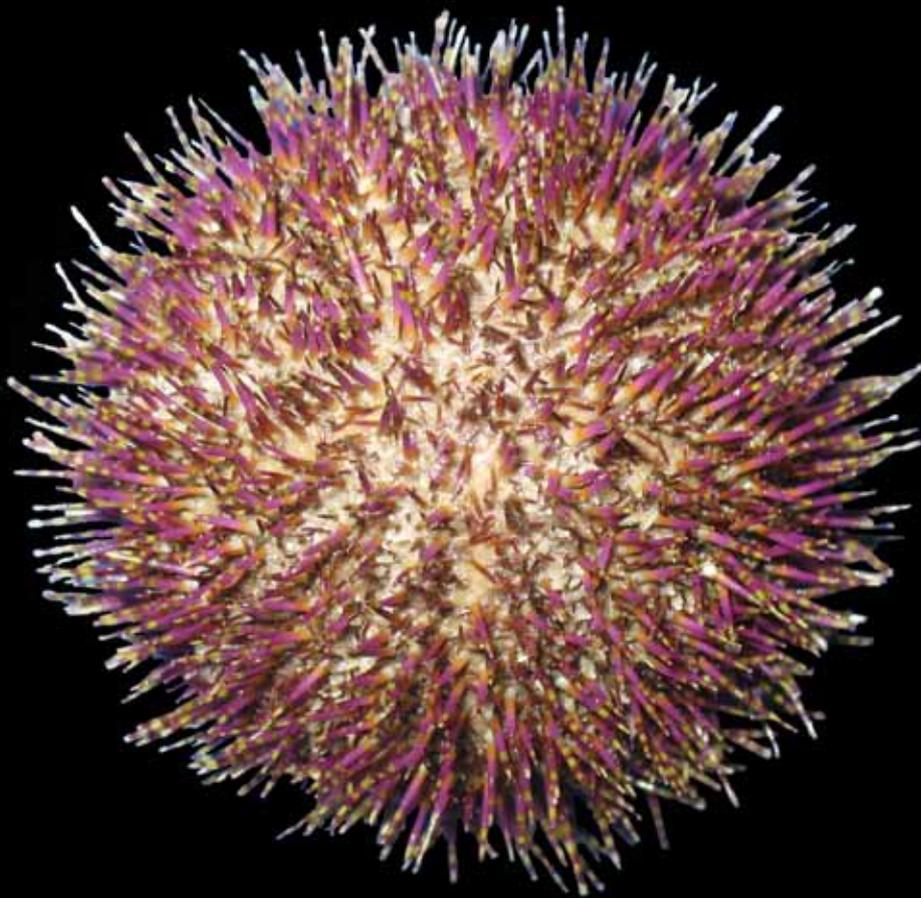


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FURTHER BREEDING RECORDS FOR BIRDS (AVES) IN ANGOLA

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Dean, W.R.J., Franke, U., Joseph, G., Gonçalves, F.M., Mills, M.S.L., Milton, S.J., Monadjem, A. & Oschadleus, H.D. 2013. Further breeding records for birds (Aves) in Angola. *Durban Natural Science Museum Novitates* 36: 1-10. Some details of records of nests, eggs and nestlings of 167 (possibly 168) species in the bird collection at Lubango, Angola are given. This includes 23 species for which there were no Angolan breeding records at all, and one possibly new breeding species (Slaty Egret). The data also confirm the breeding of another 20 species strongly suspected of breeding in Angola, but that lacked egg or nestling records.

KEYWORDS: Angola, birds, museum collections, breeding.

INTRODUCTION

One of the gaps in our knowledge of the natural history of birds in Angola concerns breeding and breeding seasons. Pinto (1983) summarized breeding data from the Lubango bird collection, but often without locality or clutch details. Some of the data from both Pinto's (1983) book and from the Lubango bird collection were included in species accounts by Dean (2000). Subsequently, detailed data, mostly gleaned from museum specimens, have been published (Dean *et al.* 2002, 2003, Dean & Milton 2007), but the overall picture of breeding seasons in Angola is far from complete. Given that more than 830 species (of ca. 970 species) are likely to breed in Angola, and the published records cover less than one quarter of these species, it is of interest to present further breeding records, many of which are 'new'.

In June 2008, a team comprising the authors, spent two weeks capturing the data from the extensive bird collection at Lubango, Angola (Mills *et al.* 2010). The collection is currently under the supervision of the Instituto Superior de Ciências da Educação (ISCED) and is accessible, with permission and prior arrangement, to any students or researchers interested in Angolan birds. This collection, assembled under the leadership of Dr A.A. Rosa Pinto from 1958 to the start of the civil war in 1974, contains more than 36 000 specimens, and includes nestlings, eggs and nests, as well as study skins and mounted birds.

During the course of extracting and capturing data from the skin collection, we noted age (nestling, juvenile, immature, adult) for each species. We also captured the data from the nest and egg collection, and from the collection of nestlings preserved in alcohol. We discarded the data for nests without corresponding eggs or nestlings because the nests could have been misidentified, or collected before or after use.

SYSTEMATIC LIST

Taxonomy and order follows Gill & Donsker (2014). Accession numbers for specimens are in square brackets preceding the record. Missing accession numbers are indicated by an asterisk. Localities are listed with co-ordinates in Appendix 1.

Anatidae

White-backed Duck *Thalassornis leuconotus*
[22028] 1y, 29 Feb. 1968, Lagoa Nuntechite (= Nautelita); [598] c/1, 25 Jun. 1974, Lagoa Iventala; [596] c/1, 29 May 1974, Lagoa Iventala; [595] c/1, 29 May 1974, Lagoa Iventala.

Spur-winged Goose *Plectropterus gambensis*
[509] c/1, 5 Apr. 1970, Quiteve.

Egyptian Goose *Alopochen aegyptiaca*
[321] c/7, 24 Jun. 1968, Quiteve.

Southern Pochard *Netta erythrophthalma*
[473] c/8, 16 Apr. 1970, Lagoa Nuntechite.

Phasianidae

Coqui Francolin *Peliperdix coqui*
[*] c/2, 10 Jan. 1966, Humpata; [339] c/1, 16 Sept. 1968, Capelongo; [30682] 1y, 4 Nov. 1969, Chão da Chela

Orange River Francolin *Scleroptila gutturalis*
[420] c/4, 5 Dec 1969, Calunda.

Crested Francolin *Dendroperdix sephaena*
[125] c/1, 7 Dec 1965, Virute.

Scaly Francolin *Pternistis squamatus*
[410] c/2, 9 Sept. 1969, Condé.

Red-billed Spurfowl *Pternistis adspersus*

[22189] 3y, 8 Apr. 1968, Catequero; [312] c/6, 8 May 1968, Chicusse; [314] c/4, 27 May 1968, Mucope; [315] c/3, 29 May 1968, Mucope; [23098] 4y, 2 Jun. 1968, Mucope; [328] c/1, 1 Jul. 1968, Xangongo (= Roçadas); [32292] 1y, 21 Jul. 1970, Humbe.

Red-necked Spurfowl *Pternistis afer*

[56] c/1, 23 Apr. 1965, Omupanda (= Nompaca R.); [11111] 1y, 25 Apr. 1965, Humpata; [71] c/6, 29 Apr. 1965, Omupanda (= Mupanda); [393] c/1, 6 May 1969, Lagoa Nuntechite; [508] c/1, 26 Mar. 1971, Pirangombe; [574] c/4, 1 May 1974, Mungondo.

Podicipedidae**Little Grebe** *Tachybaptus ruficollis*

[21694] 1y, 19 Feb. 1968, Montipa. Very small chick, probably from an egg laid mid-Jan.

Threskiornithidae**African Sacred Ibis** *Threskiornis aethiopicus*

[320] c/1, 24 Jun. 1968, Quiteve; [23529] 1y, 27 Jun. 1968, Quiteve; [434] c/2, 6 Apr. 1970, Quiteve; [441] c/3, 6 Apr. 1970, Quiteve; [435] c/2, 6 Apr. 1970, Quiteve.

Glossy Ibis *Plegadis falcinellus*

[23548] 2y, 27 Jun. 1968, Quiteve.

African Spoonbill *Platalea alba*

All records from Quiteve: [326] c/1, 27 Jun. 1968; [317] c/3, 24 Jun. 1968; [318] c/4, 24 Jun. 1968; [319] c/2, 24 Jun. 1968; [23553] 1y, 27 Jun. 1968; [23558] 1y, 27 Jun. 1968.

Ardeidae**Black-crowned Night Heron** *Nycticorax nycticorax*

All records from Quiteve: [23446] 1y, 24 Jun. 1968; [23555] 1y, 27 Jun. 1968; [465] c/3, 8 Apr. 1970; [467] c/3, 8 Apr. 1970; [442] c/4, 7 Apr. 1970; [443] c/2, 7 Apr. 1970.

Striated Heron *Butorides striata*

[559] c/2, 7 Oct. 1972, Cachingues.

Squacco Heron *Ardeola ralloides*

All records from Quiteve: [23534] 1y, 27 Jun. 1968; [452] c/4, 8 Apr. 1970; [453] c/3, 8 Apr. 1970; [454] c/4, 8 Apr. 1970; [455] c/4, 8 Apr. 1970; [450] c/3, 7 Apr. 1970; [451] c/4, 8 Apr. 1970; [449] c/3, 8 Apr. 1970.

Rufous-bellied Heron *Ardeola rufiventris*

All records from Lagoa Nuntechite: [381] c/4, 27 Apr. 1969; [382] c/3, 27 Apr. 1969; [383] c/1, 27 Apr. 1969; [384] c/3, 27 Apr. 1969; [385] c/2, 27 Apr. 1969; [386] c/2, 27 Apr. 1969; [400] c/3, 9 May 1969; [401] c/3, 9 May 1969.

Grey Heron *Ardea cinerea*

[510] c/1, no date, Quiteve.

Purple Heron *Ardea purpurea*

[400] c/2, 8 Apr. 1970, Quiteve; [468] c/3, 8 Apr. 1970, Quiteve.

Great Egret *Ardea alba*

[472] c/1, 8 Apr. 1970, Quiteve; [444] c/2, 7 Apr. 1970, Quiteve.

Intermediate Egret *Egretta intermedia*

All records except one from Lagoa Nuntechite: [229] 2y, 28 Apr. 1969; [387] c/2, 27 Apr. 1969; [388] c/2, 27 Apr. 1969; [389] c/3, 28 Apr. 1969; [27430] 2y, 28 Apr. 1969; [399] c/2, 9 May 1969; [23525] 3y, 27 Jun. 1968, Quiteve.

Black Heron *Egretta ardesiaca*

All records from Quiteve: [463] c/3, 8 Apr. 1970; [464] c/3, 8 Apr. 1970; [439] c/3, 6 Apr. 1970; [440] c/4, 5 Apr. 1970.

Slaty Egret *Egretta vinaceigula*

At least four of the specimens labelled Black Heron in the Lubango collection were misidentified and are Slaty Egrets (Mills *et al.* 2010). Three nestlings of "Black Heron" were collected on 27 June 1968, and an immature female Slaty Egret was collected on the same day at the same locality. It is almost certain that these "Black Heron" nestlings are in fact misidentified Slaty Egrets. However, they were preserved as "wet" specimens (in ethyl alcohol) and it will be difficult, without making the specimens into study skins, to get a positive identification. Dean (2000) had no records of Slaty Egret occurring in Angola.]

Little Egret *Egretta garzetta*

All records from Quiteve: [445] c/3, 7 Apr. 1970; [448] c/4, 7 Apr. 1970; [446] c/3, 7 Apr. 1970; [447] c/4, 7 Apr. 1970.

Scopidae**Hamerkop** *Scopus umbretta*

[244] c/3, 14 Jun. 1966, Longa.

Phalacrocoracidae**Reed Cormorant** *Microcarbo africanus*

All records, except where noted from Quiteve: [322] c/4, 27 Jun. 1968; [323] c/4, 27 Jun. 1968; [324] c/3, 27 Jun. 1968; [325] c/2, 27 Jun. 1968; [23528] 5y, 27 Jun. 1968; [456] c/3, 8 Apr. 1970; [457] c/4, 8 Apr. 1970; [458] c/4, 8 Apr. 1970; [459] c/3, 8 Apr. 1970; [460] c/4, 8 Apr. 1970; [461] c/4, 8 Apr. 1970. All the following records from Lagoa Iventala: [597] c/3, 18 Jun. 1974; [587] c/4, 22 May 1974; [588] c/1, 29 May 1974; [590] c/4, 29 May 1974.

African Darter *Anhinga rufa*

All records from Quiteve: [23542] 1y, 23 Jun. 1968; [23551] 2y, 23 Jun. 1968; [23357] 2y, 27 Jun. 1968; [436] c/2, 6 Apr. 1970; [438] c/3, 6 Apr. 1970.

Accipitridae**Black-winged Kite** *Elanus caeruleus*

[594] c/4, 29 May 1974, Lagoa Iventala. Pinto (1983) and Dean (2000) had no egg records.

Wahlberg's Eagle *Hieraaetus wahlbergi*

[348] c/1, 26 Sept. 1968, Capelongo.

Lizard Buzzard *Kaupifalco monogrammicus*

[567] c/2, 13 Nov. 1972, Missão do Chillesso (= Missão do Andulo); [561] c/1, 14 Oct. 1972, Chicala. Pinto (1983) and Dean (2000) had no egg records.

Dark Chanting Goshawk *Melierax metabates*

[566] c/2, 3 Oct. 1972, Chitembo.

Shikra *Accipiter badius*

[526] c/3, 13 Oct. 1971, Dolondolo (Capira).

African Fish Eagle *Haliaeetus vocifer*

[437] c/2, 6 Apr. 1970, Quiteve.

Otididae**Red-crested Korhaan** *Lophotis ruficrista*

[421] c/1, 5 Dec 1969, Calunda.

Rallidae

African Swamphen *Porphyrio madagascariensis*
[45] c/2, 25 Nov. 1969, Inamangondo

Common Moorhen *Gallinula chloropus*
All records from Lagoa Iventala: [600] c/3, 25 Jun. 1974; [585] c/3, 22 May 1974; [586] c/1, 22 May 1974. First breeding record for Angola (Pinto 1983, Dean 2000).

Red-knobbed Coot *Fulica cristata*
[591] c/3, 22 May 1974, Lagoa Iventala. Date given as June in Pinto (1983).

Recurvirostridae

Black-winged Stilt *Himantopus himantopus*
[3659] 4y, 14 Jun. 1961, Morro dos Veados (at Luanda town) (Pinto 1983).

Charadriidae

Blacksmith Lapwing *Vanellus armatus*
[23702] 2y, 2 Jul. 1968, Lagoa Pocolo (Quiteve); [316] c/1, 1 Jun. 1968, Xangongo (= Roçadas); [23625] 3y, 29 Jun. 1968, Lagoa Maquete; [579] c/3, 5 May 1974, Mungondo.

Crowned Lapwing *Vanellus coronatus*
[13737] 1y, 28 Oct. 1965, Chitado.

African Wattled Lapwing *Vanellus senegallus*
[361] c/2, 24 Oct. 1968, Missão Católica de Sangueve; [517] c/3, 31 Aug. 1971, Cariango; [37074] 2y, 25 Oct. 1972, Cachingues.

Kittlitz's Plover *Charadrius pecuarius*
[9] c/1, 17 Aug. 1964, Goma.

Jacanidae

African Jacana *Actophilornis africanus*
[536] c/4, 31 Jul. 1972, Acampamento da Caua (Pinto 1983).

Glareolidae

Bronze-winged Courser *Rhinoptilus chalcopterus*
[108] c/3, 2 Sept. 1965, Cangandala (village) (Pinto 1983).

Collared Pratincole *Glareola pratincola*
[537] c/1, 24 Aug. 1972, Bom Jesus (Pinto 1983)

Laridae

African Skimmer *Rynchops flavirostris*
[484] c/3, 20 Jun. 1970, Quiteve; [485] c/1, 20 Jun. 1970, Quiteve; [486] c/1, 20 Jun. 1970, Quiteve.

Pteroclididae

Namaqua Sandgrouse *Pterocles namaqua*
[11] c/3, 23 Aug. 1964, Calai; [242] c/4, 11 May 1966, Mão de Octávio de Matos.

Double-banded Sandgrouse *Pterocles bicinctus*
[527] c/3, 16 Oct. 1971, Dolondolo (Capira). Dean (2000) had one egg record.

Burchell's Sandgrouse *Pterocles burchelli*
[10] c/1, 22 Aug. 1964, Goma.

Columbidae

Mourning Collared Dove *Streptopelia decipiens*
[327] c/2, 5 Jul. 1968, Quiteve.

Red-eyed Dove *Streptopelia semitorquata*
[54] 2y, 27 Apr. 1965, Chibia; [65] c/2, 27 Apr. 1965, Chibia; [52] c/2, 23 Apr. 1965, Omupanda (= Nompaca R.); [12563] 2y, 20 Aug. 1965, Cacungun; [11325] 2y, 20 May 1965, Omupanda (= Mupanda); [11326] 1y, 20 May 1965, Omupanda (= Mupanda); [11381] 2y, 31 May 1965, Tchiamenha; [85] c/1, 13 May 1965, Humpata; [13241] 1y, 6 Oct. 1965, Quilemba; [245] c/1, 23 Jun. 1966, Cuíto-Cuanavale; [480] c/2, 7 May 1970, Cangolo; [482] c/2, 20 May 1970, Unguéria; [592] c/2, 29 May 1974, Lagoa Iventala; [593] c/2, 29 May 1974, Lagoa Iventala.

Ring-necked Dove *Streptopelia capicola*
[9] 2y, 5 Jun. 1963, Cangalongue; [2] c/2, 5 Jun. 1963, Cangalongue; [53] 1y, 27 Apr. 1965, Chibia; [53, accession no. duplicated] c/2, 23 Apr. 1965, Omupanda (= Nompaca R.); [63] c/2, 27 Apr. 1965, Chibia; [88] c/2, 12 Aug. 1965, Cangandala (village); [104] c/1, 22 Aug. 1965, Culamagia; [147] c/1, 15 Feb. 1965, Ponta da Lubango; [149] c/1, 15 Jan. 1965, Omupanda (= Nompaca R.); [80] c/2, 5 May 1965, Huila (town); [81] c/2, 6 May 1965, Palanca; [91] c/2, 20 May 1965, Omupanda; [92] c/2, 20 May 1965, Omupanda; [89] c/2, 20 May 1965, Omupanda; [90] c/1, 20 May 1965, Omupanda; [93] c/2, 20 May 1965, Omupanda; [94] c/2, 26 May 1965, Quilemba; [84] c/1, 12 May 1965, Lubango, 16 km north; [208] c/2, 25 Mar. 1966, Omupanda; [220] c/1, 25 Mar. 1966, Omupanda; [374] c/1, 30 Mar. 1967, Rio da Areia; [371] c/2, 22 Apr. 1969, Montipa; [396] c/2, 6 May 1969, Lagoa Nuntechite; [397] c/2, 6 May 1969, Lagoa Nuntechite; [405] c/1, 23 May 1969, Gambos (Chilemba); [394] c/1, 6 May 1969, Lagoa Nuntechite; [395] c/2, 6 May 1969, Lagoa Nuntechite; [430] c/2, 6 Apr. 1970, Cahama; [431] c/2, 6 Apr. 1970, Cahama; [432] c/2, 6 Apr. 1970, Cahama; [474] c/2, 22 Apr. 1970, Cangolo; [511] c/2, 17 Aug. 1971, Ponte Salazar; [579] c/2, 7 May 1974, Cahama; [580] c/2, 7 May 1974, Cahama.

Laughing Dove *Spilopelia senegalensis*
[43] 2y, 21 Apr. 1965, Caitou; [49] 1y, 23 Apr. 1965, Omupanda (= Nompaca R.); [50] 2y, 23 Apr. 1965, Omupanda (= Nompaca R.); [52] 2y, 27 Apr. 1965, Chibia; [46] c/2, 21 Apr. 1965, Caitou; [61] c/2, 27 Apr. 1965, Chibia; [78] c/2, 3 May 1965, Lubango (= Sá da Bandeira); [369] c/1, 7 Apr. 1966, Chibia; [365] c/1, 12 Nov. 1968, Foz do Cunene; [402] c/2, 16 May 1969, Omupanda (= Nompaca R.); [404] c/2, 16 May 1969, Omupanda (= Nompaca R.); [475] c/2, 22 Apr. 1970, Cangolo; [497] c/2, 29 Apr. 1970, Vila Arriaga.

Emerald-spotted Wood Dove *Turtur chalcospilos*
[370] c/2, 22 Apr. 1969, Montipa; [515] c/1, 26 Aug. 1971, Mussende.

Blue-spotted Wood Dove *Turtur afer*
[11694] 2y, 22 Jul. 1965, Siengo; [409] 1y, 28 Aug. 1969, Chiela.

Tambourine Dove *Turtur tympanistria*
[603] c/2, 18 Sept. 1974, Fazenda Hissapa.

African Green Pigeon *Treron calvus*
[5006] 1y, 4 Oct. 1963, Leba; [69] 1y, 22 Aug. 1965, Culamagia.

Musophagidae

Grey Go-away-bird *Corythaixoides concolor*
[55] 3y, 27 Apr. 1965, Chibia; [66] c/3, 27 Apr. 1965, Chibia; [83] c/3, 12 May 1965, Lubango; [87] c/2, 15 May 1965, Lubango; [88] c/3, 15 May 1965, Lubango; [245] c/2, 22 Aug. 1966, Lubango; [286] c/2, 8 Feb. 1968, Montipa; [329] c/2, 13 Jul. 1968, Quiteve; [406] c/3, 23 May 1969, Gambos (Chilemba); [36001] 1y, 5 Sept. 1972, Cangalongue.

Cuculidae

Levaillant's Cuckoo *Clamator levaillantii*

[523] c/1, 14 Sept. 1971, Mussende. Presumably an oviducal egg. No host is listed on the label.

Diederik Cuckoo *Chrysococcyx caprius*

[1788] 1y, 14 Jun. 1960, Fazenda Boa Esperança; [1789] 1y, 14 Jun. 1960, Fazenda Boa Esperança; [1790] 1y, 14 Jun. 1960, Fazenda Boa Esperança; [1791] 1y, 14 Jun. 1960, Fazenda Boa Esperança; [3287] 1y, 29 Mar. 1961, Fazenda Boa Esperança; [259] c/1, 5 Dec 1966, Bumbo; [15202] 1y, 25 Feb. 1966, Dongue. No hosts are listed on labels.

Klaas's Cuckoo *Chrysococcyx klaas*

[519] c/1, 7 Sept. 1971, Cariango. Presumably an oviducal egg. No host is listed on the label.

Strigidae

Southern White-faced Owl *Ptilopsis granti*

[34168] 3y, 20 Jul. 1971, Quissongo. Pinto (1983) listed only a "breeding condition" record at Calulo. Dean (2000) had no breeding records.

Marsh Owl *Asio capensis*

[398] c/3, 9 May 1969, Lagoa Nuntechite; [475] c/1, 25 Apr. 1970, Lagoa Nuntechite; [39049] 2y, 18 Jun. 1974, Lagoa Iventala.

Caprimulgidae

Fiery-necked Nightjar *Caprimulgus pectoralis*

[*] c/1, 13 Aug. 1965, Cangandala (village); [358] c/1, 19 Oct. 1968, Missão Católica de Sangueve.

Pennant-winged Nightjar *Caprimulgus vexillarius*

[25846] 2y, 19 Oct. 1968, Missão Católica de Sangueve; [518] c/2, 1 Sept. 1971, Mussende; [960] c/1, 14 Sept. 1971, Mussende; [540] c/1, 31 Aug. 1972, Cangandala (village); [546] c/2, 3 Oct. 1972, Cachingues; [549] c/2, 5 Oct. 1972, Cachingues; [550] c/1, 1 Oct. 1972, Cachingues.

Apodidae

African Palm Swift *Cypsiurus parvus*

All records, except where noted from Missão do Munhino: [182] 1y, 7 Feb. 1968; [183] 1e + 1y, 7 Feb. 1968; [184] 2y, 7 Feb. 1968; [185] 1y, 7 Feb. 1968; [186] 2y, 7 Feb. 1968; [187] 2y, 7 Feb. 1968; [283] c/1, 7 Feb. 1968; [284] c/2, 7 Feb. 1968; [262] c/1, 7 Feb. 1968. All the following records from Lubango: [506] c/3, 8 Feb. 1971; [499] c/2, 30 Jan. 1971; [500] c/1, 15 Jan. 1971; [270] 2y, 10 Sept. 1971; [521] c/2, 10 Sept. 1971. Pinto (1983) gives a number of breeding records without details.

Little Swift *Apus affinis*

[3655] 1y, 14 Jun. 1961, Luanda (town); [202] 2y, 7 Sept. 1968, Micossi (Micosse); [343] c/2, 17 Sept. 1968, Micossi (Micosse); [340] c/3, 17 Sept. 1968, Micossi (Micosse); [341] c/3, 17 Sept. 1968, Micossi (Micosse); [342] c/2, 17 Sept. 1968, Micossi (Micosse); [530] c/3, Jan. 1972, Rio Cubango; [531] c/3, Jan. 1972, Rio Cubango; [532] c/2, Jan. 1972, Rio Cubango; [529] c/3, Jan. 1972, Rio Cubango; [541] c/2 30 Sept. 1972, Chicala. Pinto (1983) gives some breeding records without details.

White-rumped Swift *Apus caffer*

[22136] 4y, 4 Apr. 1968, Tundavala; [213] 3y, 22 Oct. 1968,

Missão Católica de Sangueve; [359] c/3, 22 Oct. 1968, Missão Católica de Sangueve; [344] c/2, 19 Sept. 1968, Guengue. Pinto (1983) gives some breeding records without details.

Coliidae

Red-backed Mousebird *Colius castanotus*

[217] 2y, 22 Apr. 1969, Montipa; [27422] 2y, 22 Apr. 1969; Montipa; [494] c/4, 3 Dec 1970, Quilengues.

Red-faced Mousebird *Urocolius indicus*

[3301] 1y, 3 Apr. 1961, Luanda (town); [228] 3y, 29 Apr. 1969, Huíla (town); [391] c/3, 29 Apr. 1969, Huíla (town). Pinto (1983) and Dean (2000) had no egg records for this species, but subsequently Dean *et al.* (2003) and Dean & Milton (2007) listed records of eggs of this species collected by Dr W.J. Ansorge.

Alcedinidae

Grey-headed Kingfisher *Halcyon leucocephala*

[539] c/3, 28 Aug. 1972, Culamagia.

Brown-hooded Kingfisher *Halcyon albiventris*

[36478] 3y, 10 Oct. 1972, Missão de Mizenze.

Striped Kingfisher *Halcyon chelicuti*

[257] c/3, 7 Nov. 1966, Toco. This record is in Pinto (1983) without locality.

Woodland Kingfisher *Halcyon senegalensis*

[285] c/1, 8 Feb. 1968, Montipa; [21547] 2y, 8 Feb. 1968, Montipa.

Meropidae

Swallow-tailed Bee-eater *Merops hirundineus*

[349] c/4, 26 Sept. 1968, Capelongo. Only an oviducal egg for this species listed by Dean (2000).

Little Bee-eater *Merops pusillus*

[354] c/4, 3 Oct. 1968, Matala.

White-fronted Bee-eater *Merops bullockoides*

[18477] 4y, 11 Oct. 1966, Quilemba; [36388] 4y, 7 Oct. 1972, Cachingues; [36392] 4y, 7 Oct. 1972, Cachingues; [36401] 4y, 7 Oct. 1972, Cachingues.

Phoeniculidae

Green Wood Hoopoe *Phoeniculus purpureus*

[488] c/5, 27 Sept. 1970, Omupanda (= Nompaca R.).

Lybiidae

Anchieta's Barbet *Stactolaema anchietae*

[25920] 3y, 21 Oct. 1968, Gogué; [36289] 5y, 5 Oct. 1972, Cachingues.

Yellow-fronted Tinkerbird *Pogoniulus chrysoconus*

[22372] 3y, 6 May 1968, Quihita.

White-headed Barbet *Lybius leucocephalus*

[525] c/4, 30 Sept. 1971, Humpata.

Crested Barbet *Trachyphonus vailantii*

[32518] 4y, 30 Oct. 1970, Tundavala.

Indicatoridae

Greater Honeyguide *Indicator indicator*

[350] c/1, 27 Sept. 1968, Muquequete. Presumably an oviducal egg. No host listed on the label.

Picidae

Bearded Woodpecker *Dendropicos namaquus*
[513] c/3, 25 Aug. 1971, Mussende.

Psittacidae

Rosy-faced Lovebird *Agapornis roseicollis*
[390] c/4, 20 Apr. 1969, Humbe; [406] c/4, Jul. 1969, Ondjiva;
[479] c/1, 9 May 1970, Lubango. Pinto (1983) listed one
record, c/4 at Ondjiva, July, presumably 406 above.

Meyer's Parrot *Poicephalus meyeri*
[478] c/2, 3 May 1970, Cangolo.

Platysteiridae

Chin-spot Batis *Batis molitor*
[168] c/1, 15 Feb. 1966, Ponta da Lubango.

White-tailed Shrike *Lanioturdus torquatus*
[5309] 3y, 24 Oct. 1963, Fazenda da Cacanda

Black-throated Wattle-eye *Platysteira peltata*
[368] c/2, 19 Oct. 1968, Uige (town).

Prionopidae

White-crested Helmetshrike *Prionops plumatus*
[345] c/3, 25 Sept. 1965, Castanheira de Pêra; [338] c/4, 15
Sept. 1968, Muquequete.

Retz's Helmetshrike *Prionops retzii*
[307] c/3, 1 Apr. 1968, Nongombe

Malaconotidae

Orange-breasted Bushshrike *Chlorophoneus sulfureopectus*
[144] c/1, 13 Jan. 1966, Omupanda (= Nompaca R.); [255]
c/2, 24 Oct. 1966, Cascata da Huíla (Unguéria). First breeding
record for Angola (Dean 2000).

Brown-crowned Tchagra *Tchagra australis*
[169] c/1, 15 Feb. 1966, Ponta da Lubango; [15404] 1y, 18 Mar.
1966, Cristo Rei; [254] c/1, 17 Oct. 1966, Huíla (town); [493] c/2,
9 Nov. 1970, Tundavala.

Black-crowned Tchagra *Tchagra senegalus*
[100] c/2, 18 Aug. 1965, Rio Maubi; [14594] 2y, 12 Dec 1965,
Tchivinguiro; [163] c/1, 9 Feb. 1966, Lubango.

Swamp Boubou *Laniarius bicolor*
[351] c/1, 29 Sept. 1968, Matala. First breeding record for
Angola (Dean 2000).

Crimson-breasted Shrike *Laniarius atrococcineus*
[253] c/2, 17 Oct. 1966, Huíla (town); [264] c/2, 1 Feb. 1971,
Mucope; [503] c/2, 1 Feb. 1971, Mucope. Dean (2000) had no
egg records.

Laniidae

Southern White-crowned Shrike *Eurocephalus*
anguitimens [32600] 3y, 3 Dec 1970, Capunda-Cavilongo
(= Picada de Olivença a Nova). Dean (2000) had only a nest
building record.

Southern Fiscal *Lanius collaris*
[6] c/2, 10 Sept. 1963, Huíla (town); [4945] 2y, 10 Sept. 1963,
Huíla (town); [14248] 3y, 29 Nov. 1965, Palanca; [134] c/3,
10 Oct. 1965, Lubango; [13234] 4y, 6 Oct. 1965, Quilemba;
[13253] 1y, 10 Oct. 1965, Lubango; [13254] 1y, 10 Oct. 1965,

Lubango; [13255] 1y, 10 Oct. 1965, Lubango; [251] c/3, 10
Oct. 1966, Lubango; [247] c/3, 7 Sept. 1966, Lubango,
16 km north.

Oriolidae

African Golden Oriole *Oriolus auratus*
[111] c/2, 30 Sept. 1965, Omupanda (= Nompaca R.). Dean
(2000) had only an oviductal egg record.

Black-headed Oriole *Oriolus larvatus*
[105] c/1, 22 Aug. 1965, Culamagia; [110] c/3, 30 Sept. 1965,
Omupanda (= Nompaca R.); [363] c/2, 23 Oct. 1968, Tápua,
Chipindo; [492] c/2, 7 Nov. 1970, Tundavala. Dean (2000) had
no egg records.

Dicruridae

Square-tailed Drongo *Dicrurus ludwigii*
[214] 3y, 26 Dec 1968, Chipindo. First breeding record for
Angola (Dean 2000).

Fork-tailed Drongo *Dicrurus adsimilis*
[12945] 2y, 31 Aug. 1965, Culamagia; [115] c/1, 13 Nov. 1965,
Tchivinguiro; [118] c/3, 20 Nov. 1965, Eica; [13805] 2y, 13 Nov.
1965, Uncondo; [249] c/3, 19 Sept. 1966, Mucanca; [362] c/2,
26 Oct. 1968, Chipindo (= Tandala); [512] c/2, 19 Aug. 1971,
Mussende; [538] c/3, 27 Aug. 1972, Culamagia; [36188] 3y,
3 Oct. 1972, Cachingues, 18 km S.

Monarchidae

African Paradise Flycatcher *Terpsiphone viridis*
[10881] 1y, 31 Mar. 1965, Chão da Chela; [562] c/1, 16 Oct.
1972, Cachingues.

Alaudidae

Rufous-naped Lark *Mirafra africana*
[119] c/1, 21 Nov. 1965, Tchivinguiro; [14112] 3y, 19 Nov. 1965,
Tchivinguiro; [14094] 1y, 19 Nov. 1965, Tchivinguiro; [82]
1y, 21 Nov. 1969, Tchivinguiro; [258] 1e + 1y, 12 Jan. 1971,
Quilemba; [498] c/1, 12 Jan. 1971, Quilemba. Dean (2000) had
no egg records.

Red-capped Lark *Calandrella cinerea*
[8] c/2, 17 Aug. 1964, Goma; [241] c/1, 6 May 1966, Mão de
Octávio de Matos; [15844] 1y, 2 May 1966, Mão de Octávio
de Matos; [15855] 1y, 2 May 1966, Mão de Octávio de Matos.
Dean (2000) had no egg records.

Pycnonotidae

African Red-eyed Bulbul *Pycnonotus nigricans*
[507] c/3, 6 Mar. 1971, Iona Posto. First breeding record for
Angola (Dean 2000).

Common Bulbul *Pycnonotus barbatus*
[67] 2y, 22 Aug. 1965, Cangandala (village); [70] 1y, 26 Aug.
1965, Cangandala (village); [71] 2y, 31 Aug. 1965, Cangandala
(village); [107] c/2, 31 Aug. 1965, Cangandala (village); [103] c/2,
22 Aug. 1965, Cangandala (village); [106] c/1, 26 Aug. 1965,
Cangandala (village); [77] 1y, 6 Oct. 1965, Lubango; [112] c/4, 6
Oct. 1965, Quilemba; [13233] 1y, 6 Oct. 1965, Quilemba; [109]
2y, 9 Feb. 1966, Lubango; [164] c/2, 9 Feb. 1966, Lubango;
[189] 3y, 12 Feb. 1968, Minilinhonde; [288] c/3, 12 Feb. 1968,
Minilinhonde; [346] c/1, 25 Sept. 1968, Castanheira de Pêra;
[30626] 1y, 23 Oct. 1969, Lagoa Nuntechite (= Nautelita); [254]

1y, 3 Dec 1970, Quilengues; [495] c/1, 3 Dec 1970, Quilengues.

Yellow-bellied Greenbul *Chlorocichla flaviventris*

[194] 1y, 19 Feb. 1968, Montipa; [195] 2y, 4 Mar. 1968, Rio da Areia; [299] c/2, 4 Mar. 1968, Rio da Areia; [216] 2y, 17 Apr. 1969, Chibia; [219] 2y, 22 Apr. 1969, Montipa; [372] c/1, 22 Apr. 1969, Montipa; [373] c/1, 22 Apr. 1969, Montipa; [27416] 2y, 17 Apr. 1969, Chibia; [27426] 2y, 22 Apr. 1969, Montipa; [239] 1y, 12 Jan. 1971, Quilemba; [33360] 2y, 12 Jan. 1971, Quilemba; [266] 2y, 24 Mar. 1971, Pirangombe; [578] c/1, 5 May 1974, Mungolo. Dean (2000) had no definite breeding records for this species. Subsequently Dean *et al.* (2003) listed one record without date, but details provided later by Dean & Milton (2007).

Terrestrial Brownbul *Phyllastrephus terrestris*

[79] c/1, 3 May 1965, Lubango, 16 km north; [181] 1e + 1y, 26 Jan. 1968, Tundavala; [21420] 1y, 25 Jan. 1968, Rio Mutuco; [27432] 2y, 29 Apr. 1969, Huíla (town). Dean (2000) had no egg records.

Pale-olive Greenbul *Phyllastrephus fulviventris*

[27424] 2y, 22 Apr. 1969, Montipa; [497] c/1, 3 Dec 1970, Quilengues. First definite breeding record for Angola (Dean 2000).

Hirundinidae

Lesser Striped Swallow *Cecropis abyssinica*

[282] 2y, 30 Sept. 1972, Chicala; [542] c/3, 30 Sept. 1972, Chicala. Dean (2000) had no egg records.

Red-throated Cliff Swallow *Petrochelidon rufigula*

[330] c/1, 9 Sept. 1968, Guengue; [331] c/2, 9 Sept. 1968, Guengue; [332] c/2, 9 Sept. 1968, Guengue; [333] c/2, 9 Sept. 1968, Guengue; [334] c/2, 9 Sept. 1968, Guengue; [335] c/1, 9 Sept. 1968, Guengue; [336] c/2, 9 Sept. 1968, Guengue; [534] c/2, 22 Jul. 1972, Quibala; [535] c/3, 22 Jul. 1972, Quibala; [568] c/2, 30 Nov. 1972, Rio Cuando (= Nova Moncao); [601] c/3, 4 Aug. 1974, Mt Soque; [602] c/3, 4 Aug. 1974, Mt Soque.

Acrocephalidae

Lesser Swamp Warbler *Acrocephalus gracilirostris*

[470] c/2, 8 Apr. 1970, Quiteve; [471] c/1, 8 Apr. 1970, Quiteve; [462] c/3, 8 Apr. 1970, Quiteve; [469] c/3, 8 Apr. 1970, Quiteve. First breeding records for Angola (Dean 2000).

Cisticolidae

Rattling Cisticola *Cisticola chiniana*

[129] c/3, 12 Dec 1965, Tchivinguiro; [131] c/3, 15 Dec 1965, Tchivinguiro; [260] c/2, 19 Dec 1966, Quipungo; [258] c/2, 14 Nov. 1966, Tundavala; [270] c/3, 12 Mar. 1967, Lubango; [21660] 2y, 15 Feb. 1968, Fazenda da Leba; [570] c/4, 2 Mar. 1973, Lubango.

Tinkling Cisticola *Cisticola rufilatus*

[135] c/1, 10 Jan. 1966, Humpata.

Wailing Cisticola *Cisticola lais*

[157] c/3, 31 Jan. 1965, Tundavala; [178] c/3, 18 Feb. 1966, Tundavala; [136] c/3, 10 Jan. 1966, Humpata. Dean (2000) had only one egg record.

Chirping Cisticola *Cisticola pipiens*

[547] c/4, 3 Oct. 1972, Cachingues.

Levaillant's Cisticola *Cisticola tinniens*

[357] c/3, 17 Oct. 1968, Chipindo.

Short-winged Cisticola *Cisticola brachypterus*

[205] c/3, 21 Mar. 1966, Lubango; [256] c/3, 2 Nov. 1966, Quilemba.

Neddicky Cisticola *fulvicapilla*

[179] c/4, 20 Feb. 1966, Capunda-Cavilongo; [196] c/3, 7 Mar. 1966, Lubango, 16 km north; [250] c/3, 28 Sept. 1966, Mucanca; [269] c/3, 10 Mar. 1967, Lubango; [310] c/2, 5 Apr. 1968, Lubango, 16 km north.

Zitting Cisticola *Cisticola juncidis*

[127] c/3, 9 Dec 1965, Tchivinguiro; [128] c/2, 10 Dec 1965, Tchivinguiro; [313] c/1, 14 May 1968, Chite. Dean (2000) had no egg records.

Wing-snapping Cisticola *Cisticola ayresii*

[133] c/3, 17 Dec 1965, Humpata.

Tawny-flanked Prinia *Prinia subflava*

[15] c/3, 10 Apr. 1965, Omupanda (= Nompaca R.); [183] c/3, 29 Nov. 1965, Palanca; [209] c/3, 25 Mar. 1966, Omupanda; [210] c/1, 25 Mar. 1966, Omupanda; [15430] 2y, 25 May 1966, Omupanda; [428] c/2, 29 Mar. 1970, Cangolo.

Black-chested Prinia *Prinia flavicans*

[23] c/3, 12 Apr. 1965, Omupanda (= Nompaca R.). Dean (2000) had no definite breeding records for this species, but subsequently egg records were given by Dean & Milton (2007).

Grey-backed Camaroptera *Camaroptera brevicaudata*

[12] c/3, 29 Mar. 1965, Chibia; [502] c/2, 1 Feb. 1971, Mucupe; [544] c/2, 1 Oct. 1972, Cachingues. First breeding record for Angola (Dean 2000).

Green-capped Eremomela *Eremomela scotops*

[1] Nest that apparently had 2y, 7 Nov. 1960, Bocoio. First breeding record for Angola (Dean 2000).

Pellorneidae

Brown Illadopsis *Illadopsis fulvescens*

[34511] 1y, 2 Aug. 1971, Cabuta. Traylor (1963) listed a record of a juvenile at Calandula; this record repeated in Dean (2000).

Leiotherichidae

Black-faced Babbler *Turdoides melanops*

[505] c/2, 2 Feb. 1971, Melunga.

Arrow-marked Babbler *Turdoides jardineii*

[303] c/1, 18 Mar. 1968, Mucanca; [306] c/2, 28 Mar. 1968, Lagoa Nuntechite; [569] c/3, 18 Feb. 1973, Cangolo.

Hartlaub's Babbler *Turdoides hartlaubii*

[28] c/3, 14 Apr. 1965, Lubango; [124] c/3, 7 Dec 1965, Virute; [62] 1e + 1y, 12 May 1965, Lubango; [82] c/1, 12 May 1965, Lubango; [11265] 2y, 12 May 1965, Lubango, 16 km S; [223] c/3, 1 Apr. 1966, Mucanca; [15491] 1y, 6 Apr. 1966, Mucanca; [192] c/2, 3 Mar. 1966, Humpata; [203] c/1, 21 Mar. 1966, Lubango; [204] c/1, 21 Mar. 1966, Lubango; [524] c/2, 30 Sept. 1971, Humpata; [571] c/4, 17 Apr. 1974, Chibia.

Bare-cheeked Babbler *Turdoides gymnogynys*

[528] c/3, 22 Oct. 1971, Serra da Neve. First breeding record for Angola (Dean 2000).

Sturnidae

Greater Blue-eared Starling *Lamprotornis chalybaeus*

[352] c/4, 2 Oct. 1968, Cutenda. First breeding record for Angola (Dean 2000).

Violet-backed Starling *Cinnyricinclus leucogaster*

[109] c/1, 30 Sept. 1965, Omupanda (= Nompaca R.).

Turdidae

Kurrichane Thrush *Turdus libonyana*
[3563] c/3, 7 Nov. 1970, Tundavala.

Muscicapidae

Miombo Scrub Robin *Cercotrichas barbata*
[265] 3y, 3 Oct. 1972, Missão de Mizenze; [545] c/1, 20 Oct. 1972, Chitembo.

White-browed Scrub Robin *Cercotrichas leucophrys*
[145] c/2, 17 Jan. 1966, Tundavala; [489] c/3, 31 Oct. 1970, Tundavala.

Southern Black Flycatcher *Melaenornis pammelaina*
[102] c/1, 21 Aug. 1965, Cangandala (village); [347] c/1, 26 Sept. 1968, Capelongo; [35496] 1y, 11 Sept. 1971, Mussende; [543] c/2, 30 Sept. 1972, Chicala.

Pale Flycatcher *Melaenornis pallidus*
[152] 2y, 19 Sept. 1966, Mucanca; [248] c/2, 7 Sept. 1966, Lubango, 16 km north.

Ashy Flycatcher *Muscicapa caerulescens*
[548] c/3, 5 Oct. 1972, Cachingues. Dean (2000) had no egg records.

White-browed Robin-Chat *Cossypha heuglini*
[6795] 1y, 30 Mar. 1964, Huíla (town); [*] c/1, 29 Aug. 1965, Cangandala (village); [32522] 3y, 30 Oct. 1970, Tundavala.

Rufous-tailed Palm Thrush *Cichladusa ruficauda*
[85] c/1, 8 Dec 1965, Viavala; [604] c/3, 26 Sept. 1974, Canjala (Egito).

Arnot's Chat *Myrmecocichla arnotti*
[92] 3y, 16 Dec 1965, Dundualundo; [132] c/1, 16 Dec 1965, Dundualundo; [14736] 2y, 16 Dec 1965, Dundualundo; [14744] 1y, 16 Dec 1965, Dundualundo; [14747] 1y, 16 Dec 1965, Dundualundo.

Nectariniidae

Carmelite Sunbird *Chalcomitra fuliginosa*
[32584] 2y, 20 Nov. 1970, Conda. First breeding record for Angola (Dean 2000).

Amethyst Sunbird *Chalcomitra amethystina*
[224] c/2, 1 Apr. 1966, Mucanca; [262] c/1, 23 Dec 1966, Tundavala; [180] c/2, 20 Feb. 1966, Capunda-Cavilongo; [15224] 1y, 25 Feb. 1966, Rio da Areia.

Scarlet-chested Sunbird *Chalcomitra senegalensis*
[606] c/1, 24 Nov. 1971, Cahama.

Olive-bellied Sunbird *Cinnyris chloropygius*
[412] c/2, 12 Sept. 1969, Cacongo (= Lândana).

Ludwig's Double-collared Sunbird *Cinnyris ludovicensis*
[293] c/1, 15 Feb. 1968, Leba. First breeding record for Angola (Dean 2000).

Purple-banded Sunbird *Cinnyris bifasciatus*
[418] c/2, 5 Dec 1969, Calunda; [419] c/2, 5 Dec 1969, Calunda; [427] c/2, 8 Dec 1969, Carunjamba; [411] c/2, 2 Sept. 1969, Cacongo (= Lândana).

White-bellied Sunbird *Cinnyris talatala*
[156] c/1, 27 Jan. 1966, Humpata; [417] c/1, 1 Dec 1969, Calunda. First breeding record for Angola (Dean 2000).

Variable Sunbird *Cinnyris venustus*
[202] c/2, 18 Mar. 1966, Cristo Rei. First breeding record for Angola (Dean 2000).

Passeridae

White-browed Sparrow-Weaver *Plocepasser mahali*
[298] c/1, 28 Feb. 1968, Quipungo; [287] c/2, 8 Feb. 1968, Montipa; [487] c/2, 24 Jun. 1970, Jau.

Cape Sparrow *Passer melanurus*
[243] c/1, 19 May 1966, Mão de Octávio de Matos.

Yellow-throated Petronia *Gymnoris supercilialis*
[353] c/3, 2 Oct. 1968, Cutenda; [24789] 3y, 10 Sept. 1968, Vambunde; [514] c/3, 25 Aug. 1971, Mussende; [34903] 2y, 24 Aug. 1971, Mussende.

Ploceidae

All egg and nest records in the collection were summarized in Dean (2000). However, nestlings and juveniles of Ploceidae in the collection were not listed in Dean (2000) and these data are presented here.

Red-billed Buffalo Weaver *Bubalornis niger*
[1373, 1374, 1375], 3 immatures collected on 13 Apr. 1960 at Cuamato. Dean (2000) had records of nests but no definite breeding records.

Spectacled Weaver *Ploceus ocularis*
[199] c/2, 8 Mar. 1966, Omupanda (= Nompaca R.).

Bocage's Weaver *Ploceus temporalis*
[97] c/2, 6 Aug. 1965, Rio Luasso; [556] c/3, 7 Oct. 1972, Cachingues; [557] c/2, 7 Oct. 1972, Cachingues; [558] c/3, 7 Oct. 1972, Cachingues; [551] c/2, 6 Oct. 1972, Cachingues; [552] c/2, 6 Oct. 1972, Cachingues; [553] c/2, 7 Oct. 1972, Cachingues; [554] c/2, 7 Oct. 1972, Cachingues; [555] c/2 7 Oct. 1972, Cachingues.

Holub's Golden Weaver *Ploceus xanthops*
[48] c/1, 21 Apr. 1965, Caitou; [114] c/2, 12 Nov. 1965, Tchivinguiro; [116] c/3, 14 Nov. 1965, Tchivinguiro; [239] c/3, 6 Apr. 1966, Mucanca; [263] c/2, 23 Dec 1966, Tundavala; [176] c/2, 18 Feb. 1966, Tundavala; [181] c/2, 23 Feb. 1966, Tundavala; [193] c/1, 3 Mar. 1966, Humpata; [200] c/2, 9 Mar. 1966, Huíla (town); [198] c/2, 8 Mar. 1966, Omupanda (= Nompaca R.); [197] c/1, 7 Mar. 1966, Lubango, 16 km north; [206] c/3, 21 Mar. 1966, Lubango (= Sá da Bandeira); [216] c/3, 25 Mar. 1966, Omupanda; [218] c/2, 29 Mar. 1966, Omupanda; [252] c/2, 11 Oct. 1966, Quilemba; [272] c/1, 20 Mar. 1967, Palanca; [297] c/2, 22 Feb. 1968, Chipeio; [305] c/3, 23 Mar. 1968, Chipeio; [304] c/3, 18 Mar. 1968, Mucanca; [355] c/2, 3 Oct. 1968, Matala; [429] c/1, 29 Mar. 1970, Cangolo; [520] c/2, 8 Sept. 1971, Cariango; [573] c/2, 17 Apr. 1974, Chibia.

Lesser Masked Weaver *Ploceus intermedius*
[300] c/1, 11 Mar. 1968, Pirangombe; [301] c/2, 11 Mar. 1968, Pirangombe; [425] c/3, 8 Dec 1969, Carunjamba; [426] c/2, 8 Dec 1969, Carunjamba; [422] c/1, 8 Dec 1969, Carunjamba; [423] c/2, 8 Dec 1969, Carunjamba; [424] c/4, 8 Dec 1969 Carunjamba.

Southern Masked Weaver *Ploceus velatus*
[47] c/2, 21 Apr. 1965, Caitou; [49] c/3, 21 Apr. 1965, Caitou; [51] c/1, 21 Apr. 1965, Caitou; [184] c/1, 25 Feb. 1966, Dongue; [211] c/2, 25 Mar. 1966, Omupanda; [212] c/1, 25 Mar. 1966, Omupanda; [277] c/2, 4 Apr. 1967, Rio da Areia; [278] c/4, 13 Apr. 1967, Gambos; [279] c/2, 13 Apr. 1967, Gambos; [275] c/4, 30 Mar. 1967, Rio da Areia; [367] c/1, 2 Dec 1968, Ondjiva (=N'giva, Pereira de Eça); [296] c/2, 21 Feb. 1968, Chicusse; [366] c/2, 12 Nov. 1968, Foz do Cunene; [414] c/2, 24 Nov.

1969, Carunjamba; [606] c/2, 24 Nov. 1971, Cahama.

Village Weaver *Ploceus cucullatus*

[1] c/3, 29 Mar. 1961, Fazenda Boa Esperança; [5] c/2, 29 Mar. 1961, Fazenda Boa Esperança; [24] c/1, 12 Apr. 1965, Omupanda (= Nompaca R.); [291] c/2, 12 Feb. 1968, Minilinhonde; [292] c/1, 12 Feb. 1968, Minilinhonde; [294] c/1, 19 Feb. 1968, Vila Arriaga; [295] c/3, 19 Feb. 1968, Vila Arriaga; [375] c/2, 22 Apr. 1969, Montipa; [376] c/3, 22 Apr. 1969, Montipa; [374] c/2, 22 Apr. 1969, Montipa; [607] c/2, 11 Feb. 1973, Quipungo.

Vieillot's Black Weaver *Ploceus nigerrimus*

[364] c/2, 14 Oct. 1968, Uige (town).

Chestnut Weaver *Ploceus rubiginosus*

[25] c/2, 12 Apr. 1965, Omupanda (= Nompaca R.).

Dark-backed Weaver *Ploceus bicolor*

[25] c/2, 12 Apr. 1965, Omupanda (= Nompaca R.).

Red-headed Weaver *Anaplectes rubriceps*

[563] c/2, 18 Oct. 1972, Cachingues.

Black-winged Red Bishop *Euplectes hordeaceus*

[483] c/2, 25 May 1970, Chongoroi.

Southern Red Bishop *Euplectes orix*

[16] c/2, 10 Apr. 1965, Omupanda (= Nompaca R.); [17] c/1, 10 Apr. 1965, Omupanda (= Nompaca R.); [18] c/2, 10 Apr. 1965, Omupanda (= Nompaca R.); [31] c/2, 15 Apr. 1965, Huíla (town); [32] c/4, 15 Apr. 1965, Huíla (town); [33] c/2, 15 Apr. 1965, Huíla (town); [34] c/2, 15 Apr. 1965, Huíla (town); [35] c/1, 15 Apr. 1965, Huíla (town); [36] c/2, 15 Apr. 1965, Huíla (town); [37] c/4, 15 Apr. 1965, Huíla (town); [38] c/4, 15 Apr. 1965, Huíla (town); [39] c/3, 15 Apr. 1965, Huíla (town); [57] c/1, 23 Apr. 1965, Omupanda (= Nompaca R.); [58] c/2, 23 Apr. 1965, Omupanda (= Nompaca R.); [59] c/2, 23 Apr. 1965, Omupanda (= Nompaca R.); [60] c/3, 23 Apr. 1965, Omupanda (= Nompaca R.); [67] c/2, 29 Apr. 1965, Omupanda (= Nompaca R.); [68] c/3, 29 Apr. 1965, Omupanda (= Nompaca R.); [69] c/3, 29 Apr. 1965, Omupanda (= Nompaca R.); [70] c/3, 29 Apr. 1965, Omupanda (= Nompaca R.); [72] c/3, 29 Apr. 1965, Omupanda (= Nompaca R.); [73] c/2, 29 Apr. 1965, Omupanda (= Nompaca R.); [74] c/2, 29 Apr. 1965, Omupanda (= Nompaca R.); [75] c/1, 29 Apr. 1965, Omupanda (= Nompaca R.); [76] c/3, 29 Apr. 1965, Omupanda (= Nompaca R.); [230] c/2, 1 Apr. 1966, Mucanca; [228] c/2, 1 Apr. 1966, Mucanca; [226] c/2, 1 Apr. 1966, Mucanca; [231] c/3, 1 Apr. 1966, Mucanca; [232] c/3, 1 Apr. 1966, Mucanca; [171] c/2, 18 Feb. 1966, Tundavala; [183] c/3, 23 Feb. 1966, Omupanda; [201] c/3, 9 Mar. 1966, Huíla (town); [194] c/1, 3 Mar. 1966, Humpata; [214] c/1, 25 Mar. 1966, Omupanda; [215] c/3, 25 Mar. 1966, Omupanda; [267] c/2, 30 Jan. 1967, Mungolo; [265] c/3, 30 Jan. 1967, Mungolo; [264] c/3, 30 Jan. 1967, Mungolo; [392] c/3, 2 May 1969, Huíla (town); [433] c/3, 8 Apr. 1970, Lubango; [575] c/3, 21 Apr. 1974, Lubango; [576] c/4, 21 Apr. 1974, Lubango.

Fan-tailed Widowbird *Euplectes axillaris*

[237] c/2, 1 Apr. 1966, Mucanca; [175] c/2, 18 Feb. 1966, Tundavala; [137] c/1, 13 Jan. 1966, Omupanda (= Nompaca R.); [280] c/3, 20 Apr. 1967, Nongombe; [268] c/1, 16 Feb. 1967, Chibia.

White-winged Widowbird *Euplectes albonotatus*

[54] c/2, 23 Apr. 1965, Omupanda (= Nompaca R.); [240] c/2, 6 Apr. 1966, Mucanca; [238] c/1, 6 Apr. 1966, Mucanca; [229] c/2, 1 Apr. 1966, Mucanca; [227] c/1, 1 Apr. 1966, Mucanca; [225] c/1, 1 Apr. 1966, Mucanca; [233] c/1, 1 Apr. 1966, Mucanca;

[234] c/2, 1 Apr. 1966, Mucanca; [235] c/2, 1 Apr. 1966, Mucanca; [236] c/1, 1 Apr. 1966, Mucanca; [172] c/2, 18 Feb. 1966, Tundavala; [182] c/1, 23 Feb. 1966, Tundavala; [195] c/1, 3 Mar. 1966, Humpata; [213] c/2, 25 Mar. 1966, Omupanda.

Estrildidae

Orange-winged Pytilia *Pytilia afra*

[41] 1e + 3y, 16 Apr. 1965, Lubango, 16 km north; [10976] 3y, 14 Apr. 1965, Lubango; [66] 5y, 20 Aug. 1965, Cangandala (village); [12941] 4y, 30 Aug. 1965, Mar. imbanguengo; [271] 1y, 14 Sept. 1971, Mussende.

Green-winged Pytilia *Pytilia melba*

[281] c/4, 20 Apr. 1967, Nongombe.

Red-headed Finch *Amadina erythrocephala*

[4885] 2y, 25 Aug. 1963, Pedra Grande; [4910] 1y, 24 Aug. 1963, Pedra Grande; [4912] 1y, 26 Aug. 1963, Pedra Grande.

Dusky Twinspot *Euschistospiza cinereovinacea*

[7] c/2, 17 May 1964, Mt Moco. Dean (2000) had no egg records.

Red-billed Firefinch *Lagonosticta senegala*

[403] c/1, 15 May 1969, Chibia. First breeding record for Angola (Dean 2000).

Jameson's Firefinch *Lagonosticta rhodopareia*

[42] 4e + 1y, 19 Apr. 1965, Tchiamenha; [56] 5y, 29 Apr. 1965, Omupanda (= Mupanda); [57] 5y, 29 Apr. 1965, Omupanda (= Mupanda); [11003] 1y, 19 Apr. 1965, Tchiamenha; [11157] 5y, 29 Apr. 1965, Omupanda (= Nompaca R.); [11158] 5y, 29 Apr. 1965, Omupanda (= Nompaca R.); [10] 5y, 5 Jun. 1965, Cangalongue; [127] 4y, 10 Feb. 1966, Tundavala; [225] 5y, 22 Apr. 1969, Montipa; [27] c/4, 14 Apr. 1965, Lubango; [40] c/2, 15 Apr. 1965, Huíla (town); [30] c/4, 14 Apr. 1965, Lubango; [66] c/2, 15 May 1965, Lubango; [95] c/3, 26 May 1965, Quilemba; [160] c/5, 2 Feb. 1966, Lubango; [162] c/4, 9 Feb. 1966, Lubango.

Blue Waxbill *Uraeginthus angolensis*

[140] c/5, 13 Jan. 1966, Omupanda (= Nompaca R.); [141] c/2, 13 Jan. 1966, Omupanda (= Nompaca R.); [311] c/3, 22 Apr. 1968, Omupanda (= Nompaca R.); [309] c/2, 5 Apr. 1968, Lubango, 16 km north; [481] c/4, 18 May 1970, Chiange; [583] c/2, 22 May 1974, Lagoa Iventala. First breeding records for Angola (Dean 2000).

Violet-eared Waxbill *Uraeginthus granatinus*

[581] c/3, 7 May 1974, Cahama. First breeding record for Angola (Dean 2000).

Angolan Waxbill *Coccyzygia bocagei*

[15149] 4y, 23 Feb. 1966, Tundavala; [273] c/3, 22 Mar. 1967, Fazenda Bruco. First breeding record for Angola (Dean 2000).

Orange-breasted Waxbill *Amandava subflava*

[3] c/5, 10 Jun. 1963, Lubango; [20] c/4, 10 Apr. 1965, Omupanda (= Nompaca R.); [222] c/1, 29 Mar. 1966, Omupanda; [221] c/1, 29 Mar. 1966, Omupanda.

Bronze Mannikin *Lonchura cucullata*

[10913] 1y, 6 Apr. 1965, Lubango, 10 km on Tundavala road; [15414] 2y, 21 Feb. 1966, Cristo Rei; [14872] 3e + 2y, 17 Jan. 1966, Cascatada, Tundavala; [21656] 4y, 15 Feb. 1968, Fazenda da Leba.

Motacillidae

Cape Wagtail *Motacilla capensis*

[181] c/1, 22 Nov. 1965, Tchivinguiro. Dean (2000) had no egg records.

Fülleborn's Longclaw *Macronyx fülleborni*

[356] c/1, 17 Oct. 1968, Chipindo; [25812] 1y, 18 Oct. 1968, Chipindo; [413] c/3, 2 Nov. 1969, Nongombe.

African Pipit *Anthus cinnamomeus*

[126] c/3, 8 Dec 1965, Tchivinguiro; [130] c/3, 15 Dec 1965, Tchivinguiro; [117] c/3, 15 Nov. 1965, Tchivinguiro; [120] c/2, 31 Nov. 1965, Lagoa Nuntechite. Dean (2000) had no egg records.

Long-billed Pipit *Anthus similis*

[204] 1e + 2y, 15 Sept. 1968, Muquequete; [337] c/1, 15 Sept. 1968, Muquequete; [24978] 3y, 15 Sept. 1968, Muquequete. Dean (2000) had no egg records.

Buffy Pipit *Anthus vaalensis*

[148] 2y, 22 Aug. 1966, Mucanca; [18370] 1y, 22 Aug. 1966, Mucanca. First breeding record for Angola (Dean 2000).

Fringillidae**Yellow-fronted Canary** *Crithagra mozambica*

[6673] 1y, 11 Mar. 1964, Humpata; [15029] 5y, 9 Feb. 1966, Ponta da Lubango; [154] c/3, 18 Jan. 1966, Omupanda (= Nompaca R.).

Emberizidae**Cinnamon-breasted Bunting** *Emberiza tahapisi*

[407] c/3, 23 May 1969, Gambos (Chilemba). First breeding record for Angola (Dean 2000).

Golden-breasted Bunting *Emberiza flaviventris*

[32545] 2y, 20 Nov. 1970, Tundavala; [501] c/1, 21 Jan. 1971, Nehone.

ACKNOWLEDGEMENTS

Funding for the cataloguing of the ISCED collection was from Ursula Franke, the African Bird Club Conservation Fund, Tony Dowd and Robert Angiers, to whom we are grateful. Professor Brian Huntley assisted with logistical support and organising access to the collection. We thank Yudo Borges and Eduardo and Tanya Traguedo for their help during our visit, and we thank Dr Fernanda Lages, Dr Jose Luis Mateus Alexandre and other staff at ISCED who facilitated our work on the collection.

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APPENDIX I.

Localities, provinces, latitude south and longitude east for places mentioned in the text.

- Acampamento da Caua, Luanda, 09° 20' S; 13° 30' E
Boa Esperança, Luanda. 08° 53' S; 13° 34' E
Bocoio, Benguela. 12° 28' S; 14° 08' E
Bumbo, Namibe. 15° 10' S; 13° 09' E
Cabuta, Cuanza Sul. 09° 50' S; 14° 52' E
Cachingues, Bié. 13° 04' S; 16° 45' E
Cacongo (= Lândana), Cabinda. 05° 13' S; 12° 08' E
Cacungun, Malanje. 09° 25' S; 16° 21' E
Cahama, Cunene. 16° 17' S; 14° 18' E
Caitou, Namibe. 14° 28' S; 13° 05' E
Calai, Cuando Cubango. 17° 54' S; 19° 46' E
Calunda, Namibe. 13° 55' S; 12° 41' E
Cangalongue, Huíla. 15° 16' S; 13° 28' E
Cangandala (village), Malanje. 09° 47' S; 16° 28' E
Cangolo, Huíla. 14° 44' S; 15° 41' E
Canjala (Egito), Benguela. 12° 41' S; 14° 01' E
Capelongo, Huíla. 14° 53' S; 15° 04' E
Carunjamba, Namibe. 13° 57' S; 12° 25' E
Cascata da Huíla (Unguéria), Huíla. 15° 19' S; 13° 32' E
Castanheira de Pêra, Huíla. 14° 49' S; 15° 02' E
Catequero, Cunene. 16° 34' S; 14° 54' E
Chão da Chela, Namibe. 15° 08' S; 13° 14' E
Chibia, Huíla. 15° 12' S; 13° 42' E
Chicala, Bié. 13° 25' S; 16° 11' E
Chicusse, Huíla. 16° 22' S; 14° 27' E
Chipindo (= Tandala), Huíla. 13° 50' S; 15° 47' E
Chitado, Cunene. 17° 19' S; 13° 55' E
Chite, Huíla. 15° 14' S; 13° 41' E
Chitembo, Bié. 13° 32' S; 16° 46' E
Chongoroi, Benguela. 13° 34' S; 13° 57' E
Conda, Cuanza Sul. 11° 07' S; 14° 20' E
Cristo Rei, Huíla. 14° 56' S; 13° 31' E
Cuamato, Cunene. 17° 04' S; 15° 07' E
Cuíto-Cuanavale, Cuando Cubango. 15° 09' S; 19° 10' E
Culamagia, Malanje. 09° 44' S; 16° 48' E
Cutenda, Huíla. 14° 22' S; 15° 05' E
Dolondolo (Capira), Namibe. 13° 49' S; 13° 08' E

Dongue, Huíla. 15° 45' S; 14° 05' E	Mungolo, Huíla. 15° 09' S; 13° 44' E
Dundualundo, Huíla. 15° 12' S; 13° 17' E	Muquequete, Huíla. 14° 52' S; 14° 14' E
Eica, Huíla. 15° 12' S; 13° 42' E	Mussende, Cuanza Sul. 10° 30' S; 16° 02' E
Fazenda Boa Esperança, Bengo. 08° 49' S; 13° 32' E	Nehone, Cunene. 16° 38' S; 16° 02' E
Fazenda Bruco, Huíla. 15° 08' S; 13° 10' E	Nongombe, Huíla. 14° 50' S; 13° 29' E
Fazenda da Cacanda, Namibe. 14° 47' S; 13° 17' E	Omupanda (= Nompaca R.), Cunene. 17° 08' S; 15° 46' E
Fazenda da Leba, Huíla. 15° 05' S; 13° 16' E	Palanca, Huíla. 14° 57' S; 13° 16' E
Fazenda Hissapa, Benguela. 11° 58' S; 14° 04' E	Pedra Grande, Namibe. 15° 01' S; 12° 35' E
Foz do Cunene, Namibe. 17° 23' S; 11° 47' E	Pirangombe, Namibe. 14° 29' S; 13° 03' E
Gambos (Chilemba), Huíla. 15° 45' S; 14° 05' E	Ponta da Lubango, Huíla. 14° 56' S; 13° 34' E
Gogué, Huíla. 13° 50' S; 15° 47' E	Ponte Salazar, Malanje. 09° 53' S; 16° 17' E
Goma, Cuando Cubango. 17° 10' S; 18° 09' E	Quihita, Huíla. 15° 24' S; 13° 58' E
Guengue, Huíla. 13° 57' S; 14° 59' E	Quilemba, Huíla. 14° 46' S; 13° 29' E
Huíla (town), Huíla. 15° 05' S; 13° 33' E	Quilengues, Huíla. 14° 13' S; 14° 11' E
Humbe, Cunene. 16° 40' S; 14° 55' E	Quipeio, Huambo. 12° 26' S; 15° 31' E
Humpata, Huíla. 15° 01' S; 13° 23' E	Quipungo, Huíla. 14° 49' S; 14° 33' E
Iona Posto, Namibe. 16° 54' S; 12° 35' E	Quissongo, Cuanza Sul. 10° 02' S; 15° 05' E
Kuito (= Bié (Bihe) (town), Bié. 12° 23' S; 16° 57' E	Quiteve, Cunene. 16° 02' S; 15° 11' E
Lagoa Iventala, Huíla. 15° 01' S; 13° 23' E	Rio Cuando (= Nova Monção), Huambo. 11° 44' S; 18° 39' E
Lagoa Nuntechite, Huíla. 15° 07' S; 13° 25' E	Rio Cubango, Cuando Cubango. 12° 42' S; 18° 02' E
Leba, Huíla. 15° 04' S; 13° 16' E	Rio da Areia, Huíla. 15° 37' S; 14° 03' E
Lubango, Huíla. 14° 51' S; 13° 37' E	Rio Maubi, Malanje. 09° 47' S; 16° 41' E
Lubango (= Sá da Bandeira), Huíla. 14° 56' S; 13° 34' E	Rio Mutuco, Huíla. 14° 49' S; 13° 23' E
Lubango, 16 km north, Huíla. 14° 51' S; 13° 37' E	Serra da Neve, Namibe. 13° 45' S; 13° 10' E
Mão de Octávio de Matos, Namibe. 15° 46' S; 11° 58' E	Siengo, Bié. 11° 17' S; 17° 36' E
Mar. imbanguengo, Malanje. 08° 11' S; 17° 29' E	Tápua, Huíla. 13° 50' S; 15° 47' E
Matala, Huíla. 14° 43' S; 15° 02' E	Tchiamenha, Huíla. 14° 49' S; 13° 24' E
Melunga, Cunene. 17° 17' S; 16° 25' E	Tchivinguiro, Huíla. 15° 10' S; 13° 18' E
Minilinhonde, Huíla. 15° 01' S; 13° 23' E	Toco, Huíla. 14° 49' S; 13° 47' E
Missão Católica de Sanguve, Huíla. 13° 53' S; 15° 50' E	Tundavala, Huíla. 14° 50' S; 13° 24' E
Missão de Mizenze, Bié. 12° 55' S; 16° 57' E	Uige (town), Uíge. 07° 35' S; 15° 00' E
Missão do Chillesso (= Missão do Andulo), Bié. 11° 35' S; 16° 34' E	Uncondo, Huíla. 16° 03' S; 14° 07' E
Missão do Munhino, Namibe. 14° 54' S; 12° 58' E	Unguéria, Huíla. 15° 19' S; 13° 32' E
Montipa, Namibe. 14° 39' S; 13° 16' E	Viavala, Huíla. 15° 10' S; 13° 18' E
Mt Moco, Huambo. 12° 25' S; 15° 11' E	Vila Arriaga, Namibe. 14° 46' S; 13° 21' E
Mt Soque, Huambo. 12° 22' S; 15° 07' E	Virute, Huíla. 15° 14' S; 13° 19' E
Mucanca, Huíla. 14° 56' S; 13° 34' E	Vite-Vivar, near Cacula, Huíla. 14° 26' S; 14° 03' E
Mucope (= Tchica), Cunene. 16° 38' S; 14° 54' E	Xangongo (= Roçadas), Cunene. 16° 45' S; 14° 59' E

THE REDISCOVERY OF A COLLECTION OF ECHINODERMS, INCLUDING TWO HOLOTYPES – IN THE DURBAN NATURAL SCIENCE MUSEUM, SOUTH AFRICA

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Olbers, J.M., Rowe, F.W.E., Griffiths, C.L. & Samyn, Y. 2013. The rediscovery of a collection of echinoderms, including two holotypes, in the Durban Natural Science Museum, South Africa. *Durban Natural Science Museum Novitates* 36: 11–29. This paper reports on an orphaned collection of echinoderms housed at the Durban Natural Science Museum, South Africa. The collection includes holotypes of the South African endemic ophiuroid *Asteroschema capensis* Mortensen, 1925 [= *Asteromorpha capensis* (Mortensen, 1925)] according to Okanishi *et al.* (2013) and the South African endemic asteroid *Anthenoides marleyi* Mortensen, 1925. The holotype of the asteroid *Hacelia superba* var. *capensis* Mortensen, 1925 has not been found and is considered lost, whilst the holotype of *Anthosticte pacei* Mortensen, 1925 [= *Tethyaster pacei* (Mortensen, 1925)] is reported to be housed in the Zoological Museum Copenhagen, Denmark. The collection includes both wet and dry specimens of extant Asterozoa, Ophiurozoa, Echinozoa and Holothurozoa with Crinozoa being absent. Holothurozoa were excluded from examinations due to lack of locality data. In addition, *Plococidaris verticillata* (de Lamarck, 1816) is a new distribution record for South Africa. This paper gives new accession numbers of the specimens and the only photographic record of this collection.

KEYWORDS: *Anthenoides marleyi*, *Asteroschema capensis*, *Anthosticte pacei*, Echinodermata; echinoderm collection, holotype.

INTRODUCTION

In 2011, the National Research Foundation and the South African National Biodiversity Institute commissioned an audit of the national science and zoological collections to assess the state and sustainability of the natural collections within South Africa (Prof. Michelle Hamer pers. comm.). This process noted that echinoderms were part of the Durban Natural Science Museum (DNSM) collection. Among the specimens, the holotypes of the ophiuroid species *Asteroschema capensis* Mortensen, 1925 and the asteroid species *Anthenoides marleyi* Mortensen, 1925 were found preserved dry and in good condition. Some of the specimens had accession numbers but the catalogue in which these are recorded is unknown and presumed lost (Dr Kirstin Williams, pers. comm.)

The importance of this collection to Mortensen's (1925) paper became immediately apparent, for in it he reported that he had received a small collection of echinoderms from Dr E.C. Chubb, Curator of what was then known as the Durban Museum and Art Gallery. The material included specimens of *Dactylosaster cylindricus* (de Lamarck 1816) and *Ophiactis savignyi* (Müller & Troschel 1842), neither of which can now be found in the DNSM. More importantly, however, Mortensen described three new species, *Asteroschema capensis*, *Anthenoides marleyi* and *Anthosticte pacei* [= *Tethyaster pacei* according to Clark, A.M. &

Clark, A.H. 1954] from this collection. The holotypes of the first two of these species are still located in the DNSM collection but that of *A. pacei* is located in the Zoological Museum, Copenhagen, Denmark (<http://www.zmuc.dk/InverWeb/invertebrater/Hjemmesider/Asterozoa.htm>). Lastly, Mortensen described a variety of the Atlantic starfish *Hacelia superba* (var. *capensis*) from DNSM material.

Although the remaining echinoderm collection at the DNSM is small, a few additions have been made subsequent to Mortensen's work but the labels are not consistent in indicating the collectors. The collection contains specimens of Asterozoa, Ophiurozoa and Echinozoa. No Crinozoa are included in the collection and although Holothurozoa were present, no location data were found and these specimens have therefore been excluded from the following account.

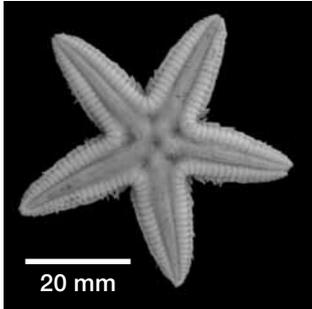
Re-discovered species are listed by class, in generic alphabetical order, under the currently accepted names. The collection number, locality data, origin, measurements, number of specimens and mode of preservation are presented in Appendix 1. Photographs of specimens are also presented (Plates 1–4). The localities referred to for all specimens in this study are shown in Figure 1.

SYSTEMATIC LIST

Phylum ECHINODERMATA Bruguiere, 1791 (Ex Klein, 1734)

Class ASTEROIDEA de Blainville, 1830.

Five species were recovered.



Order PAXILLOSIDA Perrier, 1884
Family ASTROPECTINIDAE Gray, 1840
Genus *Astropecten* Gray, 1840
Astropecten inermis (de Loriol, 1899)

Plate 1A

Astropecten inermis: de Loriol 1899: 14–16, pl. II, fig. 2a–g; Jangoux 1985: 23; Clark 1989: 260.

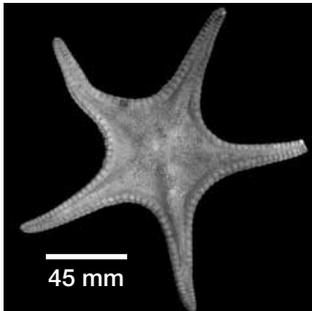
Astropecten cingulatus: Sladen 1833: 266, 267.

Astropecten antares: Döderlein 1926: 6; Clark & Rowe 1971: 30–31 (distribution table), 40 (note 1), 46 (key); Clark & Courtman-Stock 1976: 23 (distribution table), 32 (key), 48 (text); Clark 1989: 251.

Material: One specimen (DNSM ECH15), Durban.

Distribution: Cape of Good Hope to Mozambique; depth range 6–64 m (Clark & Rowe 1971; Clark 1989).

Remarks: Clark (1989: 251–252; 260) supports Jangoux's (1985) resurrection of the species *Astropecten inermis*, (an Indian Ocean species), from its synonymy with the Atlantic species *A. cingulatus*, and the synonymy of *A. antares* with *A. inermis*. However, Clark (1989) believed a case could be put to the International Commission on Zoological Nomenclature for the suppression of *A. inermis* in favour of *A. antares*, the former species having been included in the synonymy of *cingulatus* since Döderlein (1917), so placed it thus raises the status of *antares* as used in Clark & Rowe (1971). The original label indicates that the specimen was collected from the 'coast off Durban' by 'A. Wright'.



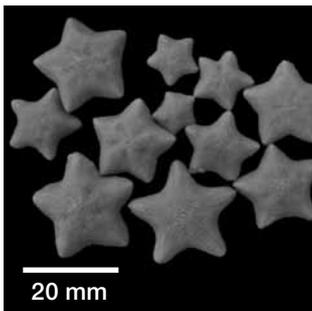
Order VALVATIDA Perrier, 1884
Family GONIASTERIDAE Forbes, 1841
Genus *Anthenoides* Perrier, 1881
Anthenoides marleyi (Mortensen, 1925)

Plate 1B

Anthenoides marleyi: Mortensen 1925: 149–151, pl. 8, figs 2–4; Mortensen 1933: 15 (distribution table), 245 (text); Clark & Courtman-Stock 1976: 25 (distribution table), 36 (fig. 59), 37 (key), 60 (text); Clark 1993: 242.

Material: Holotype (DNSM ECH 28); off Umvoti River mouth, KwaZulu-Natal, 35–40 fathoms (64–73 m).

Distribution: KwaZulu-Natal, Zanzibar Channel; depth range 183–274 m (Clark 1993).



Family ASTERINIDAE Gray, 1840
Genus *Parvulastra* O'Loughlin & Waters, 2004
Parvulastra exigua (de Lamarck, 1816)

Plate 1C

Asterias exigua: de Lamarck 1816: 554.

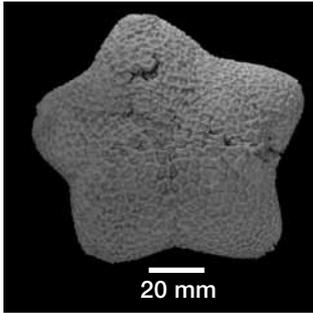
Patriella exigua: Clark & Courtman-Stock 1976: 27 (distribution table), 40 (key), 81 (text); Clark & Downey 1992: 192, figs 31h, 32l, pl. 40E, F; Clark 1993: 225.

Parvulastra exigua: O'Loughlin & Waters 2004: 27, figs 1 (clade V), 2l, 11b, 16a–d; Branch *et al.* 2010: 224, pl. 100.5.

Material: Six specimens (DNSM ECH16), Mntafufu River mouth; 11 specimens (DNSM ECH17), Ballito; five specimens (DNSM ECH18), Park Rynie.

Distribution: South Africa, from Mozambique west to Namibia; St Helena, Amsterdam and St Paul islands, South Indian Ocean and southern Australia; depth range 0–10 m (Clark 1993).

Remarks: De Lamarck (1816) described this species from specimens from '*Les mers d'Amerique*'. Since then much confusion and debate has taken place regarding the taxonomy of this species and in order to stabilise the taxonomy, and in the absence of name-bearing type specimens, Dartnall (1971) selected a neotype from False Bay, South Africa. In a wide-ranging morphological and molecular study of the family Asterinidae, O'Loughlin & Waters (2004) described several new genera, including *Parvulaster* O'Loughlin in O'Loughlin & Waters (2004), in which they designated *P. exigua* as the type species. The original label indicates that the specimens DNSM ECH 16 and DNSM ECH 17 were collected by W.J. Lawson and DNSM ECH 18 was collected on 15 April 1914 by H.W. Bell-Marley.



Family PTERASTERIDAE Perrier, 1875

Genus *Pteraster* Müller & Troschel, 1842

Pteraster capensis Gray, 1847

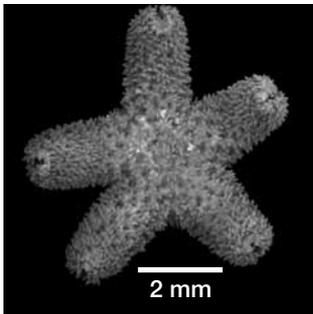
Plate 1D

Pteraster capensis: Gray 1847: 83; Clark & Courtman-Stock 1976: 28 (distribution table), 38 (key), 84–85 (text); Clark & Downey 1992: 327, pl. 79I, J; Clark 1996: 207; Branch *et al.* 2010: 224, pl. 100.3.

Material: One specimen (DNSM ECH14), off Durban.

Distribution: Luderitz Bay, Namibia to Durban, KwaZulu-Natal; depth range 34–370 m (Clark 1996).

Remarks: Specimen is well preserved but with signs of deterioration. The original label indicates that the specimen DNSM ECH 14 was collected by the trawler John Meikle, by A. Wright.



Order SPINULOSIDA Perrier, 1884

Family ECHINASTERIDAE Verrill, 1870

Genus *Henricia* Gray, 1840

Henricia ornata (Perrier, 1869)

Plate 1E

Echinaster (Cribella) ornatus: Perrier 1869: 59.

Henricia ornata: Clark & Courtman-Stock 1976: 28 (distribution table), 42 (key), 89–90 (text); Clark & Downey 1992: 394, fig. 60U, pl. 95D, E; Clark 1996: 237; Branch *et al.* 2010: 226, pl. 101.4.

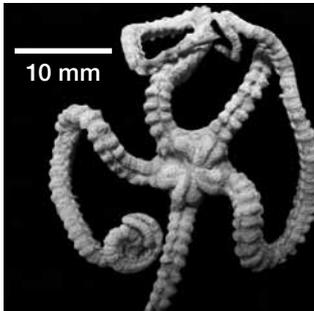
Material: One specimen (DNSM ECH22), Cape Town.

Distribution: Luderitz Bay to East London; depth range 0–90 m (Clark 1996).

Remarks: Specimen is in good condition. The original label indicates the specimen DNSM ECH 22 was collected in 1964.

Class OPHIUROIDEA Gray, 1840

A total of 38 specimens, representing 10 species from six families, was found in the collection. All specimens are preserved in ethanol, except two labeled *Asteroschema capensis* Mortensen, 1925 [= *Asteromorpha capensis* (Mortensen, 1925)] and *Ophiarachnella capensis* (Bell, 1888).



Order EURYALIDA de Lamarck, 1816
Family EURYALIDAE Gray, 1840
Genus *Asteroschema* Oerstedt & Lütken, 1856
Asteroschema capensis (Mortensen 1925)

Plate 1F

Asteroschema capensis: Mortensen 1925: 152–154, pl. VIII (figs 4 & 5), fig. 5; 1933: 221, 227;

Asteroschema capensis: Clark & Courtman-Stock 1976: 100 (distribution table), 108 (key), 130 (text), fig. 95; Sink *et al.* 2006: 469–470.

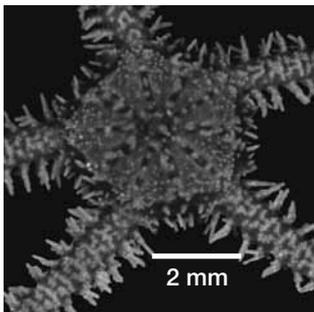
Asteroschema capense: Okanishi & Fujita 2009: 116, 119, 123, 125; 2011:149.

Asteromorpha capensis: Okanishi *et al.* 2013: 462–467, figs 2–5.

Material: Holotype, (DNSM ECH 1), off Umvoti River mouth, KwaZulu-Natal, 35–40 fathoms (64–73 m).

Distribution: South Africa; depth range 110–132 m (Clark & Courtman-Stock 1976).

Remarks: Specimen in good condition. Clark & Courtman-Stock (1976) recorded that the specimen had no depth information; however the label on the specimen gives the depth as 35–40 fathoms.



Order OPHIURIDA Müller & Troschel, 1840
Family OPHIOTRICHIDAE Ljungman, 1867
Genus *Ophiothela* Verrill, 1867
Ophiothela venusta (de Loriol, 1900)

Plate 2A

Ophiocnemis venusta: de Loriol 1900: 81, pl. 8, figs 2, 3.

Ophiothela venusta: Clark & Rowe 1971: 84–84 (distribution), 117 (key), pl.14, fig. 16; Cherbonnier & Guille 1978: 160–164, fig. 62; Lane *et al.* 2000: 481.

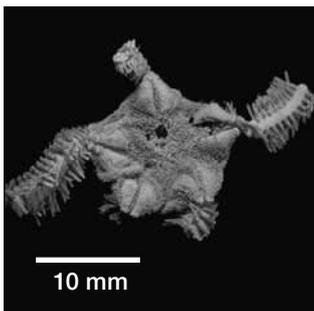
Ophiopsammium nudum: Clark 1923: 341.

Ophiothela nuda: Clark 1974: 469; Clark & Courtman-Stock 1976: 101 (distribution table), 114 (key), 141 (text), fig. 120.

Material: 23 specimens (DNSM ECH 23A), north of Durban.

Distribution: Western Indian Ocean to N.W. Australia and South China Sea; depth range 0–80 m (Clark & Rowe 1971; Clark & Courtman-Stock 1976; Rowe & Gates 1995; Lane *et al.* 2000).

Remarks: Most of these specimens are in fair condition.



Genus *Ophiothrix* Müller & Troschel, 1840
Ophiothrix (Acanthophiothrix) proteus Koehler, 1905

Plate 2B

Ophiothrix proteus: Koehler 1905: 100; Koehler 1922: 260–261, pl. 36, fig. 3, 4, pl. 101, fig. 3.

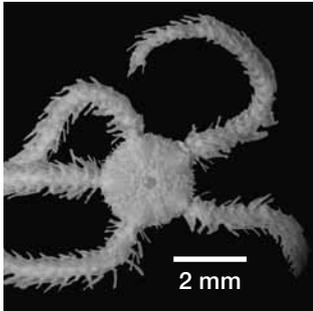
Ophiothrix (Acanthophiothrix) proteus: Clark A.M. 1966: 648; Clark & Rowe 1971: 84, 85 (distribution table), 111 (key), pl.15, fig. 5;

Clark 1974: 465, fig. 11a & b; Clark & Courtman-Stock 1976: 101 (distribution table), 112 (key), 142 (text), fig. 110; Cherbonier & Guille 1978: 147–148; pl. VI, fig. 3,4; Liao & Clark 1995: 240; Rowe & Gates 1995: 424; Lane *et al.* 2000: 481.

Material: One specimen (DNSM ECH 27), Dar es Salaam, Tanzania.

Distribution: Red Sea, western Indian Ocean to Great Barrier Reef, north to Philippines and South China Sea to Marshall Islands and New Caledonia; depth range 0–125 m (Clark & Rowe 1971; Guille & Vadon 1986; Rowe & Gates 1995; Lane *et al.* 2000).

Remarks: This specimen is in bad condition and missing whole arms. The original label indicates the specimen DNSM ECH 27 was collected between 28 & 31 January 1963, the depth on the label was not legible.

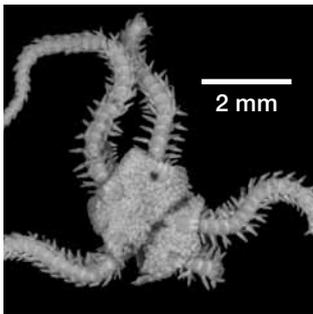


Ophiothrix sp. juv.

Plate 2C

Material: One specimen (DNSM ECH 23C), north of Durban.

Remarks: In fair condition, numerous spines missing.



Family AMPHIURIDAE Ljungman, 1867
Genus *Amphioplus* (*Lymanella*) A.M. Clark, 1970
Amphioplus (*Lymanella*) cf. *integer* (Ljungman, 1867)

Plate 2D

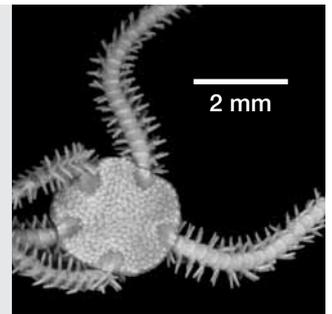


Plate 2E

Amphipholis integra: Ljungman 1867: 313.

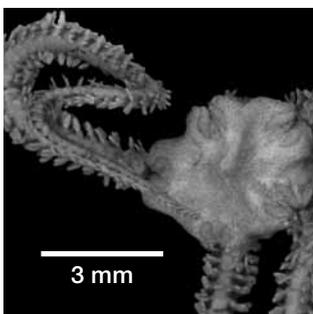
Amphioplus integer: H.L. Clark 1923: 330–331; Mortensen 1933: 368–370, figs 73, 74;

Amphioplus (*Lymanella*) *integer*: Clark & Rowe 1971: 80, 81 (distribution table), 102–103 (key); A.M. Clark 1974: 453–455; Clark & Courtman-Stock 1976: 102 (distribution table), 117 (key), 149 (text), figs 123, 137, 150; Sloan *et al.* 1979: 101; Rowe & Richmond 2011: 326.

Material: Two specimens (DNSM ECH 23D and 23E); north of Durban.

Distribution: Western Indian Ocean including the Red Sea (Clark & Rowe 1971; Clark and Courtman-Stock 1976; Sloan *et al.* 1979); depth range 0–62 m (Clark & Courtman-Stock 1976)

Remarks: DNSM 23E is not in good condition, disc broken and is identified as this species with reservation.



Genus *Amphiura* (*Amphiura*) Forbes, 1843
Amphiura (*Amphiura*) cf. *capensis* Ljungman, 1867

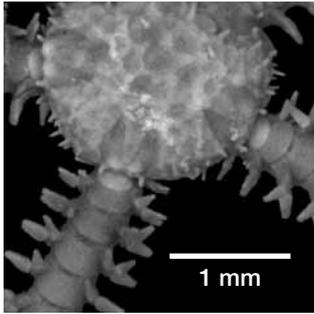
Plate 2F

Amphiura (*Amphiura*) *capensis*: Ljungman 1867: 320; Clark 1923: 327; Mortensen 1933: 348–350; Clark 1974: 445–447; Clark & Courtman-Stock 1976: 103 (distribution table), 117 (key), 155 (text), fig. 143; Branch *et al.* 2010: 232, pl. 104.3.

Material: 3 specimens (DNSM ECH 19; DNSM ECH 20; DNSM ECH 21A), Cape Town.

Distribution: South Africa, Durban to Maputo, depth range 0–180 m (Clark & Courtman-Stock 1976).

Remarks: DNSM ECH 19 & DNSM ECH 20 are damaged and is identified as this species with reservation. The original label indicates that the specimens DNSM ECH 19, DNSM ECH 20 and DNSM ECH 21A were collected in 1964.



Family OPHIACTIDAE Matsumoto, 1915

Genus *Ophiactis* Lütken, 1856

Ophiactis carnea Ljungman, 1867

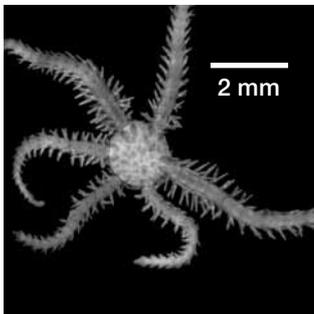
Plate 3A

Ophiactis carnea: Ljungman 1867: 324-325; Clark 1923: 332-333, pl. 20, figs 3,4; Mortensen 1933: 342-345, figs 54-56; Clark 1952: 199 (table); Clark & Courtman-Stock 1976: 104 (distribution table), 119 (key), 161-162 (text), figs 159, 166; Branch *et al.* 2010: 232, pl. 104.6.

Material: One specimen (DNSM ECH 21B), Cape Town; two specimens (DNSM ECH 24), North of Durban; one specimen (DNSM ECH 25), 18 miles East off Tugela River mouth.

Distribution: South Africa, Cape Town to Maputo (Clark & Courtman-Stock 1976) western Indian Ocean, (Clark & Rowe, 1971), depth range 0–220 m (Clark & Courtman-Stock 1976).

Remarks: These specimens are in fair condition, although some arms are missing. The original label indicates that the specimen DNSM ECH 21B was collected in 1964 while DNSM ECH 25 was collected in May 1921 by the trawler John Meikle.



Ophiactis plana Lyman, 1869

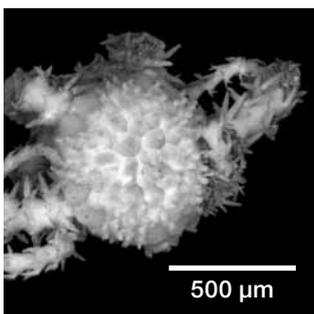
Plate 3B

Ophiactis plana Lyman 1869: 311 (table), 330–331; Clark 1923: 333; Mortensen 1933: 345–346, fig. 57, A.M. Clark 1974: 464–465; Clark & Courtman-Stock 1976: 104 (distribution table), 119 (key), 163–164 (text), figs 157, 164.

Material: One specimen (DNSM ECH 23B), north of Durban.

Distribution: South Africa, Cape Town to Maputo and the Gulf of Mexico, depth range 0–238 m (Clark & Courtman-Stock 1976).

Remarks: Type locality is the Florida Strait, depth 200 m. The original label indicates that the specimen DNSM ECH 23B was collected by W.J. Lawson and M.J. Woods in 1964.



Family OPHIACANTHIDAE Ljungman, 1867

Genus *Ophiomitrella* Verrill, 1899

Ophiomitrella cf. hamata Mortensen, 1933

Plate 3C

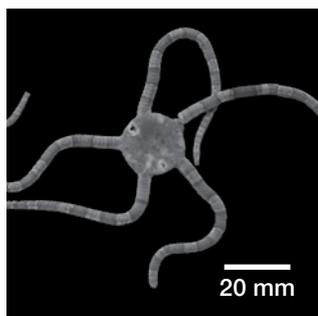
Ophiomitrella hamata: Mortensen 1933: 333–335, figs 50, 51, pl. 19, fig. 12; Clark & Courtman-Stock 1976: 105 (distribution table), 121 (key), 170 (text), fig. 178.

Material: One specimen (DNSM ECH 26), Waterfall Bluff, Eastern Cape, 35–50 fathoms (64–91 m).

Distribution: South Africa, off Durban, 412 m (Clark & Courtman-Stock 1976).

Remarks: The single specimen is attached to a gorgonian. It shows one, perhaps two, disc spines on each disc scale; radial shields are well in contact as opposed to just touching. Due to the morphology, it is with hesitation that we identify our specimen as *O. hamata* without more comparative material at hand.

The original label indicates that the specimen DNSM ECH 26 was collected by Captain Page in April 1921.



Family OPHIODERMATIDAE Ljungman, 1867

Genus *Ophiarachnella* Ljungman, 1872

Ophiarachnella capensis (Bell, 1888)

Plate 3D

Pectinura capensis: Bell 1888: 282, pl. 16, figs 3, 4.

Ophiarachnella capensis: Clark 1923: 351 (text); Mortensen 1933: 380–381, fig. 82; Clark & Courtman-Stock 1976: 106 (distribution table), 124 (key), 182–183 (text), fig. 205; Branch *et al.* 2010: 230, pl.103.2.

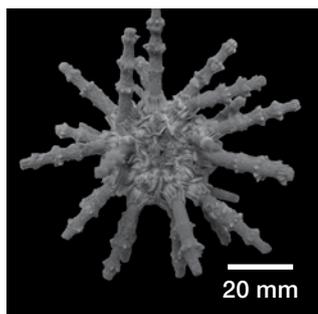
Material: One specimen, (DNSM ECH 3), Mbotyi, Eastern Cape.

Distribution: South Africa, Cape Town to Durban; Vema Seamount; depth range 0–91 m (Clark & Courtman-Stock 1976).

Remarks: This specimen is in fair condition, the ventral side is well preserved while the dorsal side shows evidence of deterioration.

Class ECHINOIDEA Leske, 1778

A total of eight species (17 specimens) representing eight families were found in the collection. Three species (*Echinodiscus bisperforatus*, *Plococidaris verticillata*, *Clypeaster eurychorius*) are preserved dry and in good condition. The remaining echinoids are in fair–good condition and preserved in ethanol.



Order CIDAROIDA Claus, 1880

Family CIDARIDAE Gray, 1825

Genus *Plococidaris* Mortensen, 1909

Plococidaris verticillata (de Lamarck, 1816)

Plate 3E

Cidaris verticillata: de Lamarck 1816: 531(10th ed);

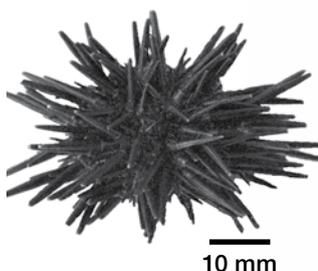
Plococidaris verticillata: Mortensen 1928: 428–433, figs 131–133, pl. 51, figs 3–7, pl. 74, fig. 5, pl. 83, figs 19–21.

Prionocidaris verticillata: Clark 1946: 287; Clark & Rowe 1971: 140–141 (distribution table), 151 (key), fig. 61; Rowe & Gates 1995: 199; Samyn 2003: 200–201, fig. 2E, E'; Lane *et al.* 2000: 484; Rowe & Richmond 2011: 304, 305.

Material: One specimen (DNSM ECH 4), Durban Harbour.

Distribution: Indo-west Pacific; depth range 0–54 m (Clark & Rowe 1971; Rowe & Gates 1995; Lane *et al.* 2000; Rowe & Richmond 2011).

Remarks: This is a new record for this widespread species, extending its distribution south along the east African coast from Kenya (Samyn 2003). Both Clark (1946) and Hoggett & Rowe (1986) synonymized *Plococidaris* with *Prionocidaris* despite the different spine morphology (Kroh, 2013).



Order STOMOPNEUSTOIDA Kroh & Smith, 2010

Family STOMOPNEUSTIDAE Mortensen, 1903

Genus *Stomopneustes* L. Agassiz, 1841

Stomopneustes variolaris (de Lamarck, 1816)

Plate 3F

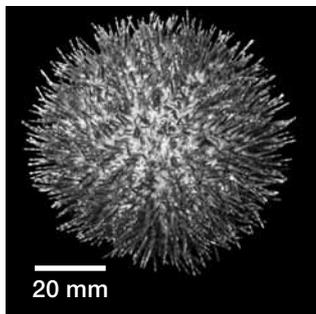
Echinus variolaris: de Lamarck 1816: 525 (10th ed).

Stomopneustes variolaris: Clark 1923: 378; Mortensen 1935: 507–512, figs 301, 302, pl. 71, figs 3–5, pl. 72, figs 1–2; Clark & Rowe 1971: 140–141 (distribution table), 153 (key), fig. 65a; Rowe & Gates 1995: 246; Samyn 2003: 208, fig. 4A; Clark & Courtman-Stock 1976: 228 (text), 201 (distribution table), 209 (key), fig. 240; Lane *et al.* 2000: 484; Branch *et al.* 2010: 234, pl. 105.3; Rowe & Richmond 2011: 306, 307.

Material: Two specimens (DNSM ECH 9), Bhanga Nek, South Africa.

Distribution: South Africa, Durban to Maputo and across the tropical Indo-west Pacific (except Hawaii); depth range 0–30 m (Clark & Rowe 1971; Clark & Courtman-Stock 1976; Samyn 2003; Lane *et al.* 2000; Branch *et al.* 2010; Rowe & Richmond 2011).

Remarks: This specimen is not very well preserved. The original label indicates that the specimen DNSM ECH 9 was collected in December 1964.



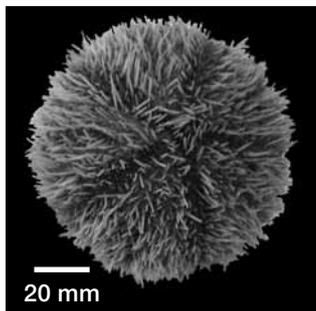
Order CAMARODONTA Jackson, 1912
Family TEMNOPLEURIDAE A. Agassiz, 1872
Genus *Salmacis* L. Agassiz, 1841
Salmacis bicolor L. Agazziz [in] Agassiz L. & Desor, 1846

Plate 4A

Salmacis bicolor: L. Agassiz [in] Agazziz L. & Desor 1846: 359, pl. 15, fig. 4; Clark 1923: 382; Clark 1924: 5; Mortensen 1943a: 112–117, figs 67a, 68a, pl.4, figs 1–8, pl. 5, figs 1–3, 10–12, pl. 6, figs 1–8, pl. 46, figs 1, 13, 16, 19, 20; Clark 1952: 201; Clark & Rowe 1971: 140–141 (distribution), 156 (key); Clark & Courtman-Stock 1976: 202 (distribution), 209 (key), 232 (text); Samyn 2003: 209, fig. 4C; Lane *et al.* 2000: 485; Branch *et al.* 2010: 234, pl. 105.4; Rowe & Richmond 2011: 306, 307.

Material: One specimen (DNSM ECH 11), Durban, South Africa.

Salmacis bicolor: L. Agassiz [in] Agazziz L. & Desor 1846: 359, pl. 15, fig. 4; Clark 1923: 382; Clark 1924: 5; Mortensen 1943a: 112–117, figs 67a, 68a, pl.4, figs 1–8, pl. 5, figs 1–3, 10–12, pl. 6, figs 1–8, pl. 46, figs 1, 13, 16, 19, 20; Clark 1952: 201; Clark & Rowe 1971: 140–141 (distribution), 156 (key); Clark & Courtman-Stock 1976: 202 (distribution), 209 (key), 232 (text); Samyn 2003: 209, fig. 4C; Lane *et al.* 2000: 485; Branch *et al.* 2010: 234, pl. 105.4; Rowe & Richmond 2011: 306, 307.



Family TOXOPNEUSTIDAE Troschel, 1872
Genus *Tripneustes* Linnaeus, 1758
Tripneustes gratilla (Linnaeus 1758)

Plate 4B

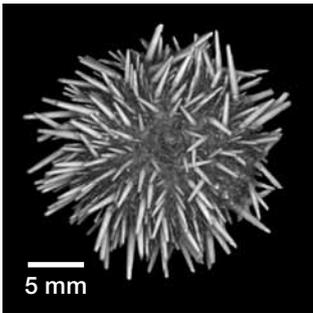
Echinus gratilla: Linnaeus 1758: 664.

Tripneustes gratilla: Clark 1923: 387; 1946: 326; Mortensen 1943a: 500–508, figs 306, 307, pl.33, figs 1–3, pl. 34, figs 2–6, pl. 35, fig. 3–4, pl. 37, fig. 1–2, 4–10; pl. 38, figs 1–4; Clark & Rowe 1971: 141–142 (distribution), 156 (key), fig. 65b; Clark & Courtman-Stock 1976: 234 (text), 202 (distribution table), 211 (key), fig. 256; Rowe & Gates 1995: 259; Samyn 2003: 210–211, fig. 4G; Lane *et al.* 2000: 485; Branch *et al.* 2010: 234, pl. 105.5; Rowe & Richmond 2011: 308, 309.

Material: Two specimens (DNSM ECH 7), Durban, South Africa; two specimens (DNSM ECH 8); Durban, South Africa and one specimen (DNSM ECH 13), Port Sudan, Sudan.

Distribution: South Africa, Port Elizabeth to Maputo, and throughout the tropical Indo-west Pacific; depth range 0–15 m (Clark & Rowe 1971; Clark & Courtman-Stock 1976; Rowe & Gates 1995; Lane *et al.* 2000).

Remarks: These specimens are preserved wet. The original label indicates that the specimen DNSM ECH 13 was collected in January 1958.



Family PARECHINIDAE Mortensen, 1903
Genus *Parechinus* Mortensen, 1903
Parechinus angulosus (Leske, 1778)

Plate 4C

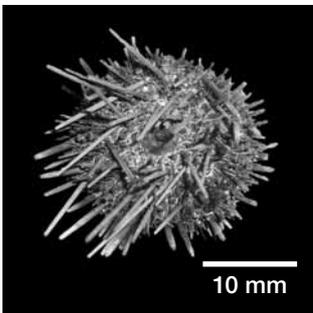
Cidaris angulosa var. *minor*: Leske 1778: 30, pl. 3, figs A, B.

Parechinus angulosus: Clark 1923: 385–386; Mortensen 1943b: 148–156, figs 64–68, pl. 18, figs 8–19, 22, pl. 58, figs 20, 21, 26–32; Clark 1952: 201; Clark & Courtman-Stock 1976: 202 (distribution table), 211 (key), 237–238 (text), figs 259; Branch *et al.* 2010: 234, pl. 105.6.

Material: Five specimens (DNSM ECH 12), Cape Town, South Africa.

Distribution: South Africa, Luderitz Bay to Durban; depth range 0–98 m (Clark & Courtman-Stock 1976).

Remarks: The specimens are a variety of colours with sizes ranging from 3–9 mm in horizontal diameter. This species is endemic to South Africa. The original label indicates that the specimen DNSM ECH 12 was collected in December 1964.



Family ECHINOMETRIDAE Gray, 1855
Genus *Echinostrephus* A. Agassiz, 1863
Echinostrephus molaris (de Blainville, 1825)

Plate 4D

Echinus molaris: de Blainville 1825: 88.

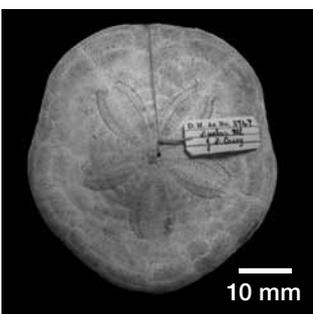
Echinostrephus molare: Clark 1923: 387–388.

Echinostrephus molaris: Mortensen 1943b: 311–316, figs 149, 150a, b, pl. 35, figs 1–10, pl. 58, figs 1, 2, 4, 9; Clark & Rowe 1971: 142–143 (distribution), 157 (key); Clark & Courtman-Stock 1976: 203 (distribution), 211 (key), 239 (text); Rowe & Gates 1995: 212; Lane *et al.* 2000: 486; Samyn 2003: 205–207, fig. 3F; Branch *et al.* 2010; Rowe & Richmond 2011.

Material: One specimen (DNSM ECH 10), Durban Harbour, South Africa.

Distribution: South Africa, Durban and throughout the tropical Indo-west Pacific region; depth range, 0–50 m (Clark & Rowe 1971; Clark & Courtman-Stock 1976; Rowe & Gates 1995; Lane *et al.* 2000; Rowe & Richmond 2011).

Remarks: This specimen is in poor condition.



Order CLYPEASTEROIDA A. Agassiz, 1872
Family CLYPEASTERIDAE L. Agassiz, 1835
Genus *Clypeaster* de Lamarck, 1801
Clypeaster eurychorius H.L. Clark 1924

Plate 4E

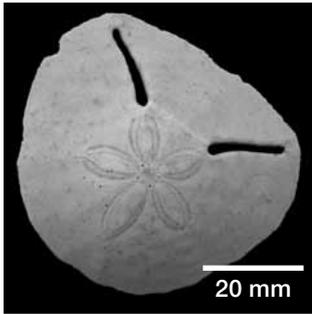
Clypeaster eurychorius: H.L. Clark 1924: 10–11, pl. 3; Mortensen 1948a: 5; Clark & Courtman-Stock 1976: 203 (distribution table), 213 (key), 241 (text), fig. 265.

Clypeaster (Stolonoclypus) eurychorius: Mortensen 1948b: 94–96, figs 54, 55, pl. 30, fig. 2, pl. 31, figs 2, 3, pl. 32, fig. 3, pl. 33, fig. 2.

Material: One specimen (DNSM ECH 5), Durban Harbour.

Distribution: KwaZulu-Natal, South Africa, Tanzania (Clark & Courtman-Stock 1976); depth range 166–384 m (Clark & Courtman-Stock 1976).

Remarks: This specimen is denuded of all spines and comprises only a test. A rare and deep-water species, known only from off Durban, its collection in Durban Harbour suggests it has drifted inshore post-mortem.



Family ASTRICLYPEIDAE Stefanini, 1912

Genus *Echinodiscus* Leske, 1778

Echinodiscus bisperforatus Leske, 1778

Plate 4F

Echinodiscus bisperforatus: Leske 1778: 132; Clark 1923: 394–395; Mortensen 1948b: 406–411, figs 241a, 242a, b, pl. 58, figs 2, 6–8, pl. 71, figs 6–9, 18; Clark 1952: 202; Clark and Courtman-Stock 1976: 203 (distribution table), 211 (key), 243 (text), fig. 264; Clark & Rowe 1971: 144–145 (distribution table), 162 (key), fig. 78; de Ridder 1986: 46–47 (as *E. bisperforatus truncatus*: L. Agassiz, 1841); Branch *et al.* 2010: 236, pl. 106.8; Rowe & Richmond 2011: 310, 311.

Material: Two specimens, DNSM ECH 2, Plettenberg Bay.

Distribution: Red Sea south to Mossel Bay, Cape Province, South Africa, and east to Indo-Malay region and South China Sea: depth range 0–20 m (Clark & Rowe 1971; Clark & Courtman-Stock 1976; de Ridder 1986; Lane *et al.* 2000; Branch *et al.* 2010; Rowe & Richmond 2011: 310, 311).

Remarks: This specimen is in good condition.

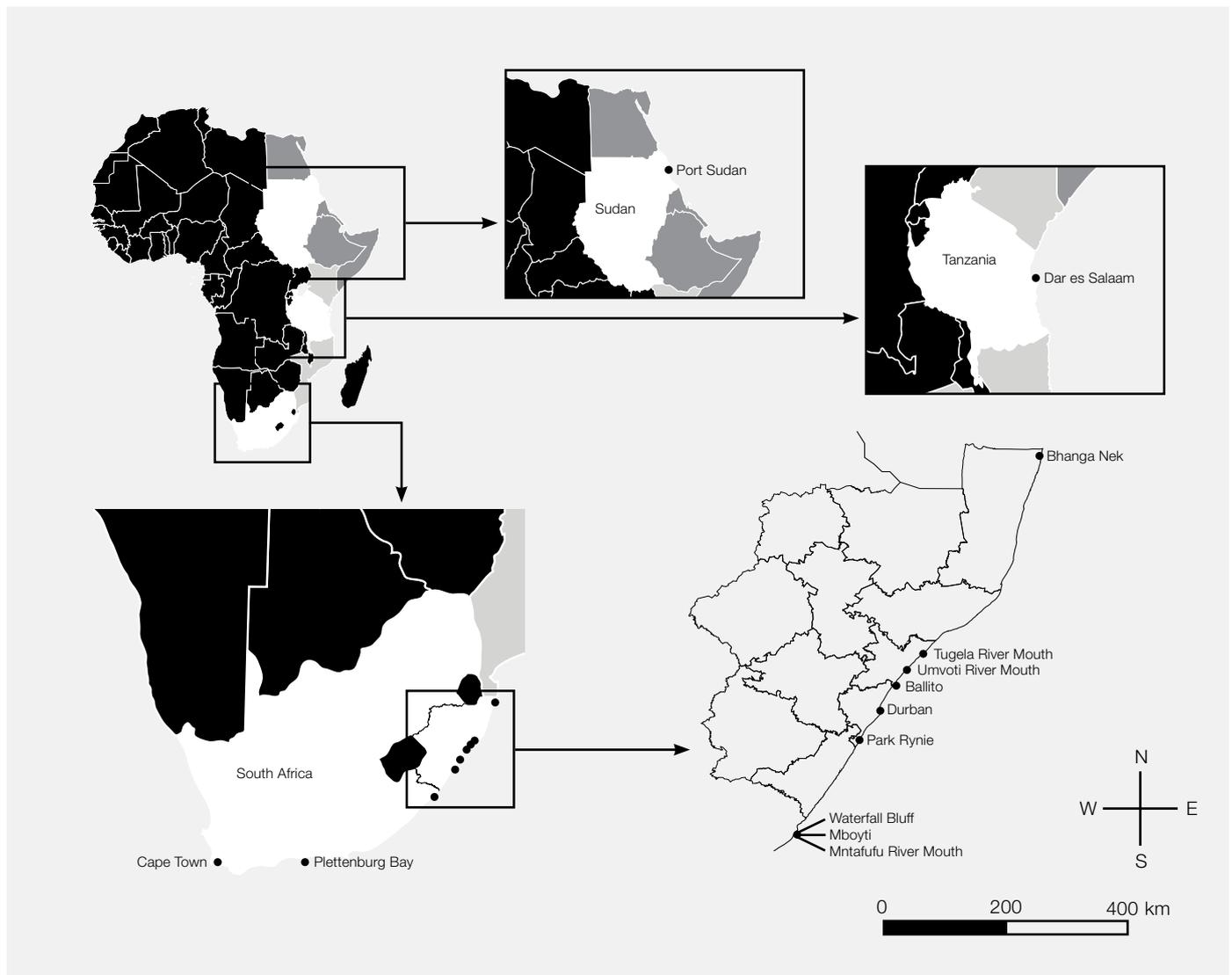
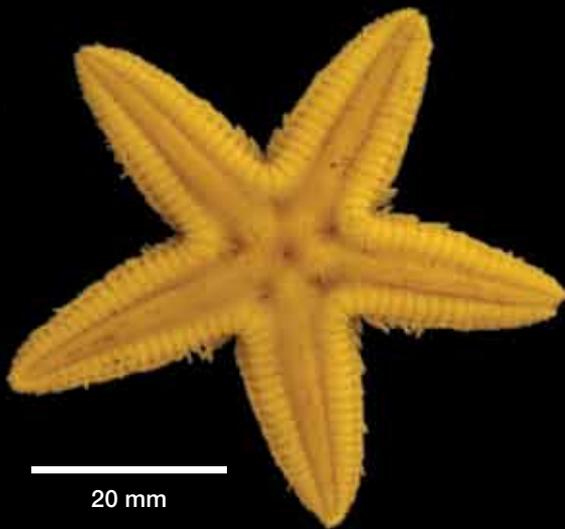


FIG. 1. Localities referred to during this study on the echinoderm collection of the Durban Natural Science Museum, KwaZulu-Natal, South Africa.

Plate 1A: *Astropecten inermis*



20 mm

Plate 1B: *Anthenoides marleyi*



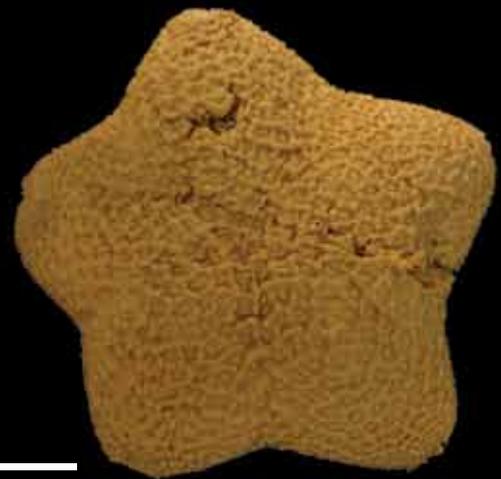
45 mm

Plate 1C: *Parvulastra exigua*



20 mm

Plate 1D: *Pteraster capensis*



20 mm

Plate 1E: *Henricia ornata*



2 mm

Plate 1F: *Asteroschema capensis*



10 mm

Plate 2A: *Ophiothela venusta*

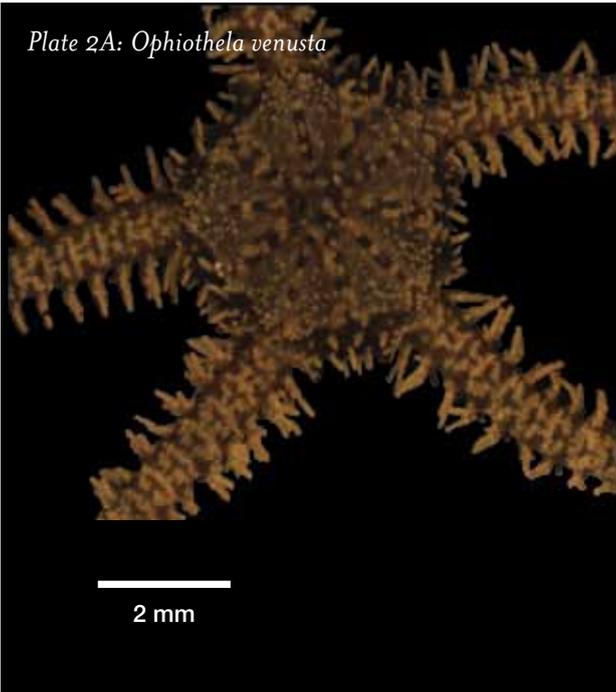


Plate 2B: *Ophiothrix (Acanthophiothrix) proteus*

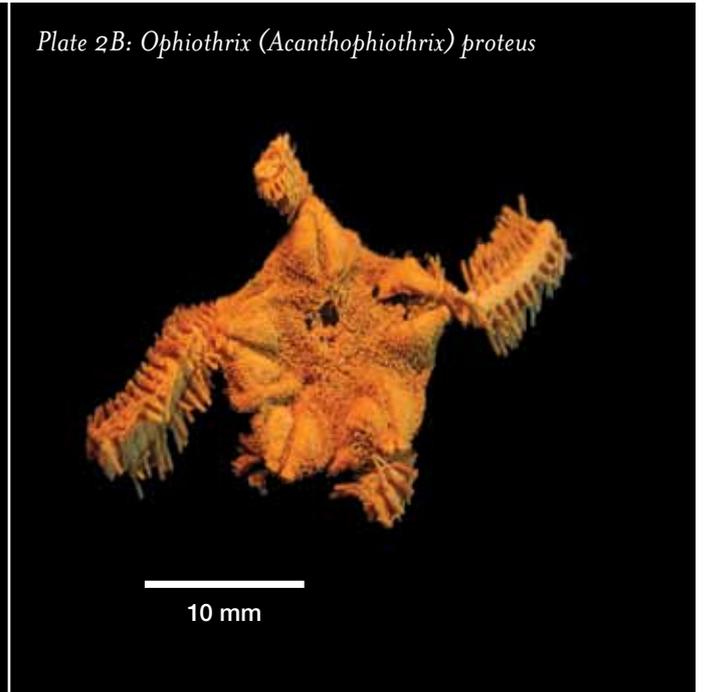


Plate 2C: *Ophiothrix* sp. juv.



Plate 2D: *Amphioplus (Lymanella) cf. integer*



Plate 2E: *Amphioplus (Lymanella) cf. integer*

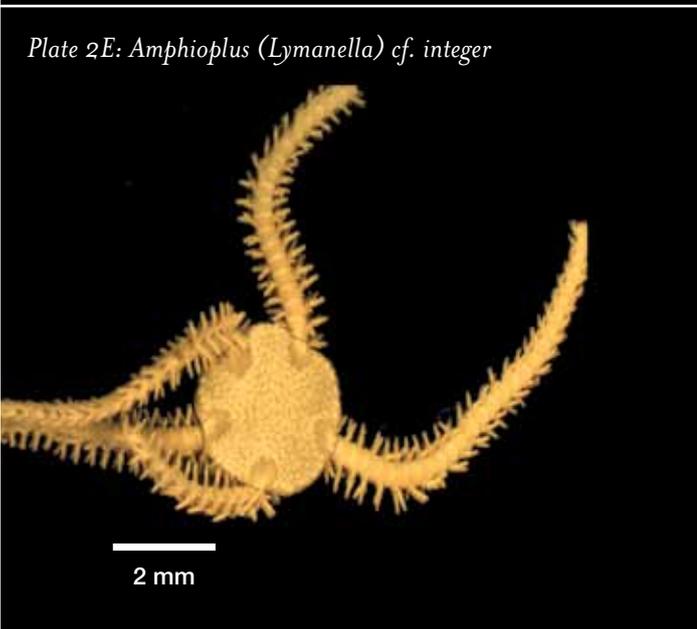
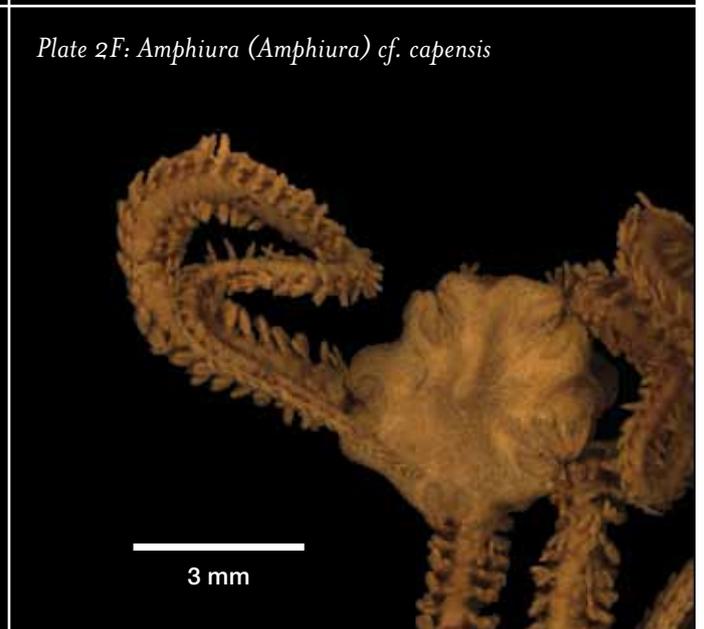


Plate 2F: *Amphiura (Amphiura) cf. capensis*



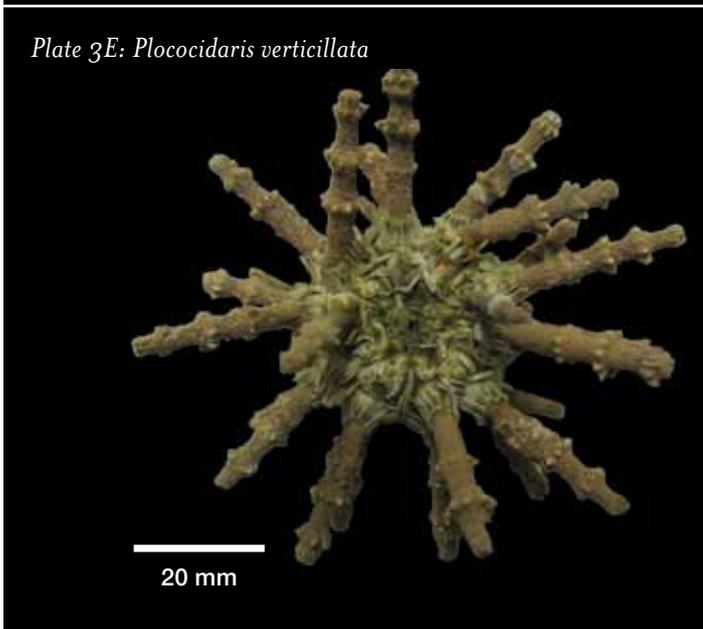
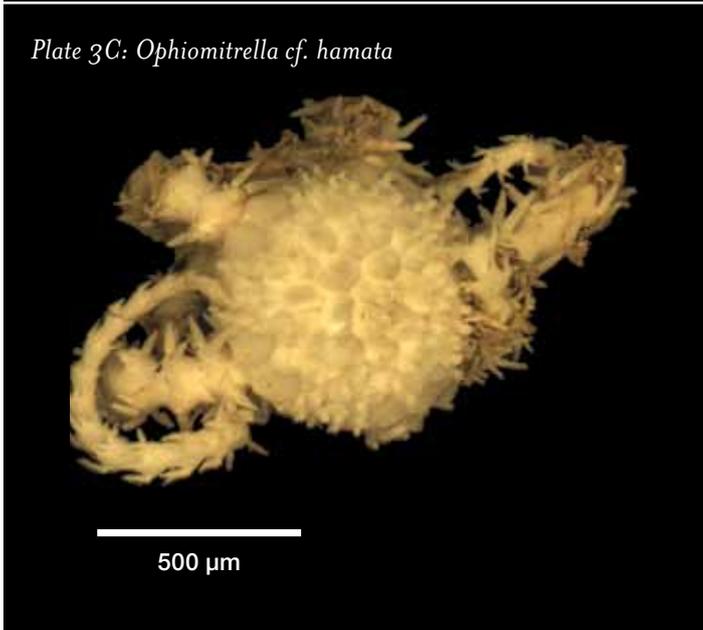
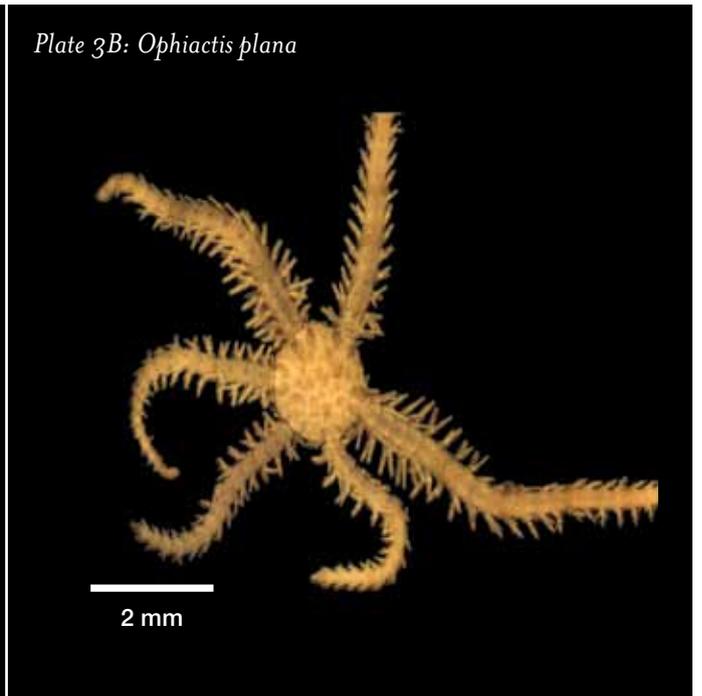
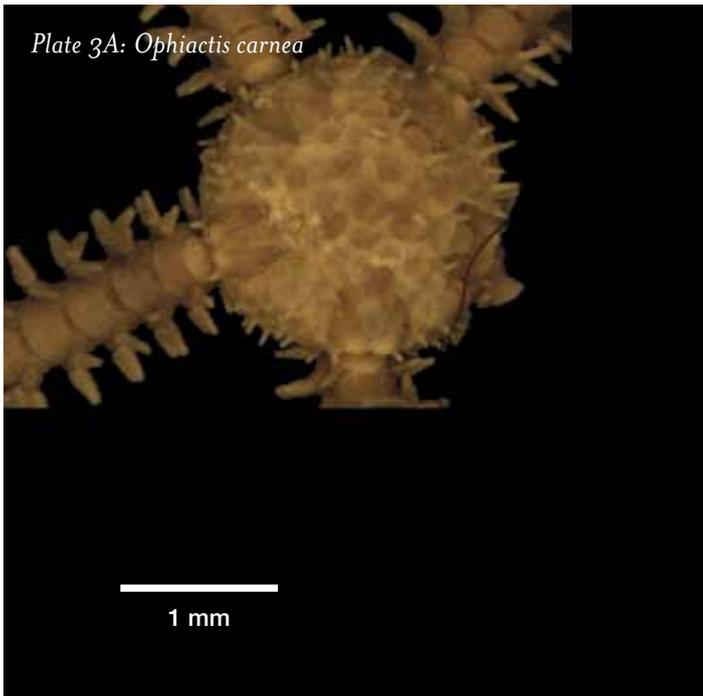
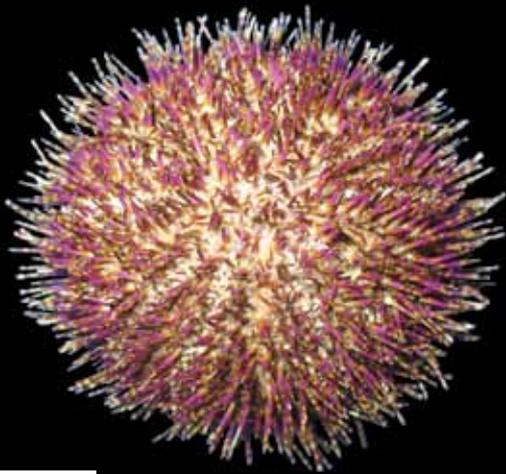
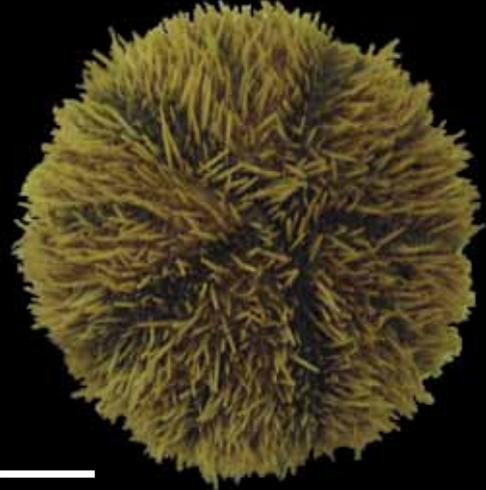


Plate 4A: *Salmacis bicolor*



20 mm

Plate 4B: *Tripneustes gratilla*



20 mm

Plate 4C: *Parechinus angulosus*



5 mm

Plate 4D: *Echinostrephus molaris*



10 mm

Plate 4E: *Clypeaster eurychorius*



10 mm

Plate 4F: *Echinodiscus bisperforatus*



20 mm

DISCUSSION

The echinoderm collection of the DNSM does not appear to have been examined by a specialist since Mortensen (1925). However, additional unidentified specimens have been added. These have been collected on an ad hoc basis by naturalists and members of the public, who presumably wanted to donate their specimens to a museum. *Hacelia superba* (var. *capensis*) described by Mortensen is recorded from DNSM material but the specimen/s were not found. The catalogue in which this collection was recorded could not be located and may be lost. Both wet and dry specimens appear to be in reasonable condition. As a result of this study, the specimens have now been identified, accessioned and a photographic record of all echinoderm specimens housed at DNSM is now available.

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The authors are indebted to Mariana Tomalin for discovering the echinoderm collection that had been lost for almost two decades. Dr Kirstin Williams at DNSM is acknowledged for her assistance in arranging examinations. Dr Didier VandenSpiegel of the Royal Museum for Central Africa in Tervuren (Belgium) is thanked for providing logistical and scientific assistance in the identification of this collection. Financial support for this study was provided through a grant to C.L. Griffiths through the National Research Foundation SEACChange Programme and the Belgian National Focal Point to the Global Taxonomic Initiative. Mark O'Loughlin is thanked for his useful suggestions and comments on the manuscript.

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APPENDIX I.

Summary of the data available for the echinoderm material housed at the Durban Natural Science Museum (DNSM). Measurements used: Asteroidea: major radius (R) and minor radius (r); Ophiuroidea: disc diameter (d.d.); Echinoidea: horizontal diameter (h.d.), vertical diameter (v.d.) and length (l), all expressed in millimetres. The preservation method includes dry and wet (in ethanol). Photographic references refer to plate numbers.

DNSM NUMBER	LOCALITY	SPECIES	MEASUREMENTS (MM)	NO. OF SPECIMENS (PRESERVATION METHOD)	PHOTOGRAPHIC REFERENCE
ASTEROIDEA					
DNSM ECH 15	Durban	<i>Astropecten inermis</i>	R = 27; r = 9	1 (wet)	1A
DNSM ECH 28	Umvoti River Mouth	<i>Anthenoides marleyi</i>	R = 90; r = 33	1 (dry)	1B
DNSM ECH 16	Mntafufu River Mouth	<i>Parvulastra exigua</i>	R = 8–11; r = 6–8	6 (wet)	1C
DNSM ECH 17	Ballito	<i>Parvulastra exigua</i>	R = 5–12; r = 3–8	11 (wet)	1C
DNSM ECH 18	Park Rynie	<i>Parvulastra exigua</i>	R = 9–13; r = 6–9	5 (wet)	1C
DNSM ECH 14	Durban	<i>Pteraster capensis</i>	R = 53; r = 39	1 (wet)	1D
DNSM ECH 22	Cape Town	<i>Henricia ornata</i>	R = 4; r = 1	1 (wet)	1E
OPHIUROIDEA					
DNSM ECH 1	Umvoti River Mouth	<i>Asteroschema capensis</i>	d.d. = 8	1 (dry)	1F
DNSM ECH 23A	North of Durban	<i>Ophiothela venusta</i>	d.d. = 2–6	23 (wet)	2A
DNSM ECH 27	Dar es Salaam, Tanzania	<i>Ophiothrix (Acanthophiothrix) proteus</i>	d.d. = 15	1 (wet)	2B
DNSM ECH 23C	North of Durban	<i>Ophiothrix sp. juv</i>	d.d. = 3	1 (wet)	2C
DNSM ECH 23D	North of Durban	<i>Amphioplus (lymanella) integer</i>	d.d. = 3	1 (wet)	2D
DNSM ECH 23E	North of Durban	<i>Amphioplus (lymanella) integer</i>	d.d. = 3	1 (wet)	2E
DNSM ECH 19	Cape Town	<i>Amphiura capensis</i>	d.d. = 2	1 (wet)	2F
DNSM ECH 20	Cape Town	<i>Amphiura capensis</i>	d.d. = 3	1 (wet)	2F
DNSM ECH 21A	Cape Town	<i>Amphiura capensis</i>	d.d. = 5	1 (wet)	2F
DNSM ECH 21B	Cape Town	<i>Ophiactis carnea</i>	d.d. = 6	1 (wet)	3A
DNSM ECH 24	North of Durban	<i>Ophiactis carnea</i>	d.d. = 1–2	2 (wet)	3A
DNSM ECH 25	Tugela River Mouth	<i>Ophiactis carnea</i>	d.d. = 4	1 (wet)	3A
DNSM ECH 23B	North of Durban	<i>Ophiactis plana</i>	d.d. = 2	1 (wet)	3B
DNSM ECH 26	Waterfall Bluff	<i>Ophiomitrella hamata</i>	d.d. = 5	1 (wet)	3C
DNSM ECH 3	Mbotyi	<i>Ophiarachnella capensis</i>	d.d. = 19	1 (dry)	3D

DNSM NUMBER	LOCALITY	SPECIES	MEASUREMENTS (MM)	NO. OF SPECIMENS (PRESERVATION METHOD)	PHOTOGRAPHIC REFERENCE
OPHIUROIDEA					
DNSM ECH 4	Durban Harbour	<i>Plococidaris verticillata</i>	h.d. = 32; v.d. = 22	1 (dry)	3E
DNSM ECH 9	Bhanga Nek	<i>Stomopneustes variolaris</i>	h.d. = 52–115; v.d. = 15–35	2 (wet)	3F
DNSM ECH 11	Durban	<i>Salmacis bicolor</i>	h.d. = 32; v.d. = 56	1 (wet)	4A
DNSM ECH 7	Durban	<i>Tripneustes gratilla</i>	h.d. = 46–82; v.d. = 23–56	2 (wet)	4B
DNSM ECH 8	Durban	<i>Tripneustes gratilla</i>	h.d. = 64–68; v.d. = 37–38	2 (wet)	4B
DNSM ECH 13	Port Sudan, Sudan	<i>Tripneustes gratilla</i>	h.d. = 41; v.d. = 61	1 (wet)	4B
DNSM ECH 12	Cape Town	<i>Parechinus angulosus</i>	h.d. = 3–9; v.d. = 4–16	5 (wet)	4C
DNSM ECH 10	Bhanga Nek	<i>Echinostrephus molaris</i>	h.d. = 13; v.d. = 19	1 (wet)	4D
DNSM ECH 5	Durban Harbour	<i>Clypeaster eurychorius</i>	l = 95	1 (dry)	4E
DNSM ECH 2	Plettenberg Bay	<i>Echinodiscus bisperforatus</i>	l = 43–52	2 (dry)	4F

STATUS OF EASTERN GREEN TINKERBIRD *VIRIDIBUCCO SIMPLEX* IN SUL DO SAVE, SOUTHERN MOZAMBIQUE, AND NOTES ON SELECTED BIRD SPECIES OF THE SITILA-MASSINGA COASTAL, TROPICAL, SEMI-DECIDUOUS DRY FOREST AND THICKET COMPLEX, INHAMBANE PROVINCE

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Davies, G.B.P. 2013. Status of Eastern Green Tinkerbird *Viridibucco simplex* in Sul do Save, southern Mozambique, and notes on selected bird species of the Sitila–Massinga coastal, tropical, semi-deciduous dry forest and thicket complex, Inhambane Province. *Durban Natural Science Museum Novitates* 36: 30–44. The recent rediscovery of Eastern Green Tinkerbird *Viridibucco simplex* in the southern African zoogeographical region in the Sitila–Massinga district, Inhambane Province, southern Mozambique is described. The habitat of the tinkerbird in the Sitila–Massinga district is a form of coastal, tropical, semi-deciduous dry forest and thicket. This dry forest–thicket formation (here termed the ‘Sitila–Massinga thicket’) is part of the larger, archipelago-like semi-deciduous, tropical, dry, ‘sand’ forest botanical unit distributed along the East African coast. The population of Eastern Green Tinkerbirds in Inhambane Province is probably in the low thousands. Correction is made to erroneous locality co-ordinates for the original Eastern Green Tinkerbird record from Chicomo perpetuated through the recent literature. The overlooked occurrence of Eastern Green Tinkerbird on the Gorongosa Massif, Sofala Province, central Mozambique is highlighted. New distributional information of selected uncommon or noteworthy species in the Sitila–Massinga thicket and dry forest formation is provided.

KEYWORDS: dry forest, Eastern Green Tinkerbird, *Viridibucco simplex*, Mozambique, thicket.

INTRODUCTION

The Eastern Green Tinkerbird *Viridibucco simplex* (Fischer & Reichenow, 1884) is a small, dull-green tinkerbird that has been included in a broadly-defined tinkerbird genus *Pogoniulus* Lafresnaye, 1842 by most recent authorities. The present paper, however, places *simplex*, and its relative *leucomystax*, the Moustached Green Tinkerbird, in the genus *Viridibucco* Oberholser, 1905 because the plumage patterns of these two species differ markedly from other tinkerbirds and there is an indication that they have a unique, hyper-specialised diet (see Discussion at the end).

Until recently, the Eastern Green Tinkerbird has been known from the southern African region only on the basis of a single skin from Chicomo, Funhalouro District, Inhambane Province, Mozambique (Pinto 1959, 1960; Clancey 1971, 1996). During the course of this investigation, a further overlooked locality for the species, the Gorongosa Massif, also came to light, as discussed further below.

This paper documents the recent rediscovery of Eastern Green Tinkerbird in southern Africa and summarises information on selected uncommon or noteworthy species found in the coastal, dry, forest-thicket complex of the Sitila–Massinga district, Inhambane Province Mozambique, by extracting records from the specimen database of the Durban Natural Science Museum, South Africa, and personal observations during two brief field-trips to Gaza and Inhambane provinces, Sul do Save, Mozambique. The term ‘Sul do Save’ refers to Mozambique south of the Save River and comprising the provinces of Maputo, Gaza and Inhambane. This term is employed in preference to ‘southern Mozambique’, which in the ornithological literature, has come to have a vague meaning and is often applied to Mozambique south of the Zambezi River (e.g. Clancey 1996). A brief popular account of the rediscovery of the Eastern Green Tinkerbird in Sul do Save, Mozambique has been written (Davies & Chittenden 2013) but fuller discussion and amplification of certain points is required.

The original Eastern Green Tinkerbird skin from Sul do Save,

was collected for the Museu Dr Álvaro de Castro (Maputo Natural History Museum; museum registration number 6184) near the village of Chicomo on 15 January 1958 by Rui Quadros (1937-2010), whom Pinto (1959: 15) called an “*incansável colector*” (tireless collector). Pinto (1959: 20) justifiably referred to Quadros’s tinkerbird as “*uma notável descoberta*” (a remarkable discovery) because the nearest records at that time were from eastern Malawi, approximately 750 km to the north (Benson 1953: 44).

The Quadros skin is still in existence and remains in adequate condition (photos of the skin forwarded in September 2013 by G. Allport). Clancey (1984: 180) tentatively ascribed the Quadros skin to the subspecies *hylodytes*, otherwise only known from Malawi, which putatively differed from the nominate subspecies (of Tanzania and Kenya) by being larger in size, darker above and more dusky grey-olive below.

In discussing the tinkerbird in his Appendix 1, Parker (1999: 265) introduced an unfortunate locality error. Parker (1999: 265) gave the quarter-degree-grid (15' X 15') square reference for Chicomo as “2434CA”. There is indeed a town called Chicomo in that grid-cell, which lies 40 km south-west of Coguno, a collecting locality made famous by C.H.B. Grant as the type locality of Rudd’s *Apalis ruddi* and Neergaard’s Sunbird *Cinnyris neergaardi*. But this is not the Chicomo that Quadros visited, as is evident from reading Pinto’s (1959, 1960) reports. Clancey (1971, 1996) also referred to the “Funhalouro district”, which is far from Coguno. The pertinent Chicomo village is at 22° 46' 29.55"S; 35° 01' 07.55"E and lies approximately 65 km north-west of the town of Massinga.

In *The Atlas of Southern African Birds*, Spottiswoode (1997) worsened the error by giving Chicomo’s quarter-degree-grid square reference as 2034CA (i.e. a grid-cell north of the Save River in a mixed savanna area); this was clearly a *lapsus calami* for 2434CA. The map for the Eastern Green Tinkerbird in the seventh edition of *Roberts Birds of Southern Africa* (Hockey *et al* 2005: 141) copied the incorrect Chicomo locality from Parker (1999) as well as the false locality reference given by Spottiswoode (1997), but unfortunately did not mark the correct Chicomo. More recently, Dowsett-Lemaire (2010) repeated the erroneous Chicomo grid-reference as “2434C1”.

The *Roberts 7* map also placed a question mark in the Inhaminga district, Sofala Province of central Mozambique. This stemmed from P.A. Clancey’s possible sighting of the tinkerbird “in forest-woodland mosaic near Inhaminga ... in June 1968” (Clancey 1971: 294, 1996: 150). When questioned by H.N. Chittenden (pers. comm.) regarding this sighting in the late 1990s, Clancey said he had only seen “something small and green in the canopy”. Michael P.S. Irwin, who was with Clancey during the June 1968 expedition, has no recollection of Clancey mentioning such a noteworthy record while in the field (Irwin *in litt.*, September 2013) and consequently, given the lack of any adequate supporting information, Clancey’s record should be viewed with circumspection.

Subsequent to Quadros’s skin, no further acceptable records of Eastern Green Tinkerbird from southern Africa came to light. Clancey (1996) summarised its status as “unknown” and Spottiswoode (1997) as “uncertain”, while Parker (1999: xxiii) called it “tantalisingly obscure”.

At the time the popular account (Davies & Chittenden 2013) was written, the present author was unaware of any other reliable records of Eastern Green Tinkerbird for southern Mozambique, aside from Quadros’s skin. However, this overlooked K.L. Tinley’s (1977: table 9.6) unpublished thesis for the Gorongosa area, Sofala Province, in which Eastern Green Tinkerbird was listed as a

frugivore dispersal agent on the Gorongosa Massif. A highly experienced naturalist, K.L. Tinley (*in litt.*, 16 May 2013) confirms that “I frequently saw [Eastern Green Tinkerbird] when I climbed the footpath through the forest once a month [1969-1972] to the highest plateau to collect and record the phenology of the summit grasslands”. This footpath approximately ran from the Murombedzi Waterfall (18° 29' S, 34° 02' E, ca 850 m asl) up to the summit on the south-west side of the massif (with complete altitudinal sequence of wet, closed-canopy forest up to ca 1800 m asl). No other records exist from Gorongosa Massif.

Following the end of the civil war, Parker (1999, 2005a) undertook an ambitious, largely single-handed atlassing project in Mozambique, mostly south of the Zambezi River. Given the vast area he had to cover and severe logistical constraints, his investigation of individual 15' x 15' grid-cells could often be no more than cursory. He did not encounter Eastern Green Tinkerbird during his seven years in southern Mozambique, although he later found the species in Niassa Province, northern Mozambique (Parker 2005b). Thus, by the 2000s, the status of the Eastern Green Tinkerbird south of the Zambezi River remained enigmatic and there was even some speculation that the locality information of the original skin was suspect (e.g. Sinclair *et al.* 2011: 274).

Nuttall (1998), in a popular account of the Olive-headed Weaver *Ploceus olivaceiceps* in the Panda district, Inhambane Province, mentioned Eastern Green Tinkerbird as one of the species he had seen in that area. However, Nuttall cannot recall the details of this sighting and reports that it was mentioned in error (D. Nuttall *in litt.*, June 2012). Furthermore, the habitat in the Panda area is predominantly tall *Brachystegia* woodland and subsistence agricultural plots and it is unlikely the tinkerbird would occur there.

METHOD

Unpublished records were extracted from the Durban Natural Science Museum avian database of skins collected in the dry forest-thicket belt between Massinga and the Save River, Inhambane Province. For reasons explained below, these expedition camps fell within what I term the ‘Sitila-Massinga dry forest-thicket complex’. The museum personnel collected in that area during April-June 1966 and June-July 1971. Details of the activities of the museum personnel during those expeditions are poorly documented, although some details appear in Clancey & Lawson (1967) and Clancey (1996); note that in the latter publication Clancey evidently had forgotten about the 1971 expedition as he does not mention it. Examination of the collection dates of skins held in the museum allows for more complete itineraries to be assembled (see Table 1). In total, approximately 37 days were spent by five collectors from the Durban Museum in or near the Sitila-Massinga thicket complex.

During 16-19 June 2011 D.W. Pietersen and I undertook a brief reconnaissance of the Sitila-Chicomo area, north-west of Massinga. We did not camp in the thicket formation but drove in each day from Morrungolo on the coast, and investigated the thickets approximately 10-15 km north of Sitila and along the entrance road to Chicomo village. Our approach was to stop at promising-looking areas of dense thicket and low-stature forest, listen and walk the immediate area. We did not employ playback of the tinkerbird calls during these investigations.

Between 15-17 January 2013 H.N. Chittenden and I camped 10.6 km north of Sitila along an overgrown bush track at 23° 04' 14.35"S; 35° 03' 41.18E (ca 115 m asl). We walked slowly along

TABLE 1.

Summary of routes and dates of collecting camps during the two Durban Museum expeditions (April-June 1966 and June-July 1971) that included the Sitila-Massinga thicket complex. Personnel during the 1966 expedition comprised P.A. Clancey, W.J. Lawson and M.O.E. Baddeley, and P.A. Clancey, F.L. Farquharson and R.C. Goetz during the 1971 expedition.

LOCALITIES	DATES	LOCATION	COMMENTS
1966 EXPEDITION			
Chimonzo	23 April-4 May 1966	30 km NW of Xai-Xai	In or near the Macia Forest
Panda	6-17 May 1966	65 km SW of Maxixe	<i>Brachystegia</i> woodland
Massinga	18 May-25 May 1966	55 km N of Inhambane	In or near the Sitila-Massinga thicket complex
Mapinhane	26 May-6 June 1966	36 km SW of Vilanculos	In or near the Sitila-Massinga thicket complex
1971 EXPEDITION			
Chicumbane	2-4 June 1971	15 km NW of Xai-Xai	Floodplain grasslands and agricultural fields
Massinga	7-13 June 1971	55 km N of Inhambane	In or near the Sitila-Massinga thicket complex
Vilanculos	15-20 June 1971	-	Subsistence agriculture and savanna
Rumbacaca	21-27 June 1971	45 km NW of Vilanculos	Dry thicket
10 km S of Save River	28 June-4 July 1971	-	Dry thicket

existing paths and tracks in the thicket complex noting all birds heard and seen, and periodically employing brief playback of the 'pop-trill' of Eastern Green Tinkerbird, from Gibbon (1991), a recording made by F. Dowsett-Lemaire on Mangochi Mountain, eastern Malawi; see also Short & Horne (2001: 152). We also drove along the tracks in the area, stopping at remnant patches of thicket and forest, and again periodically using playback of the tinkerbird calls. On 17 January, four 10-12 m mist-nets were deployed for ca 4 hours along our camp bush track.

A gazetteer with the co-ordinates of all the localities mentioned in the text appears in Appendix 2.

RESULTS

Rediscovery of the Eastern Green Tinkerbird at Chicomo-Sitila

We did not find Eastern Green Tinkerbird during the June 2011 reconnaissance and only saw a single Yellow-rumped Tinkerbird *Pogoniulus (Micropogonius) bilineatus* during that trip no tinkerbirds of any species were heard vocalising.

In January 2013, Yellow-rumped Tinkerbird was common near our campsite with ca three-four individuals singing daily. On 16 January we investigated a narrow track starting just east of the indistinct settlement of Bobiane. Approximately 3.7 km ENE of our camp we located the first Eastern Green Tinkerbird in a small but lush forest patch. The tinkerbird was detected by using playback of the fast 'pop-trill'. The response by the Eastern Green Tinkerbird was almost immediate, it began singing vigorously from the upper canopy in response to the recorded call. Identification was straight-forward: a tiny, grey-green tinkerbird with yellow edging to the remiges, bright yellow rump and a dark bill with a paler pinkish-yellow base. (Fig. 1.)

We recorded Eastern Green Tinkerbird at a further six localities along the approximately 9 km of track running from



FIG. 1. Eastern Green Tinkerbird near Bobiane (Hugh Chittenden).

Bobiane to just west of Unguana (on the EN1 highway) on 16 and 17 January (summarised in Table 2). Most of these tinkerbirds were found by using playback, although some were heard calling spontaneously. As with the first tinkerbird, response to the playback was invariably swift, the tinkerbirds approaching rapidly and appearing above our heads in the lower canopy. After call-up, several individuals puffed their plumage out and the singing sometimes changed to an agitated chittering. All tinkerbirds seen were restricted to remnant patches of the thicket and dry forest, and none were seen in the subsistence farm plots adjacent to the thicket and dry forest patches.

Throughout this 9 km of track, Yellow-rumped Tinkerbird co-occurred and sometimes responded to the playback of the Eastern Green Tinkerbird song. On one occasion we saw a Yellow-

TABLE 2.

Details of Eastern Green Tinkerbirds recorded between Bobiane and Unguana in the Sitila-Massinga thicket in January 2013:

CO-ORDINATES	REMARKS
23° 03' 42.2" S; 35° 06' 16.0" E	Single bird responded to playback, thick forested grove
23° 03' 37.3" S; 35° 10' 45.7" E	Pair responded to playback, rather open grove of <i>Azelia</i> , <i>Sclerocarya</i> and <i>Strychnos</i> trees
23° 03' 39.5" S; 35° 10' 53.0" E	Pair responded to playback, another bird unconnected with the pair heard singing (pop-trill) in the distance
23° 03' 45.1" S; 35° 10' 20.0" E	Individual heard singing in large thicket on termite mound, playback was attempted and a pair of tinkerbirds approached closely
23° 03' 55.0" S; 35° 08' 50.4" E	Single tinkerbird answered playback and came to road edge to investigate
23° 03' 47.5" S; 35° 07' 20.8" E	Individual singing spontaneously, answered playback
23° 03' 39.5" S; 35° 05' 43.1" E	Individual singing spontaneously, answered playback

rumped Tinkerbird chase an Eastern Green Tinkerbird after both were attracted to the call-up.

Description of Sitila-Massinga thicket and dry forest complex

The natural vegetation in the Sitila-Chicomo area, and the habitat of the Eastern Green Tinkerbird, was found to be a form of dense, coastal, semi-deciduous thicket with dry forest emergents growing on soft red sands (Fig. 2). The understorey was extremely dense, approximately 5-6 m high and largely impenetrable without a machete (Fig. 2). It was dominated by the following shrubs, creepers and small trees *Hymenocardia ulmoides* (Euphorbiaceae), *Rhoicissus* cf. *digitata* (Vitaceae), *Alchornea laxiflora* (Euphorbiaceae), *Uvaria* cf. *lucida* (Annonaceae), *Ancylobotrys* sp. (Apocynaceae), *Monanthes affra* (Annonaceae), *Ximenia* sp. (Olacaceae), *Monodora* sp. (Annonaceae), *Hypericanthus* sp. (Rubiaceae), *Teclea* sp. (Rutaceae), *Grewia affra* (Tiliaceae), *G. microthyrsa* (Tiliaceae), and *Vitex* cf. *ferruginea* (Lamiaceae).

Above these lower strata were taller (10-20 m) dry forest trees, prominent canopy species including *Azelia quanzensis* (Caesalpiniaceae), *Cleistanthus schlechteri* (Euphorbiaceae), *Drypetes arguta* (Euphorbiaceae), *Drypetes natalensis* (Euphorbiaceae), *Erythrophleum lasianthum* (Caesalpiniaceae), *Manilkara discolor* (Sapotaceae), *Pteleopsis myrtifolia* (Combretaceae), *Suregada zanzibariensis* (Euphorbiaceae), *Strychnos* sp. (Strychnaceae), *Balanites maughanii* (Balanitaceae), *Combretum* sp. (Combretaceae), *Margaritaria* sp. (Euphorbiaceae), and *Ochna natalita* (Ochnaceae). The canopy layer was discontinuous and these tall trees seemed aggregated into clumps (this patchiness of the emergent canopy trees is also visible on satellite imagery of the area, giving an unevenness to the green tone of the vegetation formation).

During our January 2013 trip it was striking that a large number of creepers, shrubs and trees were in heavy fruit including: *Flueggea* sp. (Phyllanthaceae), *Ximenia* sp. (Olacaceae), *Teclea* sp. (Rutaceae), *Psudrax* cf. *locuples* (Rubiaceae), *Drypetes natalensis* (Euphorbiaceae), and the epiphytic cactus, *Rhipsalis baccifera* (Cactaceae).

There were also a number of baobab trees (*Adansonia digitata*; Malvaceae) and tree aloes (*Aloe barberae*; Xanthorrhoeaceae)



FIG. 2. View of the Sitila-Massinga thicket. Note the dense understorey, sandy soils and fairly low, discontinuous canopy. Photo taken June 2011, approximately 10 km north of Sitila village, Sul do Save, Mozambique.

present, although these seemed mostly restricted to the edges of the thicket formation. At least two of the baobabs were being strangled by enormous figs (possibly *Ficus natalensis*; Moraceae). We did not observe any miombo elements (such as the caesalpinioids *Brachystegia spiciformis* or *Julbernardia globiflora*) within the Sitila thicket formation, but adjoining the thicket were remnant patches of *Julbernardia*, suggesting that the dry forest-thicket had originally occurred within a miombo matrix before agricultural slash-and-burn.

A considerable amount of destruction had occurred via subsistence agriculture plots (principally growing maize and cassava) and the original thicket vegetation had largely been reduced to fragments (varying greatly in size from <1ha to ca 2000 ha, but mostly under 50 ha) in the agricultural matrix. Two recently felled, mature *Azelia quanzensis* trees, one old, massive felled *Azelia* and a large wood-pile of ca 70 poles (each about 1.5m long) were noted in June 2011. Signs of local hunting were fairly common including, a freshly-killed blue duiker *Philantomba*

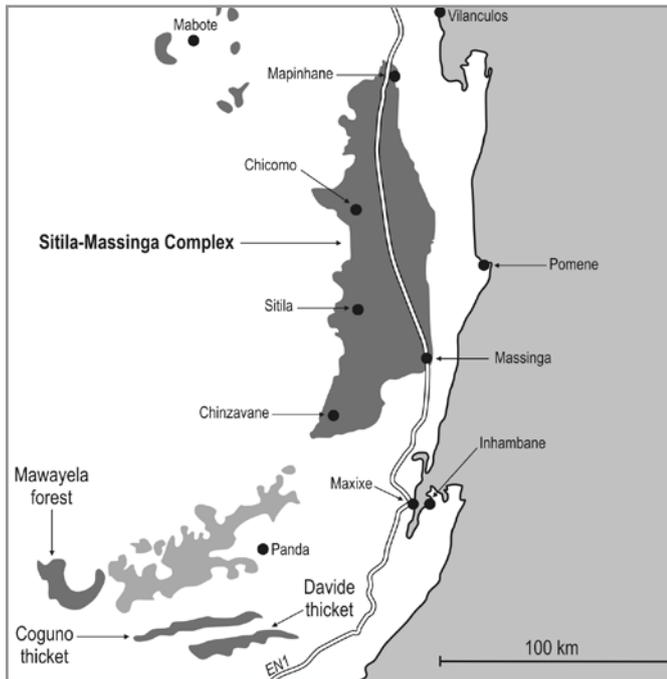


FIG. 3. Deployment of the Sitila-Massinga dry forest-thicket complex and other dry forest formations (including the mesic, tall Panda miombo woodland formation) in Sul do Save, Mozambique. Note that dune forests and dry forests/thicket complexes of the interior (>100 km inland) are not depicted on the map. The shading of the Sitila-Massinga complex does not imply that currently or historically there was forest/thicket throughout the shaded area, but rather that these appear to represent the boundaries of this botanical unit. Note also the disjunct, archipelago-like distribution of dry forest and thicket in Sul do Save.

monticola carcass on the back of a truck and several snares in the understorey of the thickets in June 2011. An old shotgun cartridge and two wire snares were found close to our campsite in January 2013. Heavy invasion along the edges of part of the thicket formation by the alien succulent *Opuntia* cf. *ficus-indica* (Cactaceae) was also observed.

The satellite photography shows that the Sitila-Massinga dry forest-thicket complex forms a fairly distinct botanical unit at the landscape level (Figs 3 and 4), although it has been severely fragmented by subsistence cultivation. The dry forest-thicket complex lies approximately 30-40 km inland of the Indian Ocean, between ca 80-150 m asl with an extremely flat topography. No reliable rainfall figures are apparently available from within the Sitila-Massinga dry forest-thicket belt but the area probably gets around 800-1000 mm of rainfall/annum (see Tinley 1977: fig. 4.8), on the lower threshold for forest development. It runs from approximately 22° 09' S to 23° 38' S and 35° 21' E to 34° 5' 7' E. The area demarcated for the Sitila-Massinga dry forest-thicket complex in Figs 3 and 4 covers an area of approximately 500 000 ha, but less than 200 000 ha of the area shaded is covered in dry forest and thicket. The demarcation is tentative as there was little ground-truthing and even prior to the destruction of the thicket by subsistence agriculture, the dry forest and thicket would not have been uniformly distributed but interspersed amidst miombo woodland, drainage lines and open grassy areas. The area

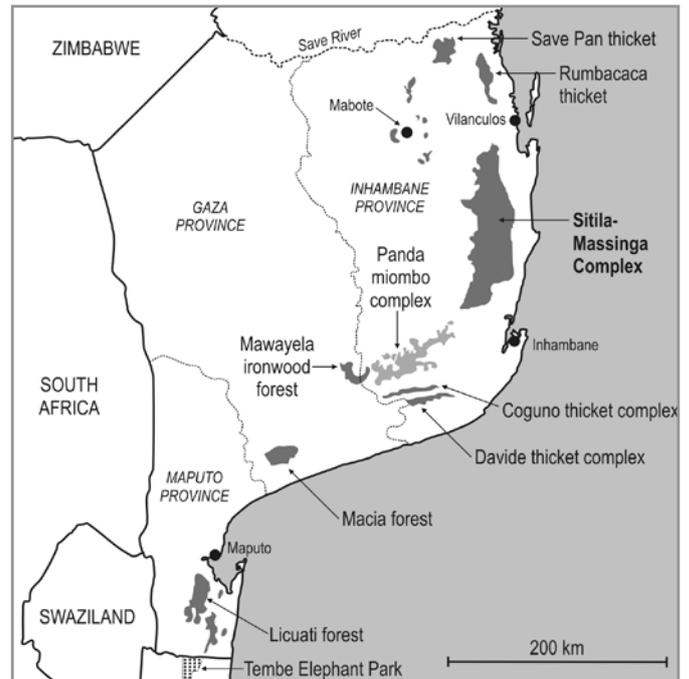


FIG. 4. Map of the Sitila-Massinga dry forest-thicket complex and villages/towns of relevance. The shading of the Sitila-Massinga complex does not imply that currently or historically there was forest/thicket throughout the shaded area, but rather that these appear to represent the boundaries of this botanical unit. EN1 = main (EN1) highway.

indicated in Figs 3 and 4 should be taken as a first approximation, awaiting extensive ground-truthing and more refined analyses.

The deployment of the Sitila-Massinga dry forest-thicket complex appears to be restricted to the distribution of a luvic arenosol soil unit (= soft red sands with a differentiated subsurface layer) mapped in the Mozambique Soils Map (F.A.O. 1982). This sand unit runs from just south of the R423 road in a longitudinal (north-south) band through the Chicomo-Sitila district past Massinga and down to around Chinzavane.

North of the R423 road the soils change to an orthic luvisol and the dry forest-thicket complex stops and is replaced by more open, drier savanna, although there are scattered, tiny (< 20 ha) patches of dry thicket and two large blocks of dry thicket. The first of these two larger blocks is the Save Pan thicket, located a few kilometres south of the main bridge over the Save River. This has become a popular bird-watching locality (Cohen *et al.* 2005: 297) and appears also to have been one of the collecting camps during the 1971 Durban Museum expedition ("10 km of Vila Franca do Save"). The second block is what I have termed the 'Rumbacaca thicket', a very dry thicket complex between the Save Pan thicket and Vilanculos (Fig. 4). East of the Sitila thicket, the luvic arenosol is replaced mainly by a coarser-grained, paler ferralic arenosol (F.A.O. 1982) that does not support thicket or forest, but rather low-statured miombo savanna and open *Sclerocarya-Terminalia* woodland, although now almost entirely converted to agricultural plots and homesteads.

The biogeographical and ornithological relevance of this pedological data is that, under the existing rainfall regime and despite the heavy destruction of the vegetation by subsistence farmers, the dry forest-thicket formation preferred by Eastern

Green Tinkerbird is probably naturally restricted to the belt of luvisc arenosols. My supposition is therefore that the Sitila-Massinga thicket-dry forest is an edaphically-based refugium for forest species such as Eastern Green Tinkerbird under a climate regime generally inimical to forest formation.

Study of the satellite imagery also reveals how limited forest and thicket vegetation is in Sul do Save, over and beyond destruction by human activities. The major coastal forests and thicket complexes, aside from dune forest, in Sul do Save, conspicuous at a landscape scale, are plotted in Fig. 4.

Other bird species at Sitila-Massinga

Eighty-eight bird species were recorded in the Sitila thickets (including the subsistence agricultural plots) during our two trips (Appendix 1; which also provides scientific names). The dawn chorus at our January campsite was dominated by Red-necked Spurfowl, Purple-crested Turaco, Red-chested Cuckoo, Brown-hooded and Mangrove Kingfishers, Square-tailed Drongo, Terrestrial Brownbul, Bearded Scrub-robin, Eastern Nicator and Yellow-breasted Apalis. After the dawn chorus faded away, the most vocal species in the thicket were Yellow-rumped Tinkerbird, Sombre Greenbul, Green-backed Camaroptera, Eastern Nicator, Black-backed Puffback, Southern Boubou, Gorgeous Bush Shrike and Grey Sunbird, all of these species calling even in the extreme heat of mid-day, when most other birds were silent. Records of rare, uncommon or otherwise noteworthy species are discussed below, especially those for which Parker (1999) had few or no records from the Sitila-Massinga area.

Ayres's Hawk-Eagle

One immature soaring over the Sitila thickets on 16 June 2011 (23°05' 59.0" S; 35°05' 07.0" E). The breast had a peach wash while the rest of the underparts were white and the primaries and secondaries were heavily barred. Parker (1999: 41) recorded it from grid-cell 2335AA, which covers the Sitila-Massinga thicket but described it as a non-breeding summer migrant to Sul do Save (we also observed an adult between Homoine and Maxixe in June 2011).

European Honey-Buzzard

A trio of pale morph adults soaring together over the thickets near our campsite on 15 January (diagnostic tail and wing pattern noted). Another pale morph adult soaring over thickets at 23°03' 55.0" S; 35°08' 50.4" E on 17 January, possibly one of the birds from 15 January. Parker (1999: 37) had no records between the Limpopo and Save rivers.

Mangrove Kingfisher

In January 2013, daily song at dawn was heard from a bird near our campsite and two further birds were heard singing west of 23°02' 29.0" S; 35°03' 04.5" E and 23°03' 42.7" S; 35°03' 11.2" E on 17 January. Another individual was found singing close to an arboreal termitarium with an entrance hole in a large baobab at 22°54' 35.6" S; 35°05' 17.5" E (11.5 km south-west of the village of Nhachengue) on 17 January, which was probably its nest site (see Davies *et al.* 2012). Aside from Brown-hooded Kingfisher, the Mangrove Kingfisher was the commonest dryland kingfisher of the Sitila thickets. During the June 2011 trip no sign of the kingfishers was found and this species was also unrecorded by the Durban Museum parties in the winters of 1966 and 1971. Either the kingfishers were overlooked (because they were

not singing) or the kingfishers had moved away (possibly to the coast) during the winter. Parker (1999: 135) only found the kingfisher in littoral grid-cells in Sul do Save, although it has been observed ca 125 km inland along the Save River during summer (Allan *et al.* 2000: 21) and on one occasion in Gona-re-zhou, south-eastern Zimbabwe, in winter (R.G.C. Boon pers. comm.).

Livingstone's Turaco

In January 2013, this turaco was uncommon and heard in several places, e.g. south of our campsite and west of 23°04' 05.9" S; 35°03' 27.0" E. It was far out-numbered by Purple-crested Turaco, which co-occurred in the thickets. I have also observed overlap between the two turaco species in the upper Chiniziua River drainage, Sofala Province, the southern part of Inhambitanga Forest, Sofala Province, and along the Mutsambidzi River, western Cheringoma Cuesta, Sofala Province. Further south in northern Zululand, they co-occur in Mabibi and Manguzi forests (Tinley 1976: 125). The Durban Museum collected two skins at Massinga, a female on 18 May 1966 (DM 20996) and a male on 11 June 1971 (DM 26852), but it is unlikely to occur in the immediate vicinity of Massinga anymore. Parker (1999: 110) had only five grid-cells marked for this turaco north of the Limpopo River, including an isolated square at 2335AA covering the Sitila-Massinga thicket. The population in the Sitila-Massinga thicket is evidently strongly isolated from other populations in the region, which persist mostly in dune forest.

Green Malkoha

Fairly common in the thicket during our January 2013 trip, both the full song and querulous 'weeping' call were heard throughout the Sitila thickets. The species was heard on one occasion on 19 June 2011 from a roadside thicket (22°49' 57.06" S; 35°10' 04.83" E) approximately 2 km north-west of Nhachengue. Henry Francis found it "not uncommon" in the Inhambane district (Sclater 1899) and the Durban Museum collected two males at Massinga on 11 June 1971 (DM 26854-26855). Parker (1999: 117) had no mainland records for this malkoha between the Incomati and Save rivers.

Tiny Greenbul

The type specimen of this greenbul was collected by Henry Francis apparently about twenty miles (32 km) north of the Bay of Inhambane, near the coast (Brooke 1993: 338). This would place it on the south-eastern edge of the Sitila-Massinga thicket complex, although Sclater (1899) merely quotes Francis to the effect that it was collected "north of Inhambane". Perhaps Brooke (1993) was quoting directly from the label of the type. Three males were collected at Massinga in July 1899 by an unknown collector but probably one of the Francis brothers (DM 6523-6525). The Durban Museum personnel collected a sub-adult male at Massinga on 24 May 1966 (DM 20146). Parker (1999: 174) had a single record in December 1995 from a small forest patch north-west of Massinga in the Sitila-Massinga thicket. Pinto & Lamm (1955: 133) did not succeed in finding it in Sul do Save. In January 2013, we found a single bird singing at dawn in a lush forest patch (at 23°04' 19.8" S; 35°12' 13.9" E) but otherwise we did not encounter this greenbul and it is evidently scarce in the area. The Sitila-Massinga population is isolated by approximately 400 km from the nearest birds in Sofala Province. It has also been reported recently from the mid-altitude (900 m asl) Chirinda Forest, south-eastern Zimbabwe (Caldwell-Barr 2002; Cizek 2004), approximately 360 km to the

north-west, although never found there by Charles Swynnerton during his long exploration of that forest (Swynnerton 1907a, b). As the vernacular name indicates, this is a small, arboreal, leaf-gleaning greenbul, almost warbler-like in deportment and physiognomy (personal observations in Sofala Province, central Mozambique). Noting some of its unusual structural characters, Roberts (1922: 226) erected a new genus (*Sclaterillas*) for *debilis* but it was recovered as part of the *Phyllastrephus* clade based on mitochondrial and nuclear gene evidence (Moyle & Marks 2006) and, thus *debilis* could be viewed as a phyletic dwarf within its genus; a greenbul that 'became' a warbler.

Black-headed Apalis

In June 2011 we encountered a pair of Black-headed Apalises foraging with a mixed species flock in the lower canopy about 10 km N of Sitila (at 23° 04' 23.06" S; 35° 03' 56.5" E). In January 2013, this apalis was found in the same area but was uncommon, with only two pairs encountered in the vicinity of our camp (one singing from a tall tree at 23° 04' 46.9" S; 35° 04' 24.2" E and pair foraging in the lower canopy at 23°04' 25.1" S; 35°03' 58.1" E). Three males were collected at Massinga in May 1966 by Durban Museum personnel (DM 20065-20067) and one female on 7 June 1971 (DM 27192), at the time the first records south of the Save River. The three Massinga males formed the basis of Clancey's (1968) description of the subspecies *addenda* (see also Chittenden *et al.* 2011: 182). The apalis was not recorded in Sul do Save by Parker (1999: 190), except on the Bazaruto Archipelago. The Sitila-Massinga population is isolated by 390 km from the nearest mainland population at Haroni-Lusitu, south-eastern Zimbabwe (Vernon *et al.* 1990). It is replaced by its close relative, Chirinda Apalis *Apalis chirindensis*; at Chirinda Forest. A record marked in the Maputo district by Hockey *et al.* (2005: 854) is without any substantive foundation as is a putative sighting from St Lucia (Cyrus & Robson 1980). The Sitila apalises did not respond to playback of a recording from Haroni-Lusitu (Gibbon 1991) and the tempo and tone of the song also sounded different to birds heard singing in Sofala Province (pers obs), suggesting the presence of a distinct local dialect and perhaps giving additional support to the validity of the subspecies *addenda*. Further investigation of this apparent vocal difference is called for.

Rudd's Apalis

This species was fairly common in both June 2011 and January 2013 in the Sitila thickets and its rapid *pok-pok-pok* call was regularly heard. The Durban Museum only collected a single male from the Sitila-Massinga thicket formation at Mapinhane (on 4 June 1966; DM 20148), although they collected several skins further south at Panda and Chimonso. Parker (1999: 191) recorded it commonly from grid-cells covering the Sitila-Massinga thicket formation. The distribution of this apalis is a zoogeographic enigma, especially the exiguous populations around the Shire-Zambezi confluence in central Mozambique and southern Malawi (Parker 2005a; Dowsett-Lemaire & Dowsett 2006). Its use of *Usnea* and other lichens in building its nest (Bell-Marley 1933; Roberts 1936: 206; Tarboton 2011: 266-267) may act as a natural limitation on its distribution but *Usnea* lichens are apparently scarce in the thickets occupied in southern Malawi (F. Dowsett-Lemaire *in litt.*). These lichens also appeared uncommon in the Sitila-Massinga thicket and other factors may have to be sought

to explain its localised distribution. Johnson's (2005) identification of 'well developed undergrowth' as an 'essential habitat feature' seems too generalised to be of use.

Red-capped Robin-Chat

This robin-chat was remarkably scarce. It was only seen once and none were heard in June 2011, and only three or four were encountered in January 2013. Perhaps reflective of this rarity in the Sitila-Massinga thicket formation, the Durban Museum only collected one skin from Massinga (DM 19810) compared to 27 skins collected from the Macia Forest at Chimonso (see also Lawson 1963). Furthermore, Parker (1999: 180) had surprisingly few grid-cells north of 24° S marked for this normally common and thicket-loving robin-chat. On the other hand, Pinto & Lamm (1955: 156) called it "a common bird" in Sul do Save.

Livingstone's Flycatcher

This bird was fairly common in the Sitila-Massinga thicket in January 2013, usually attracting attention via its brief melodious twittering song. One mist-netted in January 2013 was in active moult, with the fifth primary growing and primaries 1-4 new, rectrix 1 new and almost fully grown, remaining rectrices old, and many body feathers in pin ventrally. The Durban Museum collected five skins from Massinga in May/June 1966 (DM 20275-20279) and a further two males from Massinga in June 1971 (DM 26660-26661), and two females from Mapinhane in May/June 1966 (DM 20273-20274). The Maputo Museum collected examples at Rumbacaca and Funhalouro (Pinto & Lamm 1955: 148; Pinto 1963: 17).

Woodwards' Batis

This batis was fairly common in the Sitila thickets, even in small (*ca* 1 ha) remnant patches amidst agricultural fields. It was usually detected by its short *hoo* whistles and variations thereon. In January 2013, a female mist-netted close to our campsite was in old plumage with no active moult. Reflective of its general abundance, the Durban Museum collected no less than 15 skins in May 1966 and June 1971 at Massinga, a male at Mapinhane in May 1966, two skins from near Vila Franca do Save in June/July 1971, and two skins from Rumbacaca in June 1971. The Maputo Museum had specimens from Rumbacaca and Chicomo (Pinto & Lamm 1955: 146; Pinto 1963: 17). Parker (1999: 207) did not find it within the Sitila-Massinga complex except for the Massinga grid-cell (2335AB) and one grid-cell just west of the Sitila-Massinga complex (2234DA).

Chestnut-fronted Helmetshrike

A flock of approximately 4-5 birds were seen in the thicket at 23° 02' 28.5" S; 35° 03' 01.1" E in January 2013. Several other helmetshrike flocks were heard gobbling, chuckling and clicking in the distance while we travelled through the thickets but could not be attracted closer. They may have been attributable to this species but may also have been Retz's Helmetshrike *Prionops retzii* (which was not, however, confirmed for the area). Five Chestnut-fronted Helmetshrike skins were collected at Massinga in May 1966 and June 1971 by the Durban Museum (DM 20712-20714, DM 26998) and Lamm (1953) collected it at Rumbacaca. Parker (1999: 223) recorded it at Massinga and in the vicinity of the Sitila-Massinga thicket formation but it likely occurs still further south as P.A. Clancey observed but did not collect it at Panda (Clancey & Lawson 1967) and

Lamm (1953) found it common at Coguno. It has also been seen sparingly in the dry forest-savanna mosaic in northern Zululand on the border with Mozambique (K.L. Tinley *in litt.*; Clancey 1964; Cyrus & Robson 1980; Davis 1999) and likely occurs in and around the Licuati Forest, a vast (ca 8000 ha), largely unexplored dry 'sand' forest in Maputo Province, ca 35 km north of the South African border (Fig. 4).

Olive Bush Shrike

This bush-shrike was heard on a few occasions (fast descending *popopopop* call reminiscent of Orange-breasted Bush Shrike *Telophorus sulfureopectus*) in the Sitila thickets during the January 2013 trip. The Durban Museum collected a female (DM 19898) in May 1966 on a densely vegetated termite mound near Mapinhane but Parker (1999: 221) did not record it north of the Limpopo River. The coastal representatives of this bush shrike in Sul do Save have been described as a distinct subspecies (*vitorum* Clancey), the males apparently lacking the black facial mask, but the taxon was not recognised by Chittenden *et al.* (2011). Further investigation of this taxon is indicated, especially to verify the facial mask characteristic of the males (which would otherwise be unique in the species).

Plain-backed Sunbird

A female was seen foraging with a mixed-species flock in a dense roadside thicket, 2.5 km NW of Nhachengue in June 2011 at 22° 49' 35.84" S; 35° 09' 56.00" E. During the January 2013 trip it was uncommon, e.g. a male singing at 23° 02' 29.6" S; 35° 02' 36.5" E. In December 2010, I also heard a male singing in a dense thicket patch near Mapinhane at the northern terminus of the Sitila-Massinga thicket. Pinto & Lamm (1960: 81-82) recorded it 50 km west of Mabote. The Durban Museum collected one juvenile female at Massinga on 8 June 1971 (DM 27202). Parker (1999: 233) had the grid-cell for Massinga shaded, as well as four grid-cells west of the Sitila-Massinga formation. This species is likely to be found in all the dry forest-thicket complexes of Sul do Save, as we also encountered the sunbird in the Mawayela Forest in June 2011 and a resident population is known, far to the south, in the dry *Newtonia-Cleistanthus* forests of Tembe Elephant Park, northern KwaZulu-Natal (e.g. Boon 2000; pers. obs).

Grey and Olive sunbirds

Grey Sunbird was very common in the Sitila thickets. Its song (a descending series of clipped, high-pitched notes) was one of the dominant bird sounds in the Sitila thicket and was frequently uttered for long stretches during the heat of the day. In contrast, we did not locate any Olive Sunbirds (represented in Sul do Save by the subspecies *olivacina* described from Inhambane). The difference in abundance is also reflected in the fact that the Durban Museum collected 18 skins of Grey Sunbird at Massinga and Mapinhane but, by contrast, just three skins of Olive Sunbird from Massinga and none from Mapinhane. Pinto & Lamm (1960: 80) also observed that Olive Sunbird was "very local in its distribution" in Sul do Save. Grant did not find Olive Sunbird in the Coguno thickets but did collect Grey Sunbird (Sclater 1911: 277). Furthermore, Parker (1999: 231) only had one grid-cell marked for Olive Sunbird north of the Limpopo River but 21 grid-cells shaded for Grey Sunbird. The difference in abundance therefore seems genuine and marked. The paucity of Olive Sunbirds may be related to the scarcity of wild bananas (*Strelitzia* species; Strelitziaceae),

which we did not observe in the Sitila-Massinga thicket. In June 2011, the only place where we encountered Olive Sunbird was on the coast at Morrungolo in a miniscule fragment (< 1 ha) of *Trichilia* dune forest containing a few clumps of *Strelitzia nicolai*. In the dune and coastal forests of KwaZulu-Natal, the arborescent *Strelitzia nicolai* is common (Boon 2010: 60) and the Olive Sunbird correspondingly so (Cyrus & Robson 1980; Harrison *et al.* 1997). Other preferred nectar sources of Olive Sunbird such as *Halleria lucida* (Scrophulariaceae) and *Leonotis leonoris* (Lamiaceae) are also absent from the Sitila-Massinga thickets. Consequently, the scarcity of Olive Sunbird in coastal Sul do Save is possibly partly a reflection of the paucity of its favoured nectar species.

Red-throated Twinspot

A single male was watched for a few minutes singing and hopping around at the edge of a dense thicket in January 2013 (face, throat and upper breast noted as an intense crimson colour) but this twinspot was otherwise not encountered. The Durban Museum collected a sub-adult male (DM 19812) and female (DM 19813) at Mapinhane in May/June 1966 while the Henry Francis found it "not uncommon" north of Inhambane (Sclater 1899; Lawson 1961). Red-throated Twinspot occurs as far south as the Macia Forest, Chimonzo (south of the Limpopo River) where the Durban Museum collected 21 skins in 1960 and 1966, finding it "abundant in the evergreen forest at Chimonzo and especially in scrub tangles around native cultivation" (Lawson 1961). No trace of Pink-throated Twinspot *Hypargos margaritatus* was found in the Sitila-Massinga thicket by us. Clancey (1996) mentioned its occurrence at Panda, Coguno and Zandamela to the south of the Sitila-Massinga thicket, but they did not collect any at Massinga, Mapinhane, Rumbacaca or near the Save River. However, Parker (1999: 248) plotted two grid-cells for *margaritatus* in the Sitila area (2235CC and 2234DB) and also from 2335CA which falls within the Sitila-Massinga thicket complex as here defined. Parker (1999) did not find Red-throated Twinspot in the Sitila-Massinga thicket or indeed north of the Limpopo River. Evidently, more field work is required to elucidate how the two twinspots interdigitate in Sul do Save. It is also possible that Twinspot (Green) Indigobird *Vidua codringtoni* may occur in Inhambane Province, given the presence of its brood host/s. Male indigobirds mimicking the song of Red-throated Twinspot have been seen in Sofala Province (personal observations) and presumably relate to *codringtoni*.

Notable bird absentees from the Sitila thickets

African Crowned Eagle *Stephanoaetus coronatus*

No sign of this large eagle was found in the Sitila thicket. It is remarkably localised in Sul do Save with the only records coming from north of Maputo and from the Save Pan thicket (Clancey 1996; Parker 1999). It is possible that it has gone locally extinct in parts of Sul do Save through hunting of its prey base (monkeys and duikers) and perhaps direct persecution by humans.

Crested Guineafowl *Guttera pucherani*

We did not encounter this gamebird during either visit to the Sitila thickets. Given the high level of disturbance and indications of local hunting, it is possible that it has been locally extirpated or has become rare. Grant recorded that the locals hunted the guineafowl at Coguno (Sclater 1912: 48) and it may also have declined in the mid-Save River Valley due to hunting (Allan *et al.* 2000: 20). Superficially, the impenetrable thicket habitat of the Sitila-Chicomo

district looks ideal for the guinea fowl. The Durban Museum collected a male (DM 19763) at Mapinhane on 30 May 1966 showing that it historically occurred in this habitat type. In contrast, Red-necked Spur fowl is common in the area and is evidently less susceptible to hunting and snaring than the guinea fowl.

Green-backed Woodpecker *Campethera cailliautii*

We did not record this diminutive woodpecker during our June and January visits but suspect we overlooked this species, possibly mis-attributing some vocal records to Golden-tailed Woodpecker. The Durban Museum collected four skins at Massinga in May 1966 (DM 20776-20779) and single skins at Mapinhane in May 1966 (DM20781) and Rumbacaca in June 1971 (DM 26942). It has also been found rarely on the San Sebastian Peninsula, south-east of Vilanculos and possibly breeding in arboreal termitaria there (C. Read pers. comm.). Parker (1999: 154) had a single record for Sul do Save from Pomene, approximately 40 km east of the Sitila-Massinga thicket complex on the littoral.

Black-and-White (Vanga) Flycatcher *Bias musicus*

The last record for Sul do Save was by the Durban Museum, which collected a female at Massinga in May 1966 (DM 20325). We did not find this flycatcher in the Sitila-Chicomo area during our June 2011 and January 2013 visits but suspect we overlooked the species, which can be elusive when not calling and sitting quietly in the tree canopy. There were many spots in the thicket complex where tall (ca 20 m) forest trees adjoined agricultural fields and short scrub. From experience in Sofala Province, this is the preferred habitat of the flycatcher, i.e. the interface between forest and adjoining scrub/fields/savanna, particularly where tall *Sterculia appendiculata* trees occur at the edge of the forest or thicket patch. This is similarly the preferred habitat in southern Malawi (Dowsett-Lemaire & Dowsett 2006: 406).

Blue-mantled Crested-Flycatcher *Trochocercus cyanomelas*

This bird is astonishingly scarce in Sul do Save. Parker (1999: 208) only recorded it south of Maputo, while there are earlier records from Macia Forest, Chimonso (south of the Limpopo River; Clancey 1996) and Inharrime, south of Inhambane (Pinto & Lamm 1955: 148; Lawson 1963). The flycatcher is common in the tall, dry 'sand' and dune forests of northern Zululand, e.g. at Tembe Elephant Park (pers. obs) and it is surprising that it does not extend into the Sitila-Massinga thicket complex.

Neergaard's Sunbird *Cinnyris neergaardi*

We did not encounter this range-restricted species in the Sitila-Chicomo thicket complex and it seems unlikely that it normally occurs in this vegetation formation. From personal experience, it seems restricted to tall *Brachystegia* woodland or dry, semi-deciduous forest with heavy *Usnea* 'old man's beard' lichen encrustations, e.g. it is fairly common in the tall, dry 'sand' forests of northern Zululand such as Tembe Elephant Park (pers. obs). The *Usnea* is particularly important to this sunbird as it employs the lichen for nesting purposes (Chittenden 2002; Tarboton 2011: 312-313). Pinto & Lamm (1960: 75) were the first ornithologists to point out its need for *Usnea* lichen and inferred that its localised distribution "was probably due to the highly specialised breeding requirements". Although *Usnea* occurs in the Sitila-Chicomo thicket, it is probably too sparse and the canopy too low and discontinuous for this restless sunbird. It must be conceded, however, that Claude Grant possibly shot the type specimen in

the Coguno thicket formation and not the adjacent *Brachystegia* woodland (Sclater 1911: 274-275) and Clancey & Lawson (1967) collected two females at Mapinhane at the northern fringe of the Sitila-Massinga thicket complex but did not specify if they shot them in the thicket or adjoining miombo. The sunbird does not occur north of the Save River and it is striking that *Usnea* lichen is very rare in the miombo woodland and low-altitude forests of Sofala Province, central Mozambique (pers. obs). Parker (1999: 229) stated that the sunbird "is absent from pure *Brachystegia* woodland", but it is fairly common in the miombo woodland west of Panda, Inhambane Province, an area dominated by tall *Brachystegia spiciformis* trees (Clancey & Lawson 1967; pers. obs).

DISCUSSION

Relevant to its status in southern Africa, the Eastern Green Tinkerbird has now been revealed as a locally common resident in low-altitude dry forest-thicket of the Sitila-Chicomo district, Inhambane Province, Mozambique. The population size of Eastern Green Tinkerbirds in this area is difficult to estimate, but given that that we encountered ca 6 pairs in 9 km of track traversed suggests that there may be a substantial population, possibly in the low 1000s.

The Eastern Green Tinkerbird is also likely to be an uncommon resident in moist, evergreen, low- to high-altitude (1000-1800 m asl) forest on the Gorongosa Massif as mentioned above (Tinley 1977: table 9.6), although its current status there requires investigation. Tinley's records of the species from the Gorongosa are, at first glance, somewhat unusual because all other observers who have visited the Gorongosa Massif have not found the tinkerbird. However, this is probably not significant because most visits to the Gorongosa Massif are brief and typically involve parties of bird-watchers walking up from the base for half-a-day's bird-watching on the lower edges of the mid-altitude forest and then returning.

Furthermore, the situation on Mount Namuli in northern Mozambique shows Eastern Green Tinkerbird can long be overlooked at a locality. Both Colonel J. Vincent (during his lengthy July-August 1932 visit) and a party of ornithologists from the Percy Fitzpatrick Institute (during their November-December 1998 expedition) failed to find the tinkerbird on Namuli, but when F. Dowsett-Lemaire visited the mountain in November 2007 she detected Eastern Green Tinkerbird, albeit at low densities (Dowsett-Lemaire 2010). Like Mount Namuli, the tinkerbirds on the Gorongosa Massif possibly occur at low densities and would thus be readily overlooked during superficial visits. Furthermore, South African observers have perhaps also mistaken the fast pop-trill of Eastern Green Tinkerbird for the calls of Yellow-rumped Tinkerbird, which is common on the Massif and has a deceptively similar pop-trill (e.g. Short & Horne 2001: 152). Despite the review paper by Oatley & Tinley (1989), the avifauna of the Gorongosa Massif is indubitably still incompletely documented, and other ornithological surprises perhaps await, especially in the barely explored higher elevation forests (above 1600 m asl).

Aside from Dowsett-Lemaire's (2010) records from Mount Namuli, there was also a green *Viridibucco* tinkerbird species recorded by J. Makawa on Mount Chipirone (Benson 1950). It was not ascertained whether this was *leucomystax* or *simplex*, although the latter seems more likely and it has also been recorded from inselberg forest in Niassa Game Reserve (Parker 2005b). There are no other records for northern Mozambique and it was not encountered by Roberts (1911) or Vincent (1935)

during their northern Mozambican travels (see also Dean & Milton 2007: 5). The species is “relatively widespread and common” in the coastal forests of extreme south-eastern Tanzania (Jensen *et al.* 2005: 8) and it is therefore likely to occur in the coastal dry forests of northern Mozambique (see Timberlake *et al.* 2011 for an overview of these northern Mozambique coastal forests). Prime potential localities include: 1 - Netia Forest (ca 15° 05' S; 40° 29' E), Nampula Province, a lowland dry forest-thicket complex, last visited by J. Vincent in May/June 1932; 2 - the Pemba North forests (ca 12° 33' 11.27" S; 40° 23' 00.46" E), Cabo Delgado Province, an ornithologically unexplored complex of lowland forests (ca 5000 ha); 3 - the Mepiaéca-Matoto dry forest complex (ca 17° 35' S; 36° 27' E), Zambezia Province, a very large (ca 30-40, 000 ha), ornithologically unexplored lowland forest system on old aggraded river-course deposits 35 km north-west of Quelimane (although Austin Roberts presumably traversed part of this forest system); and 4 - the relict escarpment forests a few kilometres south of Mueda, Cabo Delgado Province (11° 41' 30.80" S; 39° 34' 35.20" E; ca 750 m asl), that although tiny (perhaps 60-70 ha), likely have a considerably wetter microclimate than the dry coastal forests to the east and possibly represent a significant zoogeographic link between the important escarpment forests of the Rondo Plateau, south-eastern Tanzania (Jensen *et al.* 2005) and the forests of the Mabu, Namuli and Chiperone massifs (Dowsett-Lemaire 2010).

Why the Eastern Green Tinkerbird should be such a highly localised species, in contrast to the ubiquitous Yellow-rumped Tinkerbird, is not understood. The Moustached Green Tinkerbird *Viridibucco leucomystax*, however, “stands out as a highly selective fruit consumer, specialising on Loranthaceae and Viscaeae [mistletoe] berries” (Dowsett-Lemaire 1988: 271) and “its breeding distribution ... correlated to the presence of at least 4-6 mistletoe species, i.e. providing berries (almost) year round” (Dowsett-Lemaire & Dowsett 2006: 293). Thus *leucomystax* could be termed a mistletoe hyper-specialist. Although Yellow-rumped Tinkerbird consumes mistletoe fruit, it also devours a wide variety of other fruit (e.g. Dowsett-Lemaire 1988). Both Eastern Green and Moustached Green tinkerbirds are closely related, indeed in the early part of the 20th century they were even treated as conspecific (e.g. Sclater 1924: 279-280), and the Eastern Green Tinkerbird may also be a mistletoe hyper-specialist restricted to forests and thickets with a sufficiently high density and richness of mistletoes (Dowsett-Lemaire 1988, 1989). During our brief time in the Sitila thickets we did not have to time to search systematically for mistletoes clumps but the mistletoes *Erianthemum dregei* and *Agelanthus subulatus* were observed fairly commonly in flower.

It is interesting to conjecture as to where else Eastern Green Tinkerbird might occur in Mozambique south of the Zambezi River, aside from the Sitila-Chicomo area and the Gorongosa Massif. Perhaps the best candidates are the enormous Maronga, Moribane and Zomba forests, in Manica Province. These forests are deployed in an arc around the eastern foothills of the Chimanimani Mountains, north and west of the town of Dombe (see Dutton 1974 and Tinley *et al.* 1976). Existing reports suggest these are wet, tall, botanically diverse forests with a broad altitudinal sequence running from ca 250-1500 m asl (e.g. Müller *et al.* 2005) but mostly under 1000 m asl. Currently, we know virtually nothing about the avifauna of these forests and Parker's (2005a) atlas regrettably says little, although the birds are likely to be similar to those in the Haroni-Lusitu forests, Zimbabwe, immediately to the west (see Vernon *et al.* 1990). The tinkerbird also possibly occurs in the Inhamitanga Forest, Sofala Province, about 30 km south of

the Zambezi River, which is a very large, semi-deciduous forest that has barely been explored.

It is likely that most of the dry 'sand' forests to the south of the Sitila-Massinga complex, such as Mawayela (Marao) ironwood forest in Gaza Province and Licuati Forest in Maputo Province (see Fig. 4), are too dry, inhospitable and lacking in sufficient parasitic epiphytes to support Eastern Green Tinkerbird. The only possibilities are the Davide and Coguno thicket belts and perhaps the Macia Forest, Chimonzo (Figs 3 and 4). Examination of satellite imagery suggests that parts of Davide thicket possibly comprise tall-statured, verdant forest. The Coguno thicket, worked by Claude Grant (Sclater 1911, 1912), lies to the north-west of the Davide thicket belt and judging from the satellite imagery seems to be a drier, shorter thicket, accordant with its more inland position and thus presumably lower annual rainfall. It is not certain how comprehensive Grant's exploration was of this thicket formation for birds. Much of his time there seems to have been devoted to trapping and shooting small mammals (Thomas & Wroughton 1907). The Macia Forest is apparently unique in Sul do Save in being a lowland forest with a distinctly wet microclimate. The Durban Museum camped in or near the forest in August/September 1960 for ca 8 days (Lawson 1963) and again in April/May 1996 for about a week (Clancey & Lawson 1967; Table 1). The discovery of Livingstone's Flycatcher and Red-throated Twinspot, here south of the Limpopo River, reflects its zoogeographic interest. Further, the collection of three skins of Yellow-breasted Hyliota *Hyliota flavigaster* in or close to the Macia Forest by A.A. da Rosa Pinto (see Lawson 1963: 99) also hints at a locality of unusual interest. In January 2013, H. Chittenden and I visited the fringes of Macia Forest for a few hours under adverse conditions (heavy, continuous rain and wind), but located African Cuckoo Hawk *Aviceda cuculoides*, Livingstone's Turaco, Green Malkoha, African Broadbill and Brown Scrub-Robin *Erythrocygia signata*, all indicative of a rich forest avifauna. The forest was under immense human pressure, completely encircled by small agricultural plots and most of its fringes were converted to thicket, but remnant slivers of primary forest were tall (25 m +) and formed a high interlocking canopy. It is not impossible that Eastern Green Tinkerbird could occur in the Macia Forest. Further ornithological investigation of this unique forest and the remnant woodlands adjacent are urgently needed before it is entirely decimated, especially to resolve Pinto's unprecedented records of Yellow-breasted Hyliota.

The Sitila-Massinga forest-thicket formation forms part of the tropical, semi-deciduous, dry forest vegetation unit on coastal and inland sands that extends from False Bay, St Lucia, South Africa northwards (e.g. Mucina & Rutherford 2006) through Mozambique (e.g. Tinley 1977: 127-129; Timberlake *et al.* 2011) into southern Malawi (e.g. Lengwe and Nta Thumba thicket, Dowsett-Lemaire 2004), the middle and lower Zambezi valley (e.g. Aspinwall 1975; Hoare *et al.* 2002; Coates Palgrave *et al.* 2007) and coastal Tanzania and Kenya. The other forest and thicket complexes depicted in Fig. 4 also belong to the same larger East African dry forest unit on coastal sands, although the Macia Forest may be an anomaly and more akin to those rare examples of forest with a moister microclimate found on flat coastal sands, such as Dukuduku Forest, Zululand, South Africa, and Dondo Forest, Sofala Province, Mozambique (as opposed to the more typical location of wetter forests on loamy soils on dissected escarpments and inselbergs or at the land/sea junction on dune sands).

Tropical, semi-deciduous, dry forest has proved difficult to define on floristic grounds because the vegetation shows high turn-over

in species composition and canopy dominants between forest patches (Tinley 1977: 127-128; Timberlake *et al.* 2011: 128). As Tinley (1977: 127) explained: "at the arid end of the dry forest ecocline, ... where this formation meets thickets on base-saturated duplex sands; it overlaps with thicket species, [and] at the moist end ... on leached duplex sands or fine compact sands it overlaps with rain forest tree species". Nonetheless, indicator trees of these dry 'sand' forests and thickets include *Pteleopsis myrtifolia*, *Drypetes arguta*, *Cleistanthus schlechteri* and *Hymenocardia ulmoides* (Tinley 1977: 127-129; Mucina & Rutherford 2006; Boon 2010: 12). All of these species were found commonly in the Sitila thickets.

Three factors appear important in determining the extent of forest and thicket in Sul do Save. First is the climate, which is noticeably arid compared to KwaZulu-Natal to the south and the Manica and Sofala provinces to the north. It is dominated by the presence of the Indian Ocean High Pressure Cell, which prevents movement of moist maritime air over much of Sul do Save. There is also an accentuated decline in annual rainfall moving away from the littoral (from ca 1000-1200 mm/annum) to as low as 400 mm/annum in the western parts of Gaza Province (Tinley 1977: fig. 4.8). Because of this steep rainfall gradient, opportunities for forest development are largely restricted to the narrow coastal band. There are also indications that the climate has fluctuated markedly over the Holocene and particularly dry periods during the 'Little Ice Age' between AD 1400-1800 have been implicated, based on palynological data, in severe reductions in forest cover near Vilanculos (Ekblom 2008).

Second, is the dominance of sands (arenosols) of various types in most of eastern Sul do Save (rocks and stones being a rare sight in Gaza and Inhambane provinces). Because of their relatively large grain size, the water-holding capacities of arenosols are usually very poor and they easily become dehydrated. The dominance of arenosols on the Sul do Save plain thus further acts against the formation of forest. However, one significant pedological feature that works in the favour of forest and thicket development is the nature of differentiated sub-surface layers (horizons) in these arenosols. Tinley (1966: 75) observed that "[t]he sands on the southern part of the Mozambique Plain ... are underlain at various depths [1-3.5 m] by ... pan horizons [differentiated layers, usually of clayey consistency] and it is suspected ... that these horizons may be the key factor which supports woody vegetation in the dry season, even permitting forest to occur in a low moisture regime" (Tinley 1966, 1977, 1982). Such water-retentive sub-surface horizons may be especially important in the luvic arenosols of Sul do Save.

The third factor determining the extent of forest and thicket is anthropogenic activity. The devastation of coastal forests and woodlands in Sul do Save has long been remarked upon (e.g. Lamm 1953; Lawson 1963; Parker 1999) and the annihilation of such habitats, which presumably only became severe within the last 100-150 years, has certainly proceeded to a point of no return in the coastal corridor between Xai-Xai and Vilanculos. Just how much of the original dry forest and thicket in Sul do Save has been destroyed or converted by subsistence agriculture cannot be calculated with any confidence at this point, but the figure must be very large (possibly 500 000 ha). One complication is that the subsistence farmers probably practised shifting swidden agriculture in the past and abandoned farmlands may well have reverted to secondary thicket and forest when the densities of subsistence farmers were (presumably) much lower and areas had a chance to revegetate.

Formally protecting any of the Sitila-Massinga dry forest and thicket would be challenging because the density of subsistence

farmers is extremely high and there are few unbroken swathes of thicket that could be meaningfully demarcated as a conservation area. The whole area is essentially an intricate mosaic of farm plots and thicket/forest patches. The absence of any bird endemics (at the species level), species of high global conservation concern, or large mammals of ecotourism relevance also unfortunately militates against the chances that any part of the Sitila-Massinga dry forest-thicket could be demarcated as an efficiently protected conservation area.

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APPENDIX I.

Check list of species recorded in the Sitila-Chicomo thicket complex during the June 2011 and January 2013 visits by G. Davies, H. Chittenden and D. Pietersen. X = recorded, O = not recorded.

SPECIES	JUNE 2011	JANUARY 2013
Ayres's Hawk-Eagle <i>Hieraaetus ayresii</i>	X	O
European Honey-Buzzard <i>Pernis apivorus</i>	O	X
Bateleur <i>Terathopius ecaudatus</i>	X	O
Black-breasted Snake Eagle <i>Circaetus pectoralis</i>	X	O
African Harrier-Hawk <i>Polyboroides typus</i>	X	O
Red-necked Spurfowl <i>Pternistis afer</i>	X	X
Crested Francolin <i>Dendroperdix sephaena</i>	X	O
African Green Pigeon <i>Treron calvus</i>	O	X
Emerald-spotted Dove <i>Turtur chalcospilos</i>	X	X

SPECIES	JUNE 2011	JANUARY 2013
Tambourine Dove <i>Turtur tympanistria</i>	O	X
Red-eyed Dove <i>Streptopelia semitorquata</i>	X	X
Purple-crested Turaco <i>Gallirex porphyreolophus</i>	X	X
Livingstone's Turaco <i>Tauraco livingstonii</i>	O	X
Narina Trogon <i>Apaloderma narina</i>	O	X
Barn Owl <i>Tyto alba</i>	X	O
Wood Owl <i>Strix woodfordii</i>	X	X
Barred Owlet <i>Glaucidium capense</i>	X	O
Mangrove Kingfisher <i>Halcyon senegaloides</i>	O	X
Brown-hooded Kingfisher <i>Halcyon albiventris</i>	X	X
Lilac-breasted Roller <i>Coracias caudatus</i>	X	X
Broad-billed Roller <i>Eurystomus glaucurus</i>	O	X
European Bee-eater <i>Merops apiaster</i>	O	X
Swallow-tailed Bee-eater <i>Merops hirundineus</i>	X	O
Brown-headed Parrot <i>Poicephalus cryptoxanthus</i>	X	X
Crowned Hornbill <i>Tockus alboterminatus</i>	X	X
Trumpeter Hornbill <i>Bycanistes bucinator</i>	X	X
Green Woodhoopoe <i>Phoeniculus purpureus</i>	X	X
Boehm's Spinetail <i>Neafrapus boehmi</i>	X	X
Mottled Spinetail <i>Telacanthura ussheri</i>	X	X
Red-chested Cuckoo <i>Cuculus solitarius</i>	O	X
Klaas's Cuckoo <i>Chrysococcyx klaas</i>	O	X
Jacobin Cuckoo <i>Clamator jacobinus</i>	O	X
Green Malkoha <i>Ceuthmochares aereus</i>	X	X
Scaly-throated Honeyguide <i>Indicator variegatus</i>	X	O
Lesser Honeyguide <i>Indicator minor</i>	X	O
Black-collared Barbet <i>Lybius torquatus</i>	O	X
Yellow-rumped Tinkerbird <i>Pogoniulus bilineatus</i>	X	X
Eastern Green Tinkerbird <i>Viridibucco simplex</i>	O	X
Golden-tailed Woodpecker <i>Campethera abingoni</i>	X	X
African Broadbill <i>Smithornis capensis</i>	O	X
Square-tailed Drongo <i>Dicrurus ludwigii</i>	X	X
Black-headed Oriole <i>Oriolus larvatus</i>	X	X
European Golden Oriole <i>Oriolus oriolus</i>	O	X
Southern Black Tit <i>Parus niger</i>	X	O
Dark-capped Bulbul <i>Pycnonotus tricolor</i>	X	X
Terrestrial Brownbul <i>Phyllastrephus terrestris</i>	X	X
Tiny Greenbul <i>Phyllastrephus debilis</i>	O	X
Yellow-bellied Greenbul <i>Chlorocichla flaviventris</i>	X	X
Sombre Greenbul <i>Andropadus importunus</i>	X	X
Eastern Nicator <i>Nicator gularis</i>	O	X
White-throated Robin-Chat <i>Cossypha humeralis</i>	X	X
Red-capped Robin-Chat <i>Cossypha natalensis</i>	X	X
Bearded Scrub-Robin <i>Erythropygia quadrivirgata</i>	X	X
White-browed Scrub-Robin <i>Erythropygia leucophrys</i>	O	X
Rudd's Apalis <i>Apalis ruddi</i>	X	X
Black-headed Apalis <i>Apalis melanocephala</i>	X	X
Yellow-breasted Apalis <i>Apalis flavida</i>	X	X
Green-backed Camaroptera <i>Camaroptera brachyura</i>	X	X
European Marsh Warbler <i>Acrocephalus palustris</i>	O	X
Willow Warbler <i>Phylloscopus trochilus</i>	O	X

SPECIES	JUNE 2011	JANUARY 2013
Livingstone's Flycatcher <i>Erythrocerus livingstonei</i>	X	X
Grey Tit-Flycatcher <i>Myioparus plumbeus</i>	O	X
Ashy Flycatcher <i>Muscicapa caerulescens</i>	O	X
Pale Flycatcher <i>Bradornis pallidus</i>	X	O
African Paradise-Flycatcher <i>Terpsiphone viridis</i>	X	O
Black-bellied Starling <i>Notopholia corrusca</i>	O	X
Grey-headed Bush Shrike <i>Malaconotus blanchoti</i>	X	O
Olive Bush Shrike <i>Telophorus olivaceus</i>	O	X
Orange-breasted Bush Shrike <i>Telophorus sulfureopectus</i>	O	X
Gorgeous Bush Shrike <i>Telophorus quadricolor</i>	X	X
Southern Boubou <i>Laniarius ferrugineus</i>	X	X
Woodwards' Batis <i>Batis fratrum</i>	X	X
Black-backed Puffback <i>Dryoscopus cubla</i>	X	X
Chestnut-fronted Helmetshrike <i>Prionops scopifrons</i>	O	X
Plain-backed Sunbird <i>Anthreptes reichenowi</i>	X	X
Collared Sunbird <i>Hedydipna collaris</i>	X	X
Purple-banded Sunbird <i>Cinnyris bifasciatus</i>	X	X
Grey Sunbird <i>Cyanomitra veroxii</i>	X	X
Yellow White-eye <i>Zosterops senegalensis</i>	X	O
Spectacled Weaver <i>Ploceus ocularis</i>	X	O
Dark-backed Weaver <i>Ploceus bicolor</i>	X	X
Yellow-rumped Widowbird <i>Euplectes capensis</i>	O	X
Bronze Mannikin <i>Lonchura cucullata</i>	X	O
Red-backed Mannikin <i>Lonchura bicolor</i>	X	X
Jameson's Firefinch <i>Lagonosticta rhodopareia</i>	O	X
Red-throated Twinspot <i>Hypargos niveoguttatus</i>	O	X
Blue Waxbill <i>Uraeginthus angolensis</i>	O	X
Yellow-fronted Canary <i>Crithagra mozambica</i>	X	X

APPENDIX 2

Gazetteer of localities mentioned in the text

Bobiane 23° 02' 59.88" S; 35° 03' 59.88" E	Inharrime 24° 28' 39.41" S; 35° 01' 34.51" E	Pomene 22° 57' 56.61" S; 35° 33' 17.46" E
Chicumbane 24° 58' 17.19" S; 33° 32' 22.95" E	Mabote 22° 02' 28.01" S; 34° 07' 57.29" E	Rumbacaca 21° 48' 48.18" S; 34° 54' 16.13" E
Chimonzo 24° 56' 03.14" S; 33° 21' 33.77" E	Macia (town) 25° 01' 37.46" S; 33° 05' 46.61" E	Sitila 23° 09' 57.99" S; 35° 03' 32.08" E
Chinzavane 23° 33' 53.35" S; 35° 00' 02.46" E	Mapinhane 22° 15' 47.46" S; 35° 06' 51.33" E	Ungwana 23° 03' 47.01" S; 35° 16' 07.52" E
Coguno 24° 23' 21.02" S; 34° 33' 07.60" E	Massinga 23° 19' 38.21" S; 35° 22' 52.79" E	Vilanculos 21° 59' 57.71" S; 35° 19' 07.12" E
Davide 24° 27' 06.60" S; 34° 45' 40.13" E	Maxixe 23° 51' 44.43" S; 35° 20' 48.08" E	Zandamela 24° 44' 04.48" S; 34° 35' 57.18" E
Dombe 19° 58' 29.72" S; 33° 23' 51.07" E	Morrungolo 23° 14' 01.42" S; 35° 29' 24.28" E	
Funhalouro 23° 05' 29.88" S; 34° 23' 01.62" E	Nhachengue 22° 50' 45.50" S; 35° 10' 42.60" E	
Homoine 23° 53' 02.05" S; 35° 09' 07.30" E	Panda (town) 24° 03' 46.59" S; 34° 43' 38.68" E	

DURBAN NATURAL SCIENCE MUSEUM NOVITATES – INSTRUCTIONS TO AUTHORS

PUBLICATION POLICY: The *Durban Natural Science Museum Novitates* is approved by the South African Department of National Education for SAPSE funding. It publishes papers dealing with the natural sciences, with an emphasis on the geographical area of southeastern Africa. Authorship is open to persons not directly associated with the Museum. Each submission will be sent to at least two referees for review. Only original material that has not been submitted for publication elsewhere may be submitted. Contributions should be written in English.

PRESENTATION OF MANUSCRIPTS: The electronic submission of manuscripts by means of email to the Editor is expected, and this includes all text, tables and figures wherever possible. Each full paper, but not short communications (<2 000 words including references but excluding words in figures, tables and appendices), must start with a short summary (<200 words) which describes the main findings and conclusions. Five to ten keywords should be provided for full papers. Provide a short, descriptive title and an abridged title for the running head. Where relevant, the title should mention the English and scientific names of the study organism/s, include the order and family names in parentheses, and make reference to the geographical area covered. Number all pages consecutively through to the end of the references.

CONVENTIONS: Authors should carefully study the latest edition of the *Novitates* for guidance as to the conventions to be followed in the text, tables, figures, titles, legends, references, etc. Follow these exactly. Give the scientific name at the first mention of a species both in the summary and in the text. Thereafter, either the English or scientific name may be used. The English names of species, except for birds, should not normally be capitalised. Usage of names should follow standard texts. Scientific names (except for taxa higher than genus) and foreign words must be in italics. Metric units and their international symbols are used throughout, and a full-stop is used for the decimal point. The 24-hour clock is employed (02h30 and 14h30) and dates should be written: 7 October 1952. Use hyphens as sparingly as possible. Abbreviations such as *loc cit.*, *op cit.*, *ibid.* and *idem.* are not used. Quotations should be accompanied by author, date and page number, e.g. (Gresbach 1888: 76), and the relevant reference should be included in the reference list.

SYSTEMATIC ACCOUNTS: Papers that include systematic descriptions should present these under the heading 'Systematics'. The description of species (and subspecies) should be preceded by a higher taxonomy including at least family, genus and type species, and should take the following form:

- Family EXOXYRINAE Vialov, 1936
- Genus Aetostreon Bayle, 1878

TYPE SPECIES: *Gryphaea latissima* Lamarck, 1801 ; by the subsequent designation of Douvillé, 1879.

This higher taxonomy should be followed, in order, by the name of the species under discussion, list of figures, synonymy list, Diagnosis, Type material (including holotype, allotypes and paratypes), Referred material, Locality data, Habitat/Ecology, Description, Discussion and Distribution. Morphometric information should be presented in the form of a table.

Synonymies are cited as follows: *Agulhasia davidsonii* King 1871: 109, pl. 11, figs 1-8; Dall 1873: 180; Thompson 1927a: 166, fig. 52; 1927b: 13, pl. 1, fig. 1, text-figs 1-3. Note that commas are not used to separate author and date, paginations are indicated by colons, lower case is used for plates and figures, plates/figures are abbreviated pls/figs (note no full stop at the end) and a plate/figure is abbreviated pl./fig. (note the full stop). All references cited in synonymies should be included in the reference list.

The first reference to species should be followed by the author of the species, e.g. *Lanius minor* (Gmelin). The names of new taxa formally described in the paper should not be included in the title.

TABLES AND FIGURES: Tables must be numbered in the order that they are to appear and are mentioned in the text. Each table should be on a separate page with the table number and title at the top. Note the arrangement of horizontal lines in tables (no other lines should appear) and that entries in the body of the table should be centred (except for those in the first column and those involving decimal points which should be aligned with the decimal points). Avoid duplication of material in the text. All illustrative material should be arranged as figures and numbered consecutively. Line illustrations, lettering, numbers and symbols must be bold and large enough for up to 50% reduction. Hand-drawn lettering on figures is unacceptable. Maps should usually include a scale-bar, co-ordinates and an indication of orientation. Each figure should be on a separate page and legends must be provided. Give a key for symbols in illustrations. Photographs will be considered if they are essential to the text and must be of high contrast and allow reduction. Where figures involve multiple illustrations/photographs, these should be labelled alphabetically, commencing in the top lefthand corner. Authors must design all tables/figures with the page size of the *Novitates* in mind.

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- BLAAUW, F.E. 1897. *A monograph of the cranes*. E.J. Brill: Leiden.
- BLACKMAN, J.G. 1978. The swamp. In: LAVERY, H.J. (ed.), *Expedition north*, pp. 147-183. Richmond Hill Press: Victoria, Australia.

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