

Subspecific identification and status of Cattle Egret

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This paper discusses the identification and status of the two subspecies of Cattle Egret *Bubulcus ibis*: nominate *B i ibis* (hereafter *ibis*; including 'seychellarum') and *B i coromandus* (hereafter *coromandus*). Recent records of *coromandus* as far west as the Arabian peninsula have resulted in the identification and status of the taxon becoming increasingly relevant in the Western Palearctic (WP). *Coromandus* is treated as a full species by some authors (Eastern Cattle Egret *B coromandus*, with nominate *ibis* (re)named Western Cattle Egret; eg, Rasmussen & Anderton 2005, Brazil 2009, Gill & Donsker 2010). Due to a lack of awareness among most birders and rarities committees, it is likely that *coromandus* is underrecorded outside its normal range.

Status

The two subspecies of Cattle Egret are widespread but form discrete populations; *ibis* breeds throughout much of Africa and parts of southern Europe (mainly France, Portugal and Spain), North America and South America, and *coromandus* breeds in South and South-east Asia north to southern China, as well as Japan and northern and

north-eastern Australia (figure 1). Cattle Egrets breeding in the Seychelles are sometimes treated as a separate subspecies ('seychellarum') and have been reported to show features of both *ibis* and *coromandus* (eg, Voisin 1991). Rasmussen & Anderton (2005) and del Hoyo et al (1992) consider 'seychellarum' as possibly not being different from *ibis* and therefore question the validity of this subspecies; it is included in *ibis* by Dickinson (2003). In 'seychellarum', only a single specimen in adult summer plumage has been described (Voisin 1991). Rasmussen & Anderton (2005) consider *ibis* and *coromandus* to be two species based on consistent differences in adult summer plumage, proportions and vocalisations. However, the Dutch taxonomic committee (CSNA) provisionally concluded that it had not yet been firmly established whether the differences in plumage are clinal (Arnoud van den Berg & George Sangster in litt). No differences in vocalisations could be found by George Sangster (in litt); the sounds compared in Rasmussen & Anderton (2005) were possibly not homologous (cf below). Note that up to 11 different call types have been described (Kushlan & Hancock 2005).

372 Western Cattle Egrets / Koereigers *Bubulcus ibis ibis* and Eastern Cattle Egret / Oostelijke Koereiger *B i coromandus* (centre), Wamm farms, Fujairah, United Arab Emirates, 19 August 2009 (Tommy Pedersen). Although mid-August, this *coromandus* still showing signs of adult summer plumage, therefore differences in distribution of rusty head/neck coloration still apparent. Structural differences also detectable; *coromandus* showing subtly longer legs and neck, and less bulbous head.



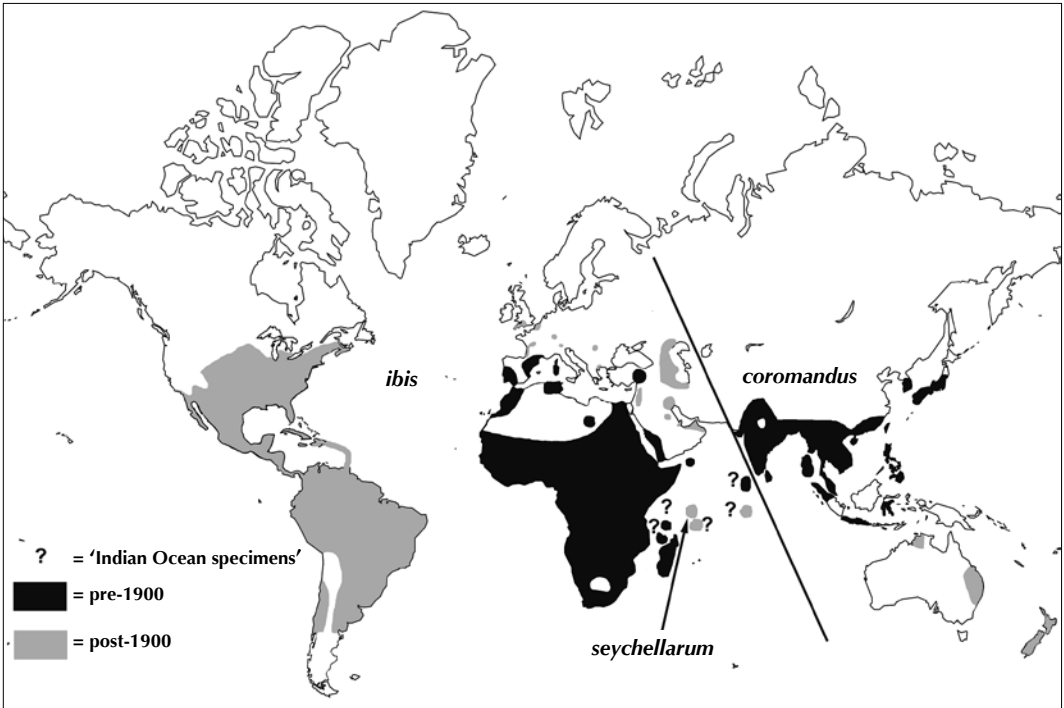


FIGURE 1 Breeding distribution of Cattle Egret subspecies based on Cramp & Simmons (1977), del Hoyo et al (1992), BirdLife International (2010) and data from various individuals. Breeding distribution as shown in the map should be considered approximate. Black indicates breeding distribution up to c 1900, while grey indicates places in which breeding began between c 1900 and present. Map highlights how Middle East, Central Asia and western Indian Ocean islands may become contact zone for each taxon. Exact date of first breeding (or first discovery) unknown on following islands (all in Indian Ocean): Coetivy, Comoros and Maldives. Validity of 'seychellarum' described from Seychelles has been questioned, while identification of taxa present on other islands in western Indian Ocean is unproven (treated here as 'Indian Ocean specimens').

373 Western Cattle Egret / Koereiger *Bubulcus ibis ibis* (left) and Eastern Cattle Egret / Oostelijke Koereiger *B i coromandus* (right), Wamm farms, Fujairah, United Arab Emirates, 19 August 2009 (Tommy Pedersen). Differences in distribution of rusty coloration of adult summer plumage is easiest way to separate them, but note also longer bill and head of *coromandus*.



Range

Ibis has undergone a dramatic extension of its world range during the last century. Its historical range was concentrated in tropical central Africa but it has since expanded throughout the African continent, Europe and the Americas (eg, Cramp & Simmons 1977, Voisin 1991, del Hoyo et al 1992, Kushlan & Hancock 2005). Since 1900, it has colonised an estimated 1.2 million km² in North and South America (Blaker 1971). Recently, the range of *ibis* has extended to northern Europe (figure 1). In Spain, the species has historically nested in Andalucía, but the provinces of Badajoz and Cáceres were not colonised until the late 1960s, Toledo in the early 1970s and the Ebro delta in the late 1970s (Voisin 1991). Breeding in Portugal was not confirmed until 1962 (although local people indicate breeding began in the late 1930s), and breeding began in Camargue, Bouches-du-Rhône, France, in 1957 (Marion & Marion 1982, Voisin 1991). In the western provinces of France, breeding was first noted in 1981 (Marion & Marion 1982). The first breeding record in the Netherlands was at De Wieden, Overijssel, in 1998 (Messe-maker & Veldkamp 1999) and the first British breeding record was in Somerset in 2008 (Hill 2008).

Birds which colonised the Americas were thought to originate from Africa, and evidence to support a transatlantic crossing is provided by a record at St Paul's rocks, which are between Africa and South America near the shortest possible sea crossing (Bowen & Nicholls 1968). There are also records from the Azores, St Helena and Tristan da Cunha (Vaurie 1965), further highlighting the species' capability for long sea crossings. The fact that *coromandus* has also undergone a large expansion demonstrates that both subspecies are capable of increasing their range.

Coromandus has spread south-east through the Malay archipelago to New Guinea, Australia and New Zealand since the 1940s. It was first recorded in New Guinea in 1941, in Australia in 1948 (possibly present since 1907) and in New Zealand in 1963. By the early 1990s in Australia, nesting pairs numbered 10 000 in New South Wales and 20 000 in Queensland alone (Maddock & Geering 1994). Of 5044 *coromandus* ringed in Japan, the mean distance of 124 birds recovered to the south was 1046 km (with only two birds recovered to the north). *Coromandus* ringed in Japan have been recovered 3000 km away in the Philippines, while Australian birds migrate annually to New Zealand, a minimum distance of 1600 km (Maddock & Geering 1994).

The potential for *coromandus* to stray westwards into the WP has recently been highlighted by a bird at Wamm farms, Fujairah, United Arab Emirates, from 8 August to 11 September 2009 (plate 372-373); this bird reappeared at this site in spring 2010 and on 23 October 2010 (Sandgrouse 33: 91, 2011). In addition, two records have been accepted for Oman: at East Khawr, Salalah, on 11 March 2000 and at Sun Farms, Sohar, from 9 May to 23 August 2002 (Birding World 13: 103, 2000; Jens Eriksen in litt). The Middle East and adjacent areas may become a contact zone if the taxon expands its range further. There is an earlier WP record of *coromandus* at Cap Bon, Tunisia on 10 September 2006. However, some doubt is expressed as to whether this was a wild bird (Ouni 2007).

Telfair & Raymond (2006) attributed the species' success to its 'dispersal tendencies, breeding and foraging adaptability and its ability to overcome challenges such as habitat loss and habitat conversion'. Others consider the critical factor of the success to be, specifically, broadscale establishment of cattle farming (eg, Blaker 1971, Siegfried 1978).

In western Europe, Cattle Egrets can also be expected as escapes from zoos and private collections. International Species Information System (ISIS) store data on zoos which hold captive Cattle Egrets. Current ISIS figures state that 1215 *ibis* and 238 *coromandus* are kept in collections worldwide. This includes 686 *ibis* in Europe (all *coromandus* being outside Europe). These figures are likely to be underestimates as not all zoos and other private collections are registered with ISIS.

Material and methods

In the sections below, the separation of *ibis* and *coromandus* in all plumages is discussed. As part of this study, biometrics from 47 specimens of *ibis* and 46 specimens of *coromandus* were taken. In addition, a large number of photographs were examined. No data on '*seychellarum*' were collected; however, biometrics were taken from 12 specimens of unproven subspecific identity from islands in the western Indian Ocean (referred to hereafter as 'Indian Ocean specimens'). Islands from which these specimens were collected were the Comoros, Madagascar and the Maldives. Data on birds from the Seychelles will help to clarify the identification of '*seychellarum*' as a valid taxon.

Differences between mensural data taken from specimens were statistically explored using ANOVA, with Tukey post hoc comparisons where

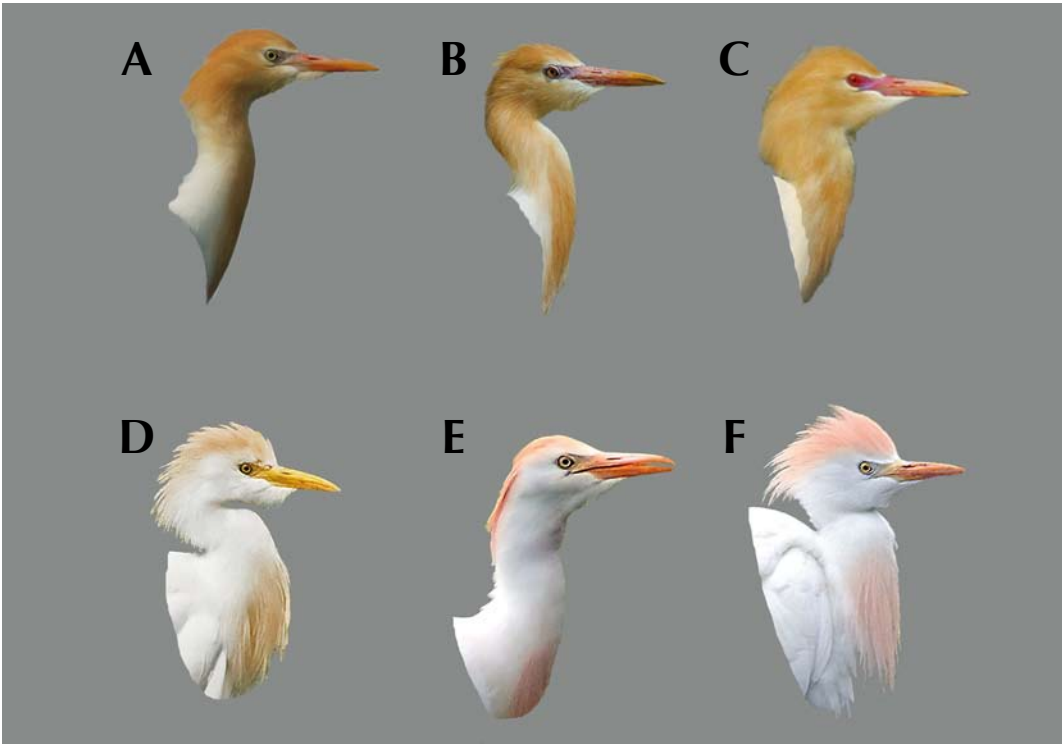


FIGURE 2 Cattle Egrets / Koereigers *Bubulcus ibis*. **A** *B i coromandus*, Magic Wood, Laoting, Hebei, China, 16 May 2010 (Ross Ahmed). **B** *B i coromandus*, Thol bird sanctuary, Mehsana, Gujarat, India, 30 May 2010 (Mital Patel). **C** *B i coromandus*, Magic Wood, Laoting, Hebei, China, 14 May 2010 (Ross Ahmed). **D** *B i ibis*, S'Albufera, Mallorca, Balearic Islands, Spain, 6 May 2010 (Garth Peacock). **E** *B i ibis*, Somerset Levels, Somerset, England, 15 July 2008 (Jeff Hazell). **F** *B i ibis*, Somerset Levels, Somerset, England, 15 May 2008 (Jeff Hazell). Note differences in distribution and tones of rusty colours of adult summer plumage. In addition, apparent texture of adult summer plumage *coromandus* appears thicker compared with more wispy plumes of *ibis*. Bill and neck of *coromandus* both appear marginally longer than in *ibis*.

significant differences were detected. Analyses were performed using the program R, version 2.13.1 (R Development Core Team 2011).

Identification

Adult summer plumage

The extent and coloration of adult summer plumage was found to be highly useful in separating *ibis* and *coromandus*. Adult summer plumage develops in the spring from second calendar-year birds onwards (Siegfried 1971). The extent and coloration of the orange or rusty head-, neck-, breast- and back- feathers (deepest on the head in both taxa) are the two most useful features. In *ibis*, adult summer plumage usually shows cinnamon-buff, mainly limited to the forehead, crown and nape (giving a capped appearance) and the 'orna-

mental' plumes of the chest and back. In *coromandus*, adult summer plumage shows darker, richer, more golden or rusty tones which extend to the throat, ear-coverts and most of the neck. The apparent texture of the orange adult summer plumage often looks thick, greasy (or wet), shorter in length and rather messy, whereas that of *ibis* often looks wispy, quite long and more neatly arranged (see figure 2). Caution should still be exercised, however, as both subspecies may show differences in the extent and coloration of adult summer plumage and the number of birds involved in this analysis is rather small. Pyle (2008) states that 'differences in extent of buff or orange coloration may be based on external pigment acquisition rates rather than geographic variation in plumage-aspect patterns'. In the early stages of adult summer plumage, or in moult out of summer plum-



374 Eastern Cattle Egret / Oostelijke Koereiger *Bubulcus ibis coromandus*, Latkrabang, Bangkok, Thailand, 14 June 2009 (*Somchai Kanchanasut*). Rusty colours of adult summer plumage on head and neck more patchy, and may briefly recall Western Cattle Egret *B i ibis*. **375** Eastern Cattle Egret / Oostelijke Koereiger *Bubulcus ibis coromandus*, Baga, Goa, India, 14 January 2009 (*Ross Ahmed*). Proportions of this bird comparable with genus *Egretta*. Dark bill-tip may persist through second calendar-year, although staining from mud may also account for this feature, as appears to be the case here. Note that adult winter plumage Intermediate Egret *Mesophoyx intermedia* also shows dark-tipped pale orange-yellow bill, a potential pitfall.



age, *coromandus* may also show reduced and more patchy rusty head/neck coloration (plate 374). Hancock & Kushlan (1984) also warn that some individuals may lack the buffy coloration while breeding.

Pyle (2008) states that Northern Hemisphere breeders of *ibis* and *coromandus* may start to acquire adult summer plumage from as early as the first half of February, and it may persist until at least the end of June. However, many *ibis* in Saudi Arabia in mid-January 2011 already showed strong indications of summer plumage (plate 376); photographs were collected which show a number of individuals of both taxa still showing full summer plumage in August and one photograph shows an *ibis* still in full summer plumage in early October 2009 (plate 377). This implies that the distinctive adult summer plumage coloration can be used in the separation of some individuals of *ibis* and *coromandus* for a substantial proportion of the year. Indeed, Hancock & Kushlan (1984) note that a few individuals retain some buff coloration throughout the non-breeding season.

Bill and leg colour of both *ibis* and *coromandus* are very variable in the breeding season, and at this time they may not show any diagnostic coloration. The bill is often pale orange-yellow for much of the year. However, for a short period before egg laying (exact timing variable), the bill and sometimes the iris, become various hues of red and even purple. Equally, leg coloration in both taxa is highly variable, more so during the breeding season. Rasmussen & Anderton (2005) state

that *ibis* shows brighter red legs than *coromandus* in the breeding season (exact timing not given). However, it was found that *coromandus* can show equally bright red (vinaceous) legs in the breeding season.

Adult winter plumage

Separation of *ibis* and *coromandus* is difficult in winter plumage, and may not be possible in the field. Indeed, Hancock (1984) stated that *coromandus* is 'indistinguishable in non-breeding plumage'. The same plumage coloration is found in both subspecies, with buff limited to the forehead and occasionally the breast and mantle – more so in males (Voisin 1991). Differences in biometrics have been highlighted as the only reliable way of separating *ibis* and *coromandus* in winter plumage, while '*seychellarum*' reportedly shows intermediate biometrics (Cramp & Simmons 1977; see below).

First and second calendar-year

In both taxa, juvenile characters include a shorter and much darker (blackish) bill. A dark tip to the bill may persist throughout the second calendar-year or even subsequent years, although mud-covered bill-tips will also be dark (plate 375). In a study of *ibis*, Siegfried (1971) found that juvenile body plumage is completely replaced by adult plumage before entering the first breeding season, although juvenile outer primaries, secondaries and tail-feathers are retained. In contrast, Maddock (1989) found that second calendar-year *coroman-*

376 Western Cattle Egret / Koereiger *Bubulcus ibis ibis*, Wadi Alassabah, Al Lith, Saudi Arabia, 18 January 2011 (Ross Ahmed). One of numerous individuals noted showing indications of adult summer plumage in Saudi Arabia in mid-January 2011. Extent and coloration of orange summer plumage immediately excludes Eastern Cattle Egret *B i coromandus*. **377** Western Cattle Egret / Koereiger *Bubulcus ibis ibis*, Robledillo de Trujillo, Extremadura, Spain, 2 October 2009 (Steve Fletcher). Still in adult summer plumage in early October.





378 Eastern Cattle Egret / Oostelijke Koereiger *Bubulcus ibis coromandus*, Magic Wood, Laoting, Hebei, China, 15 May 2010 (Ross Ahmed). Long legs apparent, as is neck bulge. Overall shape reminiscent of larger egret, such as Intermediate Egret *Mesophoyx intermedia*. **379** Western Cattle Egret / Koereiger *Bubulcus ibis ibis*, S'Albufera, Mallorca, Balearic Islands, Spain, 10 May 2010 (Garth Peacock). Compared with Eastern Cattle Egret *B i coromandus* in plate 378, legs shorter and neck bulge smaller. Overall impression smaller and more compact than *coromandus*. **380** Western Cattle Egret / Koereiger *Bubulcus ibis ibis*, Legbourne, Lincolnshire, England, 9 February 2008 (Darren Chapman). Note shaggy chin-feathers, known as jowl, contributing to rather bulbous head. Chin-feathers tend to be more shaggy in *ibis* than in Eastern Cattle Egret *B i coromandus* but is dependent on levels of aggression and fear. Short legs and neck, both characteristic of *ibis*, both readily apparent. **381** Eastern Cattle Egret / Oostelijke Koereiger *Bubulcus ibis coromandus*, Baga, Goa, India, 17 January 2009 (Ross Ahmed). Note staining on nape and shoulders, most likely from mud or dust. Stained adult summer plumage in Western Cattle Egret *B i ibis* could invite confusion with *coromandus*.

ibis returning to nesting colonies for the breeding season ranged from all white to pale patchy buff to full summer plumage. A second calendar-year *coromandus* showing patchy summer plumage could invite confusion with *ibis*. Biometrics from eight skins of juvenile *ibis* and *coromandus* were analysed. The indications are that the same structural differences used in the separation of adults still apply to juveniles (see below). However, the sample size of biometrics of first and second

calendar-year birds was too small to test for statistically.

Biometrics

Five measurements were found to be useful in the separation of *ibis* and *coromandus* (and 'Indian Ocean specimens'). Analysis of biometric data (table 1, figure 3) produced differences in bill length, tarsus length and tail length; *coromandus* showed a longer bill, a longer tarsus and a shorter tail than

TABLE 1 Morphological measurements (mm) of adult Western Cattle Egret *Bubulcus ibis ibis* and Eastern Cattle Egret *B i coromandus*, as well as 'Indian Ocean specimens'. Sequence in each column: mean (standard deviation; range; sample size). Measurements taken by Stephen Menzie at Natural History Museum, Tring, using standard wing-rule with perpendicular stop at zero (accurate to 0.5 mm) and analogue callipers (accurate to 0.01 mm). Differences in measurements were considered significant at $p < 0.05$ level.

	<i>coromandus</i>	<i>ibis</i>	'Indian Ocean specimens'	ANOVA test
bill length (skull)	58.2 (2.5; 52.1-64.6; 41)	54.9 (2.4; 46.7-60.4; 46)	55.3 (3.3; 51.4-62.5; 12)	$F_{2, 96}=20.47$, $p < 0.001$
bill depth (distal edge of nostril)	11.4 (0.8; 9.7-14.0; 40)	11.5 (0.6; 10.4-13.0; 41)	12.2 (0.9; 10.7-13.7; 12)	$F_{2, 90}=5.68$, $p=0.005$
bill depth (feathering)	14.5 (1.7; 12.0-17.6; 40)	14.9 (1.3; 12.5-17.6, 41)	16.5 (2.2; 14.0-21.1; 12)	$F_{2, 90}=8.09$, $p < 0.001$
wing length (maximum chord)	246.6 (6.9; 235.0-265.0; 33)	247.2 (6.9; 236.0-259.0; 29)	246.5 (4.3; 239.0-254.0; 11)	$F_{2, 70}=0.06$, not significant
tail length (root of central tail-feathers to tail tip)	81.5 (5.0; 71.0-94.0; 22)	85.8 (4.2; 78.0-95.0; 28)	85.4 (3.6; 81.0-92.0; 9)	$F_{2, 56}=6.19$, $p=0.004$
tarsus length	83.0 (4.9; 68.6-91.7; 42)	75.5 (5.6; 65.5-91.0; 43)	77.7 (4.2; 69.5-82.6; 12)	$F_{2, 94}=22.55$, $p < 0.001$

ibis and 'Indian Ocean specimens'. In addition, there were apparent differences in bill depth (both at feathering and nostril) between 'Indian Ocean specimens' and the other two taxa; 'Indian Ocean specimens' showed a thicker bill than the other two taxa. The data did not support the suggestion that there are differences in bill depth between *ibis* and *coromandus*, contra Blake (1977) and Pyle (2008). No evidence was found of any differences in wing length, contra Voisin (1991). Voisin (1991) noted that males are marginally larger than females in most respects; however, the data did not support this.

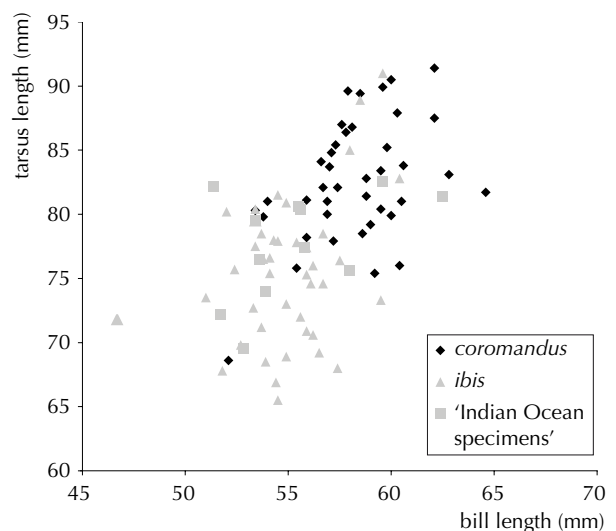
These differences in structure are likely to be most apparent in a vagrant if a different subspecies can be compared alongside. The long-legged and short-tailed appearance of *coromandus* is often most apparent in flight (plate 378). When in flight, *ibis* generally shows only a limited percentage of the visible leg length (less than half) protruding beyond the tail-tip (plate 379), whereas in *coromandus* a considerable leg length is visible beyond the tail-tip (more than half).

Other features

In the separation of *ibis* and *coromandus*, a number of other features may be used in support. *Ibis* often appears overall

smaller and stockier, with a thicker neck; *coromandus* is closer to *Egretta* egrets in shape (potentially inviting confusion with Intermediate Egret *Mesophoyx intermedia*, discussed briefly below). Typically, *ibis* shows a bulbous head, thinner mid-

FIGURE 3 Comparison of tarsus length and bill length of two subspecies of Cattle Egret *Bubulcus ibis* (*B i ibis* and *B i coromandus*), as well as 'Indian Ocean specimens'. Tarsus length is plotted against bill length (both mm). Details of measurements as in table 1.





382 Western Cattle Egret / Koereiger *Bubulcus ibis ibis*, Route des Blicqs, Guernsey, Channel Islands, 9 February 2008 (Paul Hillion). Alert posture resulting in fully outstretched neck. Legs and bill still appearing short, however. Note pale gull-grey legs; it was found that Eastern Cattle Egret *B i coromandus* does not show this coloration. **383** Eastern Cattle Egret / Oostelijke Koereiger *Bubulcus ibis coromandus*, Baga, Goa, India, 11 January 2009 (Ross Ahmed). Length of bill, neck and legs all reminiscent of genus *Egretta*.

neck and thick lower neck, whereas the neck in *coromandus* is more evenly slender. *Ibis* tends to show a more obvious jowl (shaggy or thick-looking feathering on the chin) than *coromandus* (plate 380), and the latter generally shows a less steep angle in the feathering on the chin. It was found that *coromandus* tends not to show a vertical slope in the forehead feathers, this being more likely to be shown by *ibis*, and more apparent in adult summer plumage. The extent of the jowl and position of the crest feathers varies in both subspecies, however, depending on levels of aggression and fear (Voisin 1991). Kushlan & Hancock (2005) state that *coromandus* shows more extensive feathering on the tibia. Rasmussen & Anderton (2005) state that *ibis* shows less bare facial skin than *coromandus*. Although both taxa can show black legs (contra Rasmussen & Anderton (2005) and Brazil (2009) who both state that only *coromandus* shows black legs), it was found that only *ibis* shows a pale 'gull grey' leg coloration in adult winter plumage (plate 382). However, a *coromandus* in transition between yellow/green and black legs could theoretically show this coloration. Voisin (1991) stated that the colour of the feet

seems to differ slightly in different populations; for example, they are yellowish-green in *ibis* at the African Cape, but in some populations the green colour does not fade to yellow.

Rasmussen & Anderton (2005) found differences in the vocalisations of *ibis* and *coromandus*. They report calls of the former to be noticeably higher pitched, more nasal and less gravelly; and calls of the latter (at least in adults at breeding colonies) to be short, deep, husky, croaking, murmuring barks. They also state that *coromandus* occasionally gives similar low, hoarse calls away from colonies. A more-in-depth study of vocal differences is needed to confirm or refute these differences (see above).

Pitfalls

There are various pitfalls when identifying *coromandus*. These include Intermediate Egret which is larger, with a shape closer to Western Great Egret *Casmerodius albus*, and shows a dark bill in adult summer plumage. As discussed above, first and second calendar-year Cattle Egrets may show a dark-tipped yellow bill, as in adult winter Intermediate Egret. The possibility of a hybrid

Cattle x Little Egret *E garzetta* should also be ruled out. This hybrid combination has been recorded on at least three occasions (McCarthy 2006, Meulmeester 2010). The Little Egret influence produces longer legs and a longer bill compared with pure *ibis*. Therefore, separation from pure *ibis* is straightforward but separation from pure *coromandus* requires more care. Any area of plumage in all taxa may become faintly orange or rusty toned, quite often through staining from mud and possibly dust (plate 381). A stained adult summer plumage *ibis* could then invite confusion with *coromandus*.

Conclusion

Both *ibis* and *coromandus* are capable of migrating long distances, and *coromandus* should be considered a likely vagrant to the WP. It was found that the following features are useful in separating *ibis* and *coromandus*: **1** extent and coloration of adult summer plumage; **2** bill length; **3** tarsus length; **4** tail length; and **5** bill depth at both nostril and feathering (only in separation of 'Indian Ocean specimens' from *ibis* and *coromandus*). In addition, vocalisations are of use according to Rasmussen & Anderton (2005) but data on these were not collected and they require further work. Data to confirm the validity of the taxon '*seychellarum*' and its separation from *ibis* and *coromandus* are lacking.

Acknowledgements

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Samenvatting

HERKENNING VAN ONDERSOORTEN EN STATUS VAN KOEREIGER
Zowel nominaat Koereiger *Bubulcus ibis ibis* als Oostelijke Koereiger *B i coromandus* zijn in staat om grote afstanden af te leggen en *coromandus* dient daarom te worden beschouwd als waarschijnlijke dwaalgast in het West-Palearctische gebied. Dwaalgasten zijn reeds vastgesteld op het Arabisch Schiereiland (Oman, Verenigde Arabische Emiraten); een geval in Tunesië is van twijfelachtige herkomst. In dit artikel wordt de herkenning van beide ondersoorten (die volgens sommige auteurs soortstatus verdie-



384 Western Cattle Egret / Koereiger *Bubulcus ibis ibis*, first calendar-year, Chew Valley Lake, Somerset, England, 3 August 2008 (Gary Thoburn). Plumage of Eastern Cattle Egret *B i coromandus* of same age is similar, although structural differences still evident in some individuals.

nen) behandeld en wordt ingegaan op de verspreiding in historisch perspectief (beide taxa hebben in het verleden hun broedgebieden sterk uitgebreid, waarbij verschillende continenten zijn gekoloniseerd; zie figuur 1). De volgende kenmerken zijn het belangrijkste om nominaat *ibis* en *coromandus* te onderscheiden (zie figuur 2 en tabel 1): **1** kleur en verdeling van roodbruin in adult zomerkleed (dieper geelbruin en uitgebreider bij *coromandus*; omdat vogels een groot deel van het jaar in zomerkleed kunnen zijn is dit kenmerk in grote delen van het jaar toepasbaar); **2** snavellengte (gemiddeld iets langer bij *coromandus*); **3** tarsuslengte (gemiddeld iets langer bij *coromandus*); **4** staartlengte (gemiddeld iets korter bij *coromandus*); en **5** snaveldiepte zowel ter hoogte van neusgat als van bevedering (alleen geschikt om exemplaren van de eilanden in de Indische Oceaan ('*seychellarum*') te onderscheiden van nominaat *ibis* en *coromandus*). Aanvullende kenmerken hebben betrekking op kop- en halsvorm (slanker bij *coromandus*) en pootkleur (bij nominaat *ibis* soms grijs in winterkleed). Door de verschillen in biometrie lijkt *coromandus* iets meer op *Egretta*-zilverreigers of Middelste Zilverreiger *Mesophoyx intermedia* dan nominaat *ibis*. Bij de herkenning van *coromandus* moet ook gelet worden op de mogelijkheid van een hybride *Egretta* x nominaat *ibis*. Onvolwassen vogels en vogels in winterkleed zijn alleen aan de hand van verschillen in structuur te onderscheiden. Er zijn verschillen gemeld in vocalisaties tussen nominaat *ibis* en *coromandus* maar of dat homologe geluiden betrof is gezien de grote variatie nog de vraag. Gegevens over de validiteit van '*seychellarum*' en het onderscheid met nominaat *ibis* en *coromandus* ontbreken en dit onderwerp vraagt om nadere studie.

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