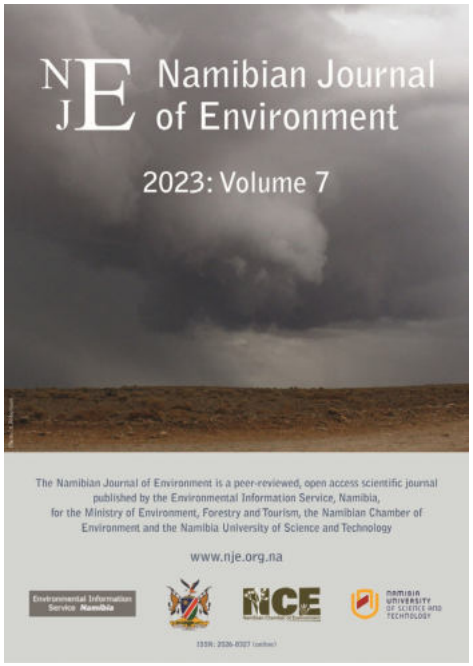
Namibian Journal of Environment

Environmental Information Service, Namibia for the Ministry of Environment, Forestry and Tourism, the Namibian Chamber of Environment and the Namibia University of Science and Technology.

The *Namibian Journal of Environment* (NJE) covers broad environmental areas of ecology, agriculture, forestry, agro-forestry, social science, economics, water and energy, climate change, planning, land use, pollution, strategic and environmental assessments and related fields. The journal addresses the sustainable development agenda of the country in its broadest context. It publishes four categories of articles: **Section A: Research articles**. High quality peer-reviewed papers in basic and applied research, conforming to accepted scientific paper format and standards, and based on primary research findings, including testing of hypotheses and taxonomical revisions. **Section B: Research reports**. High quality peer-reviewed papers, generally shorter or less formal than Section A, including short notes, field observations, syntheses and reviews, scientific documentation and checklists. **Section C: Open articles**. Contributions not based on formal research results but nevertheless pertinent to Namibian environmental science, including opinion pieces, discussion papers, meta-data publications, non-ephemeral announcements, book reviews, correspondence, corrigenda and similar. **Section D: Monographs and Memoirs**. Peer-reviewed monographic contributions and comprehensive subject treatments (> 100 pages), including collections of related shorter papers like conference proceedings.

NJE aims to create a platform for scientists, planners, developers, managers and everyone involved in promoting Namibia's sustainable development. An Editorial Committee ensures that a high standard is maintained.

ISSN: 2026-8327 (online).



SECTION B: RESEARCH REPORTS

Recommended citation format:

Kopij G (2023) Status, distribution and numbers of birds in the Ogongo Game Park, north-central Namibia. *Namibian Journal of Environment* 7 B: 9-20.

Cover photo: A Robertson

Status, distribution and numbers of birds in the Ogongo Game Park, north-central Namibia

G Kopij

URL: https://nje.org.na/index.php/nje/article/view/volume7-kopij

Published online: 29th May 2023

Department of Vertebrate Ecology, Wrocław University of Environmental & Life Sciences, ul. Kozuchowska 5b, 51-631 Wroclaw, Poland; Department of Integrated Environmental Science, Ogongo Campus, University of Namibia, Private Bag 5520 Oshakati, Namibia. gregorius.kopijus@gmail.com

Date received: 6th February 2023; Date accepted: 25th April 2023.

Abstract

In 2012, a simplified territory mapping method was employed to study the distribution and numbers of all birds breeding in the Ogongo Game Park (OGP). OGP is situated approximately 50 km north-west of Oshakati, in the Outapi district, Omusati region, North-Central Namibia. The area of the park is approximately 1000 ha. The vegetation of OGP comprises mainly mopane savanna *Colophospermum-Acacia nilotica*. In total, 142 bird species were recorded: 101 breeding residents, 19 regular visitors, 10 irregular visitors, 3 vagrants, 10 Palaearctic migrants. Maps showing the distribution of identified territories are presented for all breeding species. The dominant species were Ring-necked Dove *Streptopelia capicola* (14.2%), Helmeted Guineafowl *Numida meleagris* (9.3%), White-browed Sparrow-Weaver *Plocepasser mahali* (9.3%) and Blue Waxbill *Uraeginthus angolensis* (8.3%). Nine other species were classified as subdominant, comprising a further 27.7% of all breeding birds.

Keywords: avian community, Cuvelai Drainage System, Namibia, Ogongo Game Park, survey

Introduction

The Ogongo Game Park (OGP) constitutes the final point of the Biodiversity Monitoring Transect (BMT), which runs from the Cape Peninsula through the arid west of South Africa (11 observatories) and Namibia (17 observatories) and ends in OGP (Hoffmann *et al*. 2010, Jürgens *et al*. 2010, Schmiedel & Jürgens 2010). The BMT is an international collaboration between Germany, South Africa and Namibia, aimed at providing information on biodiversity and its changes, especially those which might be caused by climate change. Avifauna constitutes one of the most important elements of this biodiversity project and as such needs to be thoroughly investigated and monitored.

Studies on bird assemblages have been conducted in the Cuvelai Drainage System (Kopij 2013, 2014a, 2014b, 2015, 2019, 2021) including the Ogongo area (Kopij 2013, 2014a, 2014b). To date, the assemblages in natural and semi-natural habitats were, however, studied only by means of the transect line method (Kopij 2013, 2014a, 2014b). This generates only relative (linear) population density estimations. Territory mapping methods have been previously applied in the urbanised habitats of Outapi (Kopij 2019) and Ongwediva (Kopij 2021). Population estimates generated by this method are considered to be accurate and close to total counts (Sutherland 1993, Bibby *et al*. 2012).

This study contributes further to our knowledge of the avifauna of OGP by quantifying all bird species breeding in OGP using a territory mapping method.

Study area

The UNAM Ogongo Game Park (OGP) was established in 1997. It is situated approximately 50 km north-west of Oshakati in the Outapi district, Omusati region, North-Central Namibia. OGP occupies an area of approximately 1 000 ha and is about 1 100 m above sea level (Figure 1).

OGP is located in a prime summer rainfall zone, with mean annual precipitation of 400–500 mm (Mendelsohn, el Obeid, Roberts 2000; Mendelsohn *et al*. 2010; Mendelsohn & Weber 2011) and is regularly partially flooded during the rainy season (usually December–June). OGP is an extensive sandy plain with a total of 411 vascular plant species recorded across three vegetation classes

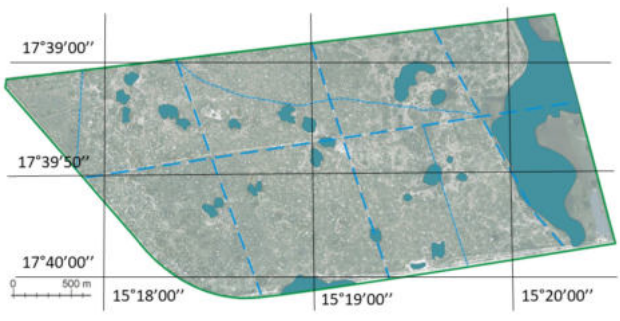


Figure 1: *The study area: Ogongo Game Park (OGP). Green areas: oshanas, broken lines: roads, dotted lines: paths.*

Figure 2: *a)* Acacia *savanna; b) mopane savanna, with Marabou Storks; c) fresh termite mound on the border of mopane and oshana.*

(Kangombe 2007). The three major vegetation classes are acacia savanna, mopane savanna and grassy plains (Figure 2). The acacia savanna is located in the north-western corner of the park, covering only c. 50 ha. It is fairly diverse, and composed mainly of *Acacia erioloba, A. nilotica, Hyphaene petersiana.* Other common tree species include *Combretum collinum, Terminalia sericea, Commiphora africana*, *Acacia siberiana* and *A. flecki*. The mopane savanna is much less diverse and strongly dominated by *Colophospermum mopane*, most of which are in young stage. This area covers most of the park's surface (c. 700 ha). The remaining c. 250 ha is covered by grasses and sedges and is flooded almost on a yearly basis. The most common grass species are *Schmidtia kalahariensis, Cynodon dactylon, Brachiara* spp., *Digitaria* spp., *Anthephora* spp., *Eragrostis* spp., *Enneapogon* spp. and *Panicum* spp. The eastern part of the reserve comprises a large oshana covered mainly with *Eragrostis* grasses. It typically retains rainwater for almost the whole year.

Methods

A simplified territory mapping method (Bibby *et al*. 2012, Sutherland 1996) was employed to identify the occupied territories of all pairs of all breeding bird species. The whole study area was surveyed four times in 2012. Six morning counts (between 06:00–07:00 and 09:00–10:00) were required to cover the whole study area. Complete surveys were conducted in May/June, July/August, September/October, and November/December.

All records of seen or heard birds showing breeding and/or territorial behaviour (including records of singing males) were plotted on a map using Garmin hand-held GPS. The grid size for the survey was 20 seconds (GPS), equivalent to 290 m. Birds were recorded on each side of the walking path up to a distance of 70–150 m. To increase detectability, during subsequent surveys the observer walked along an offset grid (different latitudes and longitudes). Special attention was paid to not record the same birds during the survey, and to record simultaneously singing males.

For species such as the Common Ostrich, Red-billed Buffalo Weaver, White-browed Sparrow-Weaver, Southern Red Bishop and Southern Masked Weaver, the number of breeding pairs was estimated based on the average number of females in the breeding colony/group. The number of breeding pairs of Helmeted Guineafowl was estimated by dividing the average number of birds in the breeding unit by two. The number of cooperatively breeding Red-faced Mousebird, Green Wood Hoopoe, and White-crested Helmetshrike was equal to the number of cooperatively breeding groups, regardless of the number of helpers present in each group. On their respective maps, colonies/groups, rather than single territories of these species, were plotted.

In addition to the main survey conducted in 2012, which aimed to estimate population densities of resident birds, observations of birds were also conducted in 2011 and 2013 in order to determine the status of all bird species (including

Figure 3: *Some bird species recorded in OGP during surveys in 2012. a) Openbill Storks; Yellow-billed Oxpecker; young Striated Heron.*

non-resident) recorded in OGP. The following terms were used to determine the status of each bird species: breeding resident (nesting in the study area); regular visitor (recorded in more than 50% of surveys, non-breeding); irregular visitor (recorded in less than 50% of surveys, non-breeding); vagrant (recorded only in 1–2 surveys); Palaearctic migrant (both regular and irregular visitors from the Palaearctic Region).

Dominance was calculated as the percentage of breeding pairs of a given species in relation to all breeding pairs of all species. A dominant species comprises at least 5% of all breeding pairs recorded, while subdominant species comprise 2–4.99%. Common and scientific species names of all bird species recorded are given in Table 1; nomenclature of names follows those in Chittenden *et al.* 2016.

Results

In total, 142 bird species were recorded in OGP in 2012: 101 breeding residents, 19 regular visitors, 10 irregular visitors, 3 vagrants, 10 Palaearctic migrants (Table 1, Figures 3–8). Among breeding residents, the dominant species were Ring-necked Dove (14.2%), Helmeted Guineafowl (9.3%), White-browed Sparrow-Weaver (9.3%) and Blue Waxbill (8.3%). Together they comprised 41.1% of all breeding birds (Table 1). The following species were classified as sub-dominant: Red-faced Mousebird, Fork-tailed Drongo, Namaqua Dove, Red-billed Buffalo Weaver, Southern Red-billed Hornbill, African Hoopoe, White-tailed Shrike, Southern Masked Weaver and Laughing Dove. Together they comprised 27.7% of all breeding birds.

During the survey 42 bird species were represented only by 1–2 breeding pairs, i.e. their population density was below 0.2 pairs per 100 ha. Population densities greater than 2 pairs per 100 ha were reached by 14 species (Table 1).

All territories identified for each breeding species are shown in Figures 4–8. Each dot on the map indicates an occupied territory. Dot size roughly reflects the territory size. For non-passerines it is therefore larger than for most passerines. Because some raptor species and few other species hold very large territories, these are shown as large circles.

Discussion

In 2012, the number of breeding bird species was exceptionally high in OGP. Some rare and elusive species (e.g., coursers, owls, nightjars, estrildid finches) may have been undetected. It should also be emphasised that some species (e.g., raptors and waterbirds) may nest in OGP irregularly, in some years only. In addition, population densities of some elusive species may have been underestimated. This is especially true regarding species with nocturnal activity, as counts were not conducted during the night. On the other hand, population densities of species with high vocal activity such as Acacia Pied Barbet, Blacksmith Lapwing, African Hoopoe, Green Wood Hoopoe, Common Scimitarbill, Southern Red-billed Hornbill, African Grey Hornbill, Ring-necked Dove, Laughing Dove, Namaqua Dove, Fork-tailed Drongo, White-browed Sparrow Weaver and Red-billed Buffalo Weaver are likely to be more accurate.

There is a lack of reliable quantitative population density estimations of birds (representative size of study plot, breeding pair as a census unit, territory mapping or total census methods) breeding in natural habitats, not only in Namibia (Kopij 2014), but in Africa at large (Urban *et al.* 1982–2004, Rowan 1983, Hockey *et al.* 2005). In comparison with urbanised habitats in the Cuvelai Drainage System (Kopij 2014a, 2019, 2021) the most striking difference is the proportion between the two most common dove species, the Ring-necked Dove and Laughing Dove. While in all urbanised areas in the Cuvelai Drainage System, the Laughing Dove strongly dominated over the Ring-necked Dove (Kopij 2014a, 2019, 2021), in natural savanna the reverse situation was recorded (this study). Population densities of the Southern Grey-headed Sparrow are low in both urbanised habitats and natural savannas, but the Blue Waxbill is common in both environments. The White-browed Sparrow Weaver is common in natural savanna, whereas it is rare in urbanised habitats. The reverse situation was recorded for the Southern Masked Weaver. Hornbills, wood hoopoes, Namaqua Dove, Fork-tailed Drongo, Long-billed Crombec and Rattling Cisticola bred in much higher densities in natural than in urbanised habitats. However, many bird species recorded as breeding in OGP were not recorded at all in urbanised areas (Kopij 2014a, 2019, 2021). This group includes common OGP species such as Helmeted Guineafowl, Spotted Thick-knee, Common Buttonquail and White-tailed Shrike.

The avian species richness in the pure stand of mopane savanna is low in comparison with acacia savanna (Kopij 2013, 2014a). The relatively high species richness in OGP, dominated by the mopane savanna, can be linked to exceptionally high rainfall in 2010/2011 wet season (numerous waterbirds recorded). Although most of the area of OGP is young mopane savanna, there is a small area with acacia savanna, which is also characterised by much higher avian species diversity (Kopij 2013, 2014a). The mopane savanna also has an abundance of large termite mounds (both functioning, recently abandoned and heavily eroded) often surrounded by a clump of trees and numerous shrubs. These sites break down the monotony of the mopane savanna, and greatly increase its biodiversity. A relatively high density of introduced ungulates may also play a role in this regard.

Table 1: Annotated checklist of bird species (listed in systematic order) recorded in Ogongo Game Park (*c.* 1 000 ha) in 2012. Number of breeding pairs/occupied territories is given for each breeding species.

Common species name	Scientific species name	Status	Number of pairs	Figure
Common Ostrich	*Struthio camelus*	breeding resident	4	4A
Helmeted Guineafowl	*Numida meleagris*	breeding resident	105	4A
Swainson's Spurfowl	*Pternistis swainsonii*	breeding resident	14	4B
Common Buttonquail	*Turnix sylvaticus*	breeding resident	3	6B
White-faced Whistling Duck	*Dendrocygna viduata*	regular visitor		
African Pygmy Goose	*Nettapus auritus*	breeding resident?	1	6C
Egyptian Goose	*Alopochen aegyptiaca*	irregular visitor		
Knob-billed Duck	*Sarkidiornis melanotos*	regular visitor		
Cape Teal	*Anas capensis*	regular visitor		
Red-billed Teal	*Anas erythrorhyncha*	regular visitor		
Southern Pochard	*Netta erythrophthalma*	breeding resident?	1	6C
Little Grebe	*Tachybaptus ruficollis*	breeding resident	1	6C
African Openbill	*Anastomus lamelligerus*	regular visitor		
Abdim's Stork	*Ciconia abdimi*	vagrant		
Woolly-necked Stork	*Ciconia episcopus*	vagrant		
Marabou Stork	*Leptoptilos crumenifer*	irregular visitor		
African Sacred Ibis	*Threskiornis aethiopicus*	irregular visitor		
African Spoonbill	*Platalea alba*	irregular visitor		
Dwarf Bittern	*Ixobrychus sturmii*	breeding resident	4	6F
Hamerkop	*Scopus umbretta*	breeding resident	6	5F
Black-crowned Night Heron	*Nycticorax nycticorax*	breeding resident	1	6F
Striated Heron	*Butorides striata*	breeding resident	1	6F
Squacco Heron	*Ardeola ralloides*	regular visitor		
Rufous-bellied Heron	*Ardeola rufiventris*	regular visitor		
Cattle Egret	*Bubulcus ibis*	regular visitor		
Intermediate Egret	*Egretta intermedia*	regular visitor		
Little Egret	*Egretta garzetta*	regular visitor		
Great Egret	*Ardea alba*	regular visitor		
Grey Heron	*Ardea cinerea*	regular visitor		
Black-headed Heron	*Ardea melanocephala*	regular visitor		
Purple Heron	*Ardea purpurea*	breeding resident?	1	6F
African Fish Eagle	*Haliaeetus vocifer*	irregular visitor		
Black-winged Kite	*Elanus caeruleus*	regular visitor		
Black Kite	*Milvus migrans*	Palaearctic visitor		
Yellow-billed Kite	*Milvus aegyptius*	breeding resident	4	6E
White-backed Vulture	*Gyps africanus*	irregular visitor		
Lappet-faced Vulture	*Torgos tracheliotos*	vagrant		
Bateleur	*Terathopius ecaudatus*	breeding resident	2	6D
Brown Snake Eagle	*Circaetus cinereus*	breeding resident	1	6D
Shikra	*Accipiter badius*	breeding resident	3	6E
Little Sparrowhawk	*Accipiter minullus*	breeding resident	1	6E
Common Buzzard	*Buteo buteo*	regular visitor		
Rock Kestrel	*Falco rupicolus*	regular visitor		
Grey Kestrel	*Falco ardosiaceus*	breeding resident	1	6E
Lesser Kestrel	*Falco naumanni*	Palaearctic visitor		

Red-footed Falcon	*Falco vespertinus*	Palaearctic visitor		
Amur Falcon	*Falco amurensis*	Palaearctic visitor		
Lanner Falcon	*Falco biarmicus*	irregular visitor		
Red-crested Korhaan	*Lophotis ruficrista*	breeding resident	1	6B
Common Moorhen	*Gallinula chloropus*	breeding resident	3	6C
Lesser Moorhen	*Paragallinula angulata*	breeding resident	1	6C
African Swamphen	*Porphyrio madagascariensis*	breeding resident?	2	6C
Spotted Thick-knee	*Burhinus capensis*	breeding resident	3	4A
Black-winged Stilt	*Himantopus himantopus*	irregular visitor		
Pied Avocet	*Recurvirostra avosetta*	irregular visitor		
Blacksmith Lapwing	*Vanellus armatus*	breeding resident	16	6G
Three-banded Plover	*Charadrius tricollaris*	breeding resident	2	6C
African Snipe	*Gallinago nigripennis*	breeding resident	1	6C
Wood Sandpiper	*Tringa glareola*	Palaearctic visitor		
Common Sandpiper	*Actitis hypoleucos*	Palaearctic visitor		
Namaqua Sandgrouse	*Pterocles namaqua*	regular visitor		
Ring-necked Dove	*Streptopelia capicola*	breeding resident	160	5H
Laughing Dove	*Streptopelia senegalensis*	breeding resident	24	5G
Mourning Collared Dove	*Streptopelia decipiens*	breeding resident	1	5G
Namaqua Dove	*Oena capensis*	breeding resident	46	6A
Grey Go-away-bird	*Corythaixoides concolor*	breeding resident	7	5B
African Cuckoo	*Cuculus gularis*	breeding resident	2	5C
Diederik Cuckoo	*Chysococcyx caprius*	breeding resident	1	5C
Klaas's Cuckoo	*Chrysococcyx klaas*	breeding resident?	1	5C
Western Barn Owl	*Tyto alba*	breeding resident	5	5F
Marsh Owl	*Asio capensis*	breeding resident	1	5F
Pearl-spotted Owlet	*Glaucidium perlatum*	breeding resident	2	5F
Rufous-cheeked Nightjar	*Caprimulgus rufigena*	breeding resident	1	5D
Common Swift	*Apus apus*	Palaearctic visitor		
African Palm Swift	*Cypsiurus parvus*	breeding resident	6	5D
Little Swift	*Apus affinis*	regular visitor		
Red-faced Mousebird	*Urocolius indicus*	breeding resident	12	5B
Lilac-breasted Roller	*Coracias caudatus*	breeding resident	5	4H
Purple Roller	*Coracias naevius*	breeding resident	2	5A
Woodland Kingfisher	*Halcyon senegalensis*	breeding resident?	2	5A
Pied Kingfisher	*Ceryle rudis*	breeding resident	2	5A
Swallow-tailed Bee-eater	*Merops hirundineus*	breeding resident	1	5A
Little Bee-eater	*Merops pusillus*	breeding resident	4	5A
European Bee-eater	*Merops apiaster*	Palaearctic visitor		
African Hoopoe	*Upupa africana*	breeding resident	35	4F
Green Wood Hoopoe	*Phoeniculus purpureus*	breeding resident	3	4G
Common Scimitarbill	*Rhinopomastus cyanomelas*	breeding resident	5	4G
Southern Red-billed Hornbill	*Tockus erythrorhynchus*	breeding resident	30	4D
African Grey Hornbill	*Lophoceros nasutus*	breeding resident	4	4E
Lesser Honeyguide	*Indicator minor*	breeding resient?	1	4C
Black-collared Barbet	*Lybius torquatus*	breeding resident	1	4C
Acacia Pied Barbet	*Tricholaema leucomelas*	breeding resident	10	4C
Golden-tailed Woodpecker	*Campethera abingoni*	breeding resident	2	4C
Rosy-faced Lovebird	*Agapornis roseicollis*	breeding resident	4	5E
Meyer's Parrot	*Poicephalus meyeri*	breeding resident	1	5E

White-tailed Shrike	*Lanioturdus torquatus*	breeding resident	27	7E
White-crested Helmetshrike	*Prinops plumatus*	breeding resident	6	7D
Crimson-breasted Shrike	*Laniarius atrococcineus*	breeding resident	5	7D
Brubru	*Nilaus afer*	breeding resident	4	7B
Black-backed Puffback	*Dryoscopus cubla*	breeding resident	2	7D
Brown-crowned Tchagra	*Tchagra australis*	breeding resident	7	7C
Southern White-crowned Shrike	*Eurocephalus anguitimens*	breeding resident?	2	7D
African Golden Oriole	*Oriolus auratus*	breeding resident	3	6H
Fork-tailed Drongo	*Dicrurus adsimilis*	breeding resident	56	7A
Cape Crow	*Corvus capensis*	breeding resident	1	6B
Pied Crow	*Corvus albus*	breeding resident	3	6B
Ashy Tit	*Melaniparus cinerascens*	breeding resident	1	6H
Rufous-naped Lark	*Mirafra africana*	breeding resident	2	7F
White-throated Swallow	*Hirundo albigularis*	breeding resident	5	7F
Lesser Striped Swallow	*Cecropis abyssinica*	breeding resident	5	7F
Long-billed Crombec	*Sylvietta rufescens*	breeding resident	16	7G
Willow Warbler	*Phylloscopus trochilus*	Palaearctic visitor		
Lesser Swamp Warbler	*Acrocephalus gracilirostris*	breeding resident	1	4H
Rattling Cisticola	*Cisticola chiniana*	breeding resident	13	8A
Zitting Cisticola	*Cisticola juncidis*	breeding resident	6	8A
Black-chested Prinia	*Prinia flavicans*	breeding resident	12	8B
Chestnut-vented Warbler	*Sylvia subcaelulea*	breeding resident	1	7F
Violet-backed Starling	*Cynnyricinclus leucogaster*	breeding resident	3	8C
Cape Starling	*Lamprotornis nitens*	breeding resident	1	8C
Yellow-billed Oxpecker	*Buphagus africanus*	breeding resident	7	8C
Groundscraper Thrush	*Turdus litsitsirupa*	breeding resident	11	8F
White-browed Scrub Robin	*Cercotrichas leucophrys*	breeding resident	1	6H
Familiar Chat	*Emarginata familiaris*	breeding resident	1	6H
Spotted Flycatcher	*Muscicapa striata*	Palaearctic visitor		
Ashy Flycatcher	*Muscicapa caerulescens*	breeding resident	1	7H
Scarlet-chested Sunbird	*Chalcomitra senegalensis*	breeding resident	3	8D
White-bellied Sunbird	*Cinnyris talatala*	breeding resident	2	8D
Southern Grey-headed Sparrow	*Passer diffusus*	breeding resident	5	7H
White-browed Sparrow-Weaver	*Plocepasser mahali*	breeding resident	105	8G
Red-billed Buffalo Weaver	*Bubalornis niger*	breeding resident	40	8G
Southern Masked Weaver	*Ploceus velatus*	breeding resident	27	8G
Red-headed Weaver	*Anaplectes rubriceps*	breeding resident	1	8G
Red-billed Quelea	*Quelea quelea*	regular visitor		
Yellow-crowned Bishop	*Euplectes afer*	breeding resident	2	8D
Southern Red Bishop	*Euplectes orix*	breeding resident	21	8D
Red-billed Firefinch	*Logonosticta senegala*	breeding resident	2	8E
Blue Waxbill	*Uraeginthus angolensis*	breeding resident	94	8F
Quailfinch	*Ortygospiza atricollis*	breeding resident	5	7H
African Pipit	*Anthus cinnamomeus*	breeding resident	1	7F
Black-throated Canary	*Crithagra atrogularis*	breeding resident	7	7C
Cinnamon-breasted Bunting	*Emberiza tahapisi*	breeding resident	4	8E
Golden-breasted Bunting	*Emberiza flaviventris*	breeding resident	6	8E

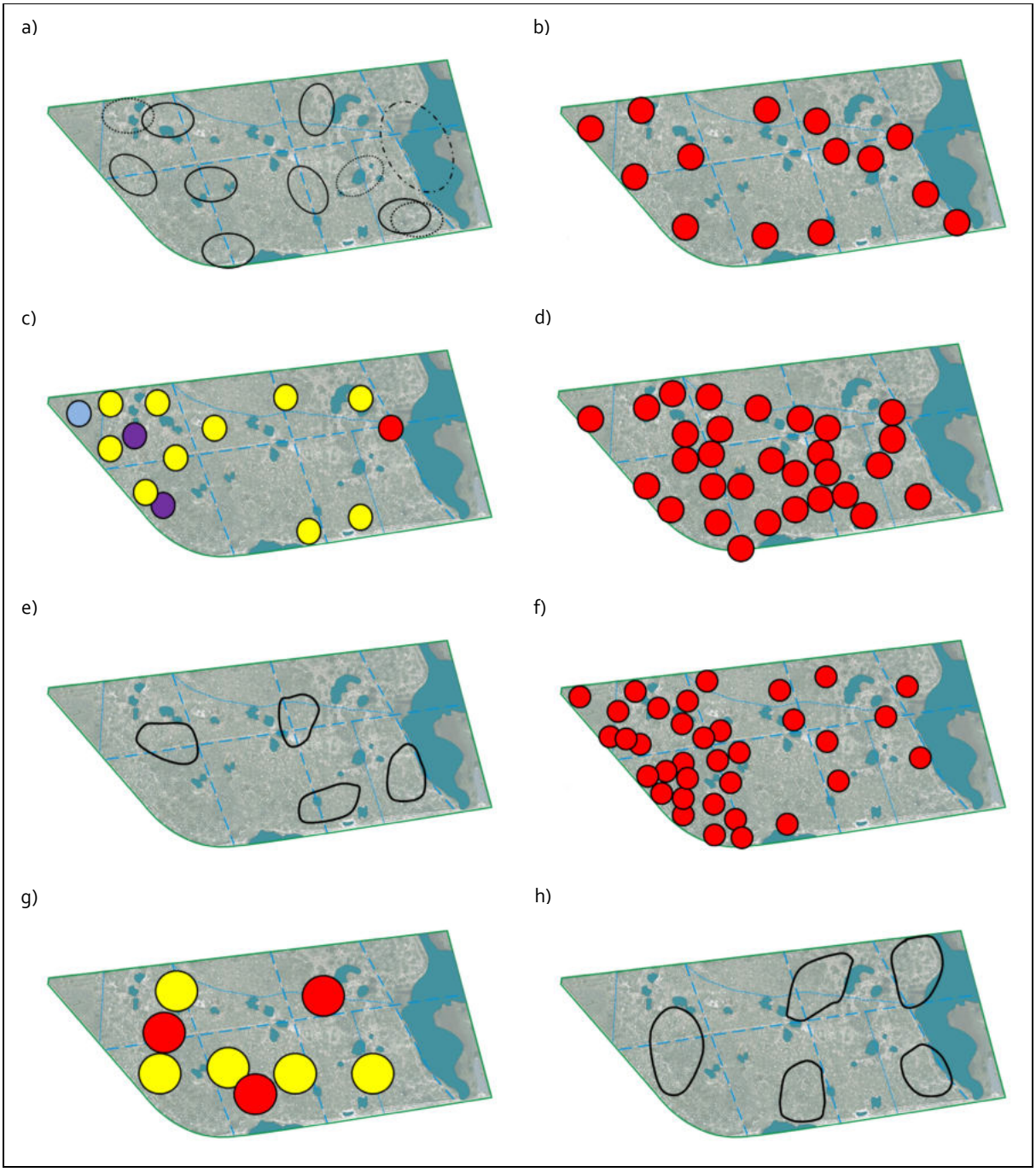


Figure 4: Distribution of breeding pairs/occupied territories of selected bird species in the Ogongo Game Park in 2012.
a) Common Ostrich (a reproductive group with male and 4 females; broken line), Helmeted Guineafowl (breeding groups, each one with 15-30 females; continuous line) and Spotted Thick-knee (occupied territories; dotted line);
b) Swainson's Spurfowl;
c) Lesser Honeyguide (red), Golden-tailed Woodpecker (purple), Black-collared Barbet (blue), and Acacia Pied Barbet (yellow);
d) Southern Red-billed Hornbill;
e) African Grey Hornbill;
f) African Hoopoe;
g) Cooperatively breeding Green Wood Hoopoe (red) and Common Scimitarbill (yellow);
h) Lilac-breasted Roller.

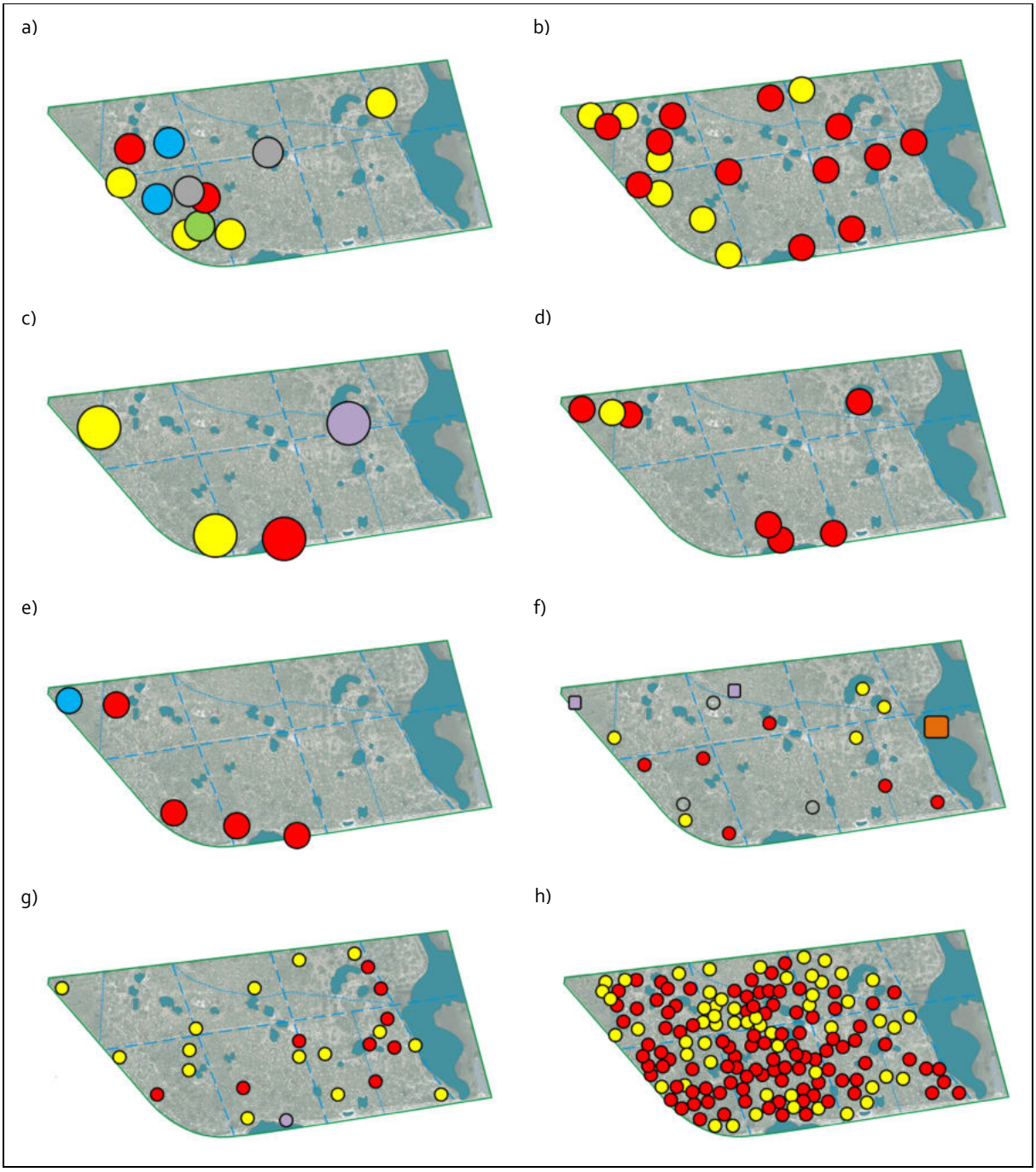


Figure 5: Distribution of breeding pairs/occupied territories of selected bird species in the Ogongo Game Park in 2012.
a) Little Bee-eater (yellow), Swallow-tailed Bee-eater (green), Woodland Kingfisher (blue), Pied Kingfisher (grey) and Purple Roller (red);
b) Grey Go-away-bird (yellow), and cooperatively breeding Red-faced Mousebird (red);
c) Diederik Cuckoo (red), Klaas's Cuckoo (purple), and African Cuckoo (yellow);
d) Rufous-cheeked Nightjar (yellow), and African Palm Swift (red);
e) Rosy-faced Lovebird (red), and Meyer's Parrot (blue);
f) Hamerkop (red – occupied nest, empty circle – unoccupied nest), Western Barn Owl (occupied nest - yellow), occupied territories of the Marsh Owl (orange), and Pearl-spotted Owlet (purple);
g) Laughing Dove (red – confirmed, yellow – not confirmed) and Mourning Collared Dove (purple);
h) Ring-necked Dove (red – confirmed, yellow – not confirmed).

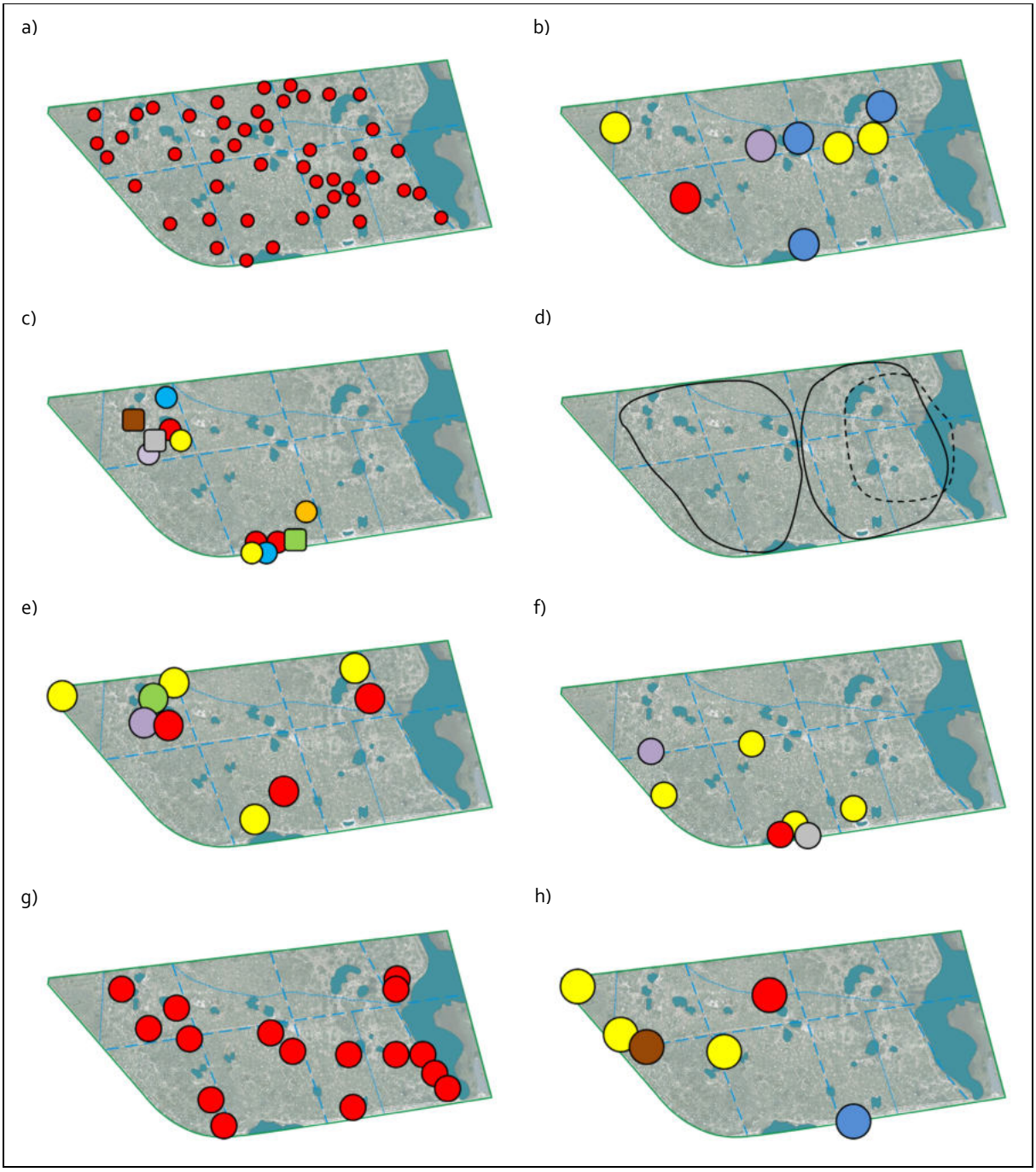


Figure 6: Distribution of breeding pairs/occupied territories of selected bird species in the Ogongo Game Park in 2012.
a) Namaqua Dove;
b) Red-crested Korhaan (red), Common Buttonquail (yellow), Pied Crow (blue), and Black Crow (purple).
c) Common Moorhen (red), Lesser Moorhen (orange), African Swamphen (yellow), Little Grebe (purple), Three-banded Plover (blue), African Snipe (grey), Southern Pochard (brown), and Pygmy Goose (green);
d) Bateleur (continuous line) and Brown Snake Eagle (broken line);
e) Yellow-billed Kite (yellow), Shikra (red), Little Sparrowhawk (purple), and Grey Kestrel (green);
f) Dwarf Bittern (yellow), Striated Heron (purple), Black-crowned Night Heron (grey), Purple Heron (red);
g) Blacksmith Lapwing;
h) African Golden Oriole (yellow), White-browed Scrub Robin (brown), Familiar Chat (blue), and Ashy Tit (red).

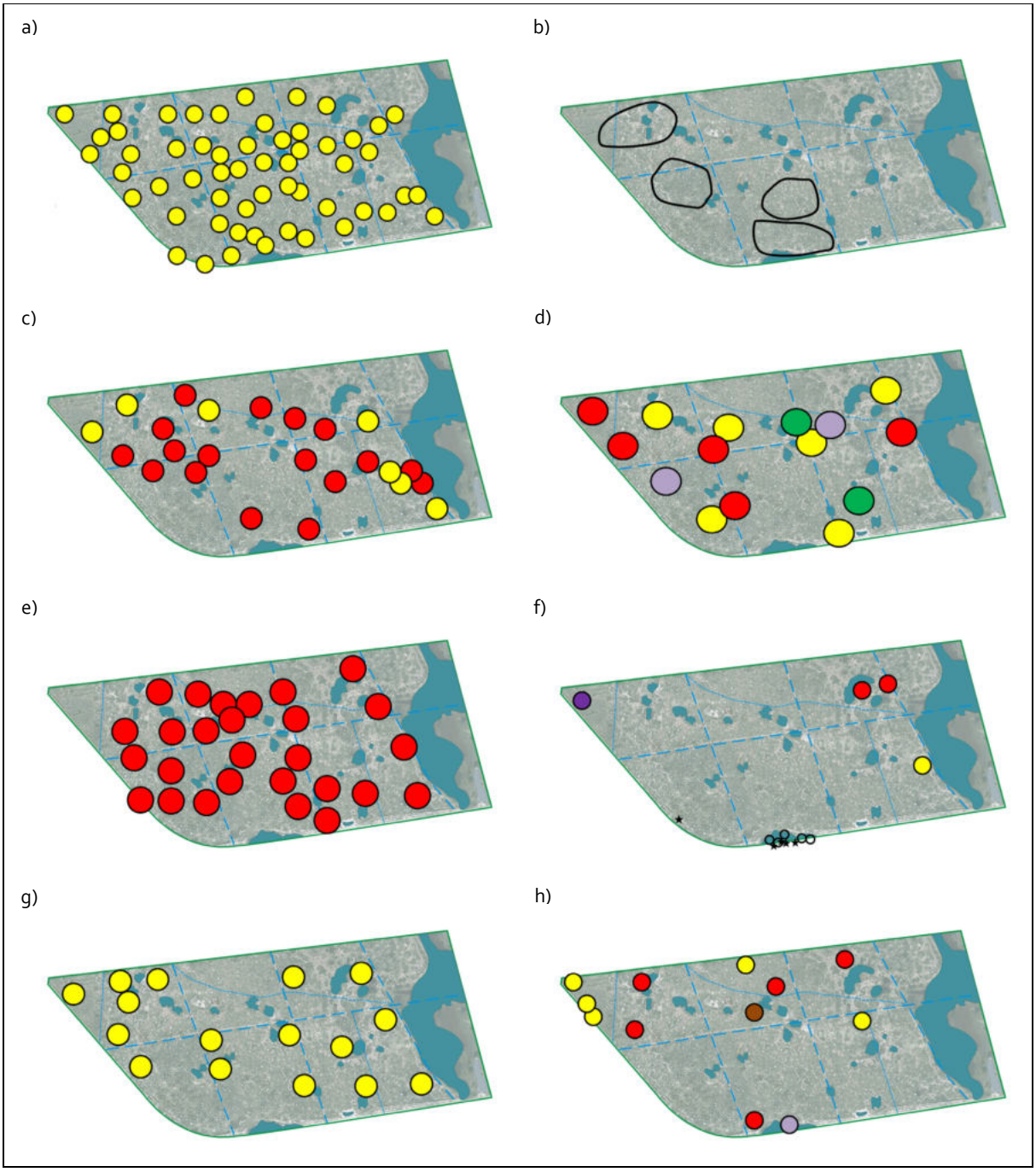


Figure 7: Distribution of breeding pairs/occupied territories of selected bird species in the Ogongo Game Park in 2012.
a) Fork-tailed Drongo;
b) Brubru;
c) Brown-crowned Tchagra (yellow), and Black-throated Canary (red);
d) Crimson-breasted Shrike (red), Southern White-crowned Shrike (purple), Black-backed Puffback (green) and cooperatively breeding White-crested Helmet-Shrike (yellow);
e) White-tailed Shrike;
f) Lesser Striped Swallow (circles), White-throated Swallow (asterisks), Rufous-naped Lark (red), African Pipit (yellow), and Chestnut-vented Warbler (purple);
g) Long-billed Crombec;
h) Lesser Swamp Warbler (purple), Ashy Flycatcher (brown), Quailfinch (red), and Southern Grey-headed Sparrow (yellow).

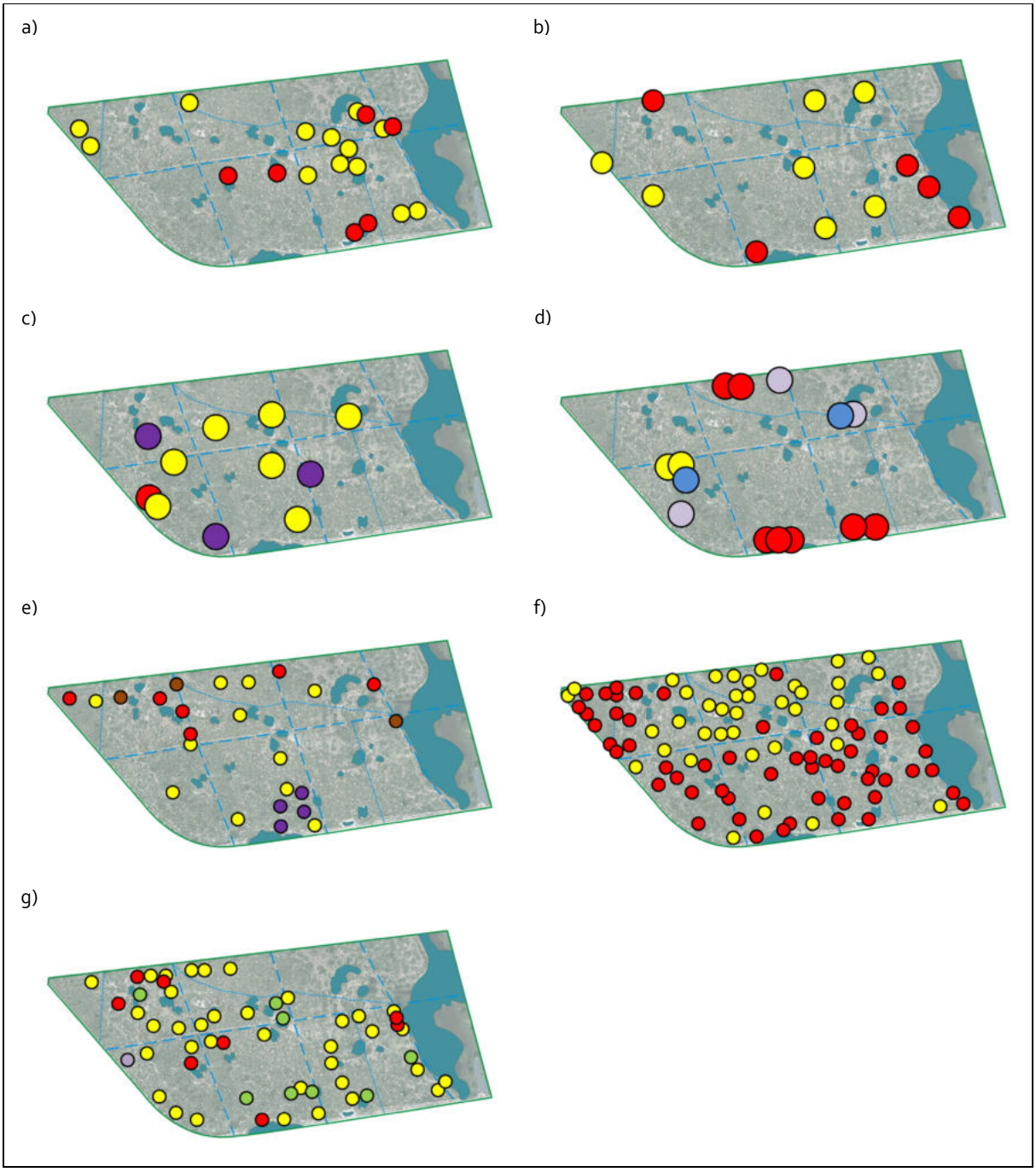


Figure 8: Distribution of breeding pairs/occupied territories of selected bird species in the Ogongo Game Park in 2012.
a) Rattling Cisticola (yellow), and Zitting Cisticola (red);
b) Black-chested Prinia (red – confirmed, yellow – not confirmed);
c) Yellow-billed Oxpecker (yellow), Cape Starling (red), and Violet-backed Starling (purple);
d) White-bellied Sunbird (blue), Scarlet-chested Sunbird (purple), Southern Red Bishop breeding groups (red), and Yellow-crowned Bishop (yellow);
e) Red-billed Firefinch (brown), Groundscraper Thrush (yellow), Golden-breasted Bunting (red) and Cinnamon-breasted Bunting (purple);
f) Blue Waxbill (red – confirmed, yellow – not confirmed);
g) White-browed Sparrow-Weaver breeding groups (yellow), Red-billed Buffalo-Weaver breeding groups (green), Red-headed Weaver (purple), and Southern Masked Weaver breeding groups (red).

Among species endemic to Namibia, the following were recorded in the OGP: White-tailed Shrike (as subdominant), and Rosy-faced Lovebird. Species especially important from a point of view of nature conservation included the Bateleur, Brown Snake Eagle, Grey Kestrel, Meyer's Parrot, Purple Roller, Pygmy Goose and Woodland Kingfisher. OGP also plays an important role as a refugium for such large terrestrial bird species as the Common Ostrich, Helmeted Guineafowl, Red-crested Korhaan and Spotted Thick-knee. Due to a heavy human pressure, these game species are rare in local areas outside OGP and are declining or locally extinct in the Cuvelai Drainage System.

OGP plays, therefore, an important role in the nature conservation of the Cuvelai Drainage System. This is the only protected area within this unique ecosystem (Mendelsohn *et al*. 2000, 2009; Mendelsohn & Weber 2011). It is, however, not a state protected area, and its conservation status is not legislated. OGP provides excellent opportunities to study the structure and function of the Cuvelai Drainage Ecosystem, as it is in relatively pristine state and is situated close to an institution of environmental higher education (Department of the Integrated Environmental Sciences of the University of Namibia). It is therefore highly recommended that the protected area be increased by inclusion of the larger oshana on the eastern border of this park and that its conservation status is legalised to safeguard it for future generations.

Acknowledgements

I greatly acknowledge logistic support for this study by the Department of Integrated Environmental Science, Ogongo Campus, UNAM. The following persons assisted in field observations: Ndeshihafela Hailonga, Lina Talohole Niilenge, Taina Tuwilka, Liisa Shiidi and Nickolae N. Aron. My thanks are also due to Alice Jarvis and referees for their comments, corrections and improvements to the earlier drafts of this paper.

References

Barnard P (ed.) (1998) *Biological diversity in Namibia: a country study*. Namibian National Biodiversity Task Force, Windhoek.

Bibby CJ, Burgess ND, Hill D (2012) *Bird censuses techniques*. Academic Press, London.

Chittenden H, Davis G, Wayersbye I (2016) *Roberts bird guide*. 2nd ed. John Voelcker Bird Book Fund, Cape Town.

Hockey PAR, Dean WRJ, Ryan PG., Maree S (eds.) (2005) *Roberts' birds of southern Africa*. John Voelcker Bird Book Fund, Cape Town.

Hoffman MT, Schmiedel U, Jurgens N (eds.) (2010) *Biodiversity in southern Africa*. Volume 3: Implications for land use and management. Klaus Hess Publishers, Gottingen & Windhoek.

Jurgens N, Haarmeyer DH, Luther-Mosebach J, Dengler J, Finckh M, Schmiedel U (eds.) (2010) (eds.). *Biodiversity in southern Africa*. Volume 1: Patterns at local scale the BIOTA Observatories, Klaus Hess Publishers, Gottingen & Windhoek.

Kangombe FN (2007) *Vegetation description and mapping of Ogongo Agricultural College and the surrounds with the aid of satellite imagery*. B.Sc. thesis. University of Pretoria, Pretoria.

Kopij G (2013) Avian Assemblages in Natural and Modified Koakoland (Mopane) Savanna in the Cuvelai Drainage System, North-Central Namibia. *Lanioturdus* 46(5): 22–33.

Kopij G (2014a) Avian communities of a Mixed *Mopane-Acacia* Savanna in the Cuvelai Drainage System, North-Central Namibia, during the dry and wet season. *Vestnik Zoologii* 48(4): 269–274.

Kopij G (2014b) Avian assemblages in urban habitats in north-central Namibia. *International Science & Technology Journal of Namibia* 3(1): 64–81.

Kopij G (2015) Seasonal changes in avian communities in a farmland in the Cuvelai Drainage System, northern Namibia. *Ornithological Observations* 6: 73–81.

Kopij G (2019) Population density and structure of birds breeding in an urban habitat dominated by large baobabs (*Adansonia digitata*), Northern Namibia. *Biosystem Diversity* 27(4): 354–360.

Kopij G (2021) Population density and structure of a breeding bird community in a suburban habitat in the Cuvelai drainage system, northern Namibia. *Arxius de Miscellània Zoològica* 19: 313–320.

Mendelsohn J, el Obeid S, Robert C (2000) *A profile of north-central Namibia*. Gamsberg Macmillan Publishers, Windhoek.

Mendelsohn J, Jarvis A, Roberts C, Robertson T (2010) *Atlas of Namibia. A Portrait of the Land and its People*. 3rd ed. Jonathan Ball Publishing.

Mendelsohn J, Weber B (2011). *The Cuvelai Basin, its water and people in Angola and Namibia*. Occasional Paper no. 8. Development Workshop, Luanda.

Monadjem A (2002). Population densities and community structural of birds in Acacia savanna in the lowveld of Swaziland. *Ostrich* 73(1&2): 11–19.

Schmiedel U, Jurgens N (eds.) (2010) *Biodiversity in southern Africa*. Volume 2: Patterns and processes at regional scale. Klaus Hess Publishers, Gottingen & Windhoek.

Sutherland WJ (ed.) (1996). *Ecological census techniques. A handbook*. Cambridge Univ. Press, Cambridge (UK).

Rowan MK (1983) *The Doves, Parrots & cuckoos of Southern Africa*. David Philip, Cape Town / Johannesburg.

Sutherland, W. J. 1996. *Ecological Census Techniques: a handbook*. Cambridge University Press, Cambridge (U.K.).

Urban EK, Fry CH, Newman K, Keith S (1982) *The Birds of Africa*. Vol. 1–7. Academic Press, London.