitschrift Für Tierpsychologie*, 59:29–83
- Mentis MT, Poggenpoel B, Maguire RRK. 1975. Food of Helmeted Guineafowl in highland Natal. *J S Afr Wildl Assoc*, 5:23–25
- Pero LV, Crowe TM. 1996. Helmeted Guineafowl *Numida meleagris* in KwaZulu-Natal: a case for non-sustainability. *S Afr J Wildl Res*, 26:123–130
- Prinsloo HC, Harley V, Reilly BK, Crowe TM. 2005. Sex-related variation in morphology of helmeted guinea-fowl (*Numida meleagris*) from Riemland of the northeastern Free State. *S Afr J Wildl Res*, 35:96–98
- Ratcliffe CS, Crowe TM. 2001. Habitat utilization and home range size of Helmeted Guineafowl (*Numida meleagris*) in the Midlands of KwaZulu-Natal province, South Africa. *Biol Conserv*, 98:333–345
- Siegfried WR. 1966. Growth, plumage development and moult in the Crowned Helmeted Guineafowl, *Numida meleagris coronata* Gurney, Department of Nature Conservation Investigation Report, 8:1–52
- Siopes TD, Wilson WO. 1973. Determination of the sex of Chukar Partridge at hatching. *J Wildl Manag*, 37:239–240
- Skead CJ. 1962. A study of the Crowned Guinea Fowl *Numida meleagris coronata* Gurney. *Ostrich*, 33:51–65
- Treisman M. 1975. Predation and the evolution of gregariousness. I Models for concealment and evasion. *Anim Behav*, 23:779–800
- Van Niekerk JH. 1979. Social and breeding behaviour of the Crowned Guineafowl in the Krugersdorp Game Reserve. *Ostrich*, 50:188–189
- Van Niekerk JH. 1980. Some socio-biological features of Crowned Guineafowl in the Krugersdorp Game Reserve. *Bokmakierie*, 32:102–108
- Van Niekerk JH. 1983. Marking and observing Helmeted Guineafowl in the Krugersdorp game reserve. *Safring News*, 12(2):48–52
- Van Niekerk JH. 1985. Submissive display in young Helmeted Guineafowl. *S Afr J Zool*, 20:38
- Van Niekerk JH. 2001. Social and breeding behaviour of Crested Francolin in the Rustenburg district, South Africa. *S Afr J Wildl Res*, 31(1):35–42
- Van Niekerk JH. 2002. Notes on habitat use by Helmeted Guineafowl in the Krugersdorp Game Reserve, South Africa. *S Afr J Wildl Res*, 32:166–169
- Van Niekerk JH, Van Ginkel CM. 2003. Notes on the behavioural ecology of Coqui Francolin in the Rustenburg district, South Africa. *S Afr J Wildl Res*, 33(1):59–62
- Van Niekerk JH, Barendse M, Mare F. 2009. Behaviour of Red-necked Spurfowl *Pternistis afer* in the Boknes and Cannon Rock coastal resorts, Alexandria district, Eastern Cape province, South Africa. *Ostrich*, 80:43–45
- Van Niekerk JH. 2009. Interflock movements in a population of Helmeted Guineafowl *Numida meleagris* at the Krugersdorp Game Reserve, Gauteng province, South Africa. *Ostrich*, 80:201–204

南非克鲁格斯多普禁猎区珠鸡的社群组织

J. H. VAN NIEKERK

(Department of Environmental Sciences, College of Agriculture and Environmental Sciences, P. O. Box 392, University of South Africa, Pretoria 0003, South Africa)

摘要: 1982年3月至1984年2月,在南非豪登省的克鲁格斯多普禁猎区(Krugersdorp Game Reserve),通过翼标观察对珠鸡(*Numida meleagris*)的社群组织进行了研究。珠鸡必须以社群的方式才能在野外存活,而集群(7-10只珠鸡)并非随机组成。地位最高的雄鸟(雄鸟A)是群体日常活动的核心,例如决定觅食方向等。地位较高的雄鸟(雄鸟A和B)密切协作以驱赶闯入者。在繁殖期,繁殖雌鸟与高地位雄鸟的结合更为紧密。尽管雄鸟中存在明显的等级差异,但群内争斗频率很低,这些争斗只是在维系群体稳定时才发生。雌性成鸟始终位于优势雄鸟和亚成体之间,以免受天敌伤害。但优势雄鸟与其配偶暂时离开群体进行繁殖时,次优势雄鸟(雄鸟B)成为集群中心,其余个体聚集在其周围以保持集群的稳定。大多数成鸟都协助抚育优势雄鸟的雏鸟。珠鸡的集群具有监视天敌的作用,以保障其在地表植被有限的环境中觅食并在冬季最大限度地获得食物。

关键词: 珠鸡(*Numida meleagris*), 社群组织, 优势度, 协作