

FIRST RECORDS OF POLYMELIA AND MELANISM IN ARDEID NESTLINGS REVEALED BY LONG-TERM MONITORING IN NORTH-EASTERN ALGERIA

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Abstract. Phenotypic anomalies such as melanism and polymelia are rarely reported in wild birds, yet they are particularly informative when documented with clear descriptions and supporting photographs. We present two such observations from a long-term monitoring of colonial breeding sites in north-eastern Algeria: a polymelic Cattle Egret (*Ardea ibis*) nestling recorded at Sidi Achour in 2003 and a melanistic Little Egret (*Egretta garzetta*) nestling observed at Lake Fetzara in 2007. In both cases, fledging was confirmed by direct observations. These records provide dated, site-specific baseline information for future monitoring and are considered in the context of published reports on developmental anomalies and plumage polymorphism in domestic and wild birds.

INTRODUCTION

Developmental anomalies can act as sensitive indicators of environmental stressors and contaminants that disrupt normal development; therefore, clearly documenting rare cases in wild vertebrates is important for natural-history records, ecological monitoring and future conservation assessments (Rockwell et al. 2003; Castro-Bastidas et al. 2025). Such records are most useful when they include precise dates, locations, morphological descriptions and photographic evidence, allowing future observations to be compared across sites and years (Schwantes et al. 2025). In birds, two conspicuous anomalies are melanism, an unusually dark melanin-rich plumage phenotype (Mundy 2005; van Grouw 2017), and polymelia, the presence of supernumerary limbs (Azeez and Oyagbemi 2013). Melanic plumage variation often has a genetic basis, and variation in the melanocortin-1 receptor gene (*MC1R*) has been associated with dark plumage phenotypes in several bird species (Mundy 2005; Yang et al. 2015). Although both have been reported sporadically across taxa, comparable records from wild colonial water birds remain uncommon.

Colonial breeders such as egrets and herons nest at high density in discrete wetland sites (Kushlan and Hancock

2005), creating favourable conditions for detecting rare phenotypes when colonies are visited repeatedly. However, without consistent reporting and explicit monitoring context, such rare events remain difficult to compare across sites or years and may therefore remain effectively inaccessible to the wider scientific community (Schwantes et al. 2025).

This study reports two rare, well-documented anomalies recorded during the long-term monitoring of colonial breeding sites in north-eastern Algeria: (1) a polymelic Cattle Egret *Ardea ibis* (Linnaeus, 1758) nestling recorded at Sidi Achour in 2003 (Samraoui et al. 2007) and (2) a melanistic Little Egret *Egretta garzetta* (Linnaeus, 1766) nestling observed at Lake Fetzara in 2007 (Samraoui et al. 2025).

MATERIALS AND METHODS

Field observations at two wetland sites in north-eastern Algeria were carried out as part of a decade-long systematic survey of water birds across one hundred major Algerian wetlands (Samraoui and Samraoui 2008, 2011).

Site 1: Sidi Achour marsh, currently referred to as Lake El Rym (36°52.74'N, 07°43.70'E), is a small marsh situated alongside the RN44 highway on the outskirts of Annaba (Samraoui et al. 2007).

Site 2: Lake Fetzara (36°47.53'N, 07°30.19'E) is an extensive brackish marsh of approximately 24,000 ha, designated both as a Ramsar site and an Important Bird Area (IBA), and desiccates only under conditions of exceptional drought (Samraoui et al. 2025).

All observations were non-invasive, except for a brief temporary handling of polymelic nestling for examination and photography, following general ethical guidelines for the use of wild birds in research (Gaunt and Oring 1999).

RESULTS

At Sidi Achour, the monospecific Western Cattle Egret *Ardea ibis* colony was first visited on 9 July 2003, when 91 active nests were counted. One newly hatched nestling showing polymelia was observed and photographed on 10 July 2003 (Fig. 1a). The chick had an additional pair of legs attached to the lower abdomen/pelvic region. These supernumerary limbs were inverted relative to the normal hind limbs, approximately 50% shorter than the normal legs, pale, underdeveloped, unfeathered and non-functional, with claw-like tips. They remained immobile throughout growth. The nestling was briefly handled only for examination and photography and was then monitored during subsequent visits. It was photographed again on 20 July 2003 at a more

advanced developmental stage (Figure 1b) and later fledged successfully at approximately 28 days of age, with no evidence of parental rejection. No additional anomalies were detected among the approximately 450 nestlings examined in this colony.

At Lake Fetzara, a mixed heronry included Cattle Egrets, Little Egrets, Common Squacco Herons *Ardeolaraloides* and Black-crowned Night Herons *Nycticorax nycticorax* during the 2007 breeding season. Approximately 250 Little Egret nests were estimated. A single melanistic Little Egret *Egretta garzetta* nestling was photographed on 5 July 2007 with normally pigmented Little Egret nestlings (Figure 2).

DISCUSSION

These two observations, a polymelic Cattle Egret and a melanistic Little Egret, document rare phenotypic anomalies in wild ardeids from North Africa. To our knowledge, comparable records of polymelia in Western Cattle Egret and melanism in Little Egret have not previously been reported from this region. The polymelic Cattle Egret also contributes to the limited literature on supernumerary limb anomalies in wild birds, alongside published cases involving Sooty Tern *Onychoprion fuscatus*, Silver Gull *Chroicocephalus novaehollandiae*, Swainson's Hawk *Buteo swainsoni*, Pied Flycatcher *Ficedula hypoleuca* and Common Teal *Anas crecca* (Austin 1969; Rogers et al. 2016; Woehler and Holzmann 2020; Fuertes-Recuero et al. 2023; Gerasimov and Artukhin 2025). In the present case, the Cattle

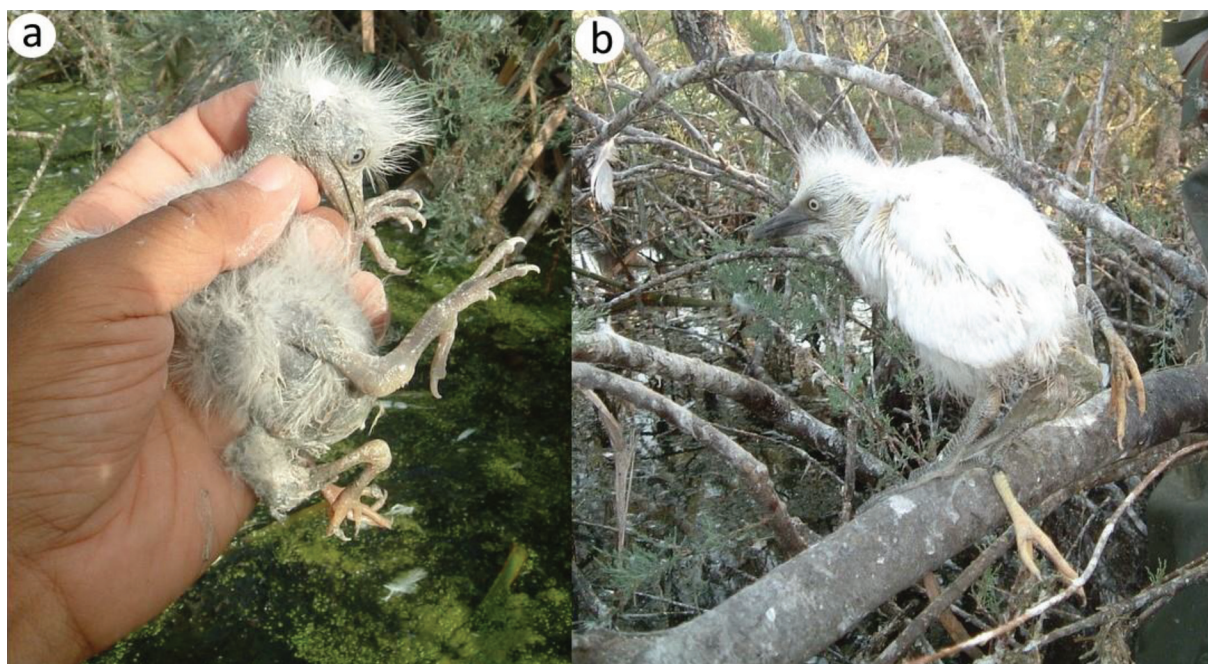


Figure 1. Polymelic *Ardea ibis* nestling at hatching at Sidi Achour in 2003, showing sparse white down feathers (a); the same polymelic *Ardea ibis* nestling at advanced development, displaying denser feather coverage (b).



Figure 2. Melanic (on the left) and normally pigmented (on the right) *Egretta garzetta* nestlings at Lake Fetzara, 2007.

Egret nestling bore an additional pair of non-functional legs attached to the lower abdomen/pelvic region, yet it fledged successfully. This confirms only that the malformation did not prevent fledging; it does not allow conclusions about its cause or about post-fledging fitness consequences, because no environmental, toxicological, radiographic or genetic analyses and no post-fledging monitoring were conducted.

Reports from domestic poultry show that polymelia does not always preclude short-term survival in managed settings, particularly when supernumerary limbs are non-functional and no major associated abnormalities are evident; however, concurrent anomalies can markedly reduce viability, and such cases should be interpreted cautiously because survival conditions differ strongly between domestic and wild birds (Ajayi and Mailafia 2011; Abu-Seida 2013; Amatya 2014; Hassanzadeh and Rahemi 2017; Oliveira Filho et al. 2024).

In contrast, several reported cases of polymelia in wild birds involve a severe functional impairment and reduced survival. A Swainson's Hawk (*Buteo swainsoni*) with bilateral polymelia and syndactyly was unable to fly or perch and was euthanised due to a poor prognosis (Rogers et al. 2016), while a European White Stork (*Ciconia ciconia*) chick with fused pairs of legs and polydactyly suffered severe mobility constraints leading to parental infanticide (Onmuş et al. 2017). Supernumerary limbs in a Pied Flycatcher (*Ficedula hypoleuca*) nestling, classified as pygomelia due to two additional limbs fused to the pelvic region, were likewise associated with pronounced

impairment (Fuertes-Recuero et al. 2023). These cases highlight the severe survival challenges limb anomalies usually pose for wild birds, whereas the Cattle Egret's successful fledging suggests that in this instance the anomaly's position and non-functional nature did not substantially hinder early development or parental care.

The causes of polymelia remain uncertain, with both genetic and environmental factors implicated in different taxa (Morath-Huss et al. 2019; Silva et al. 2020). In wild birds, published cases remain scarce and include records from Sooty Tern, Black-headed Gull, Swainson's Hawk and Pied Flycatcher (Austin 1969; Rogers et al. 2016; Gimeno 2023; Fuertes-Recuero et al. 2023). In contrast to the Black-headed Gull *Chroicocephalus ridibundus*, which survived into at least its second winter with a supernumerary limb (Gimeno 2023), the Cattle Egret nestling reported here had completely non-functional additional legs but nevertheless fledged successfully, indicating only that the malformation did not prevent short-term survival during the nestling period.

Similarly, one Little Egret brood included a melanistic nestling alongside normally pigmented siblings; no obvious behavioural or developmental differences were observed during nest monitoring. Such within-brood variation appears rare in Little Egrets, in contrast to the closely related Western Reef Heron *Egretta gularis*, which is renowned for its striking dark and white morphs and is frequently cited as a classic example of plumage polymorphism in herons (del Hoyo et al. 2014). Colour polymorphism can be evolutionarily significant and may

fulfil adaptive functions in birds (Smith and Skúlason 1996; Roulin 2004). For example, different colour morphs may differ in habitat use, foraging behaviour, breeding phenology or mate choice, as reported in the Bananaquit *Coereba flaveola*, Reddish Egret *Egretta rufescens*, Western Reef Heron *Egretta gularis*, Parasitic Jaeger *Stercorarius parasiticus* and Lesser Snow Goose *Anser caerulescens caerulescens* (Cooke et al. 1976; Wunderle 1981; O'Donald 1983; Phillips and Furness 1998; Green 2005; Al-Ali et al. 2020).

CONCLUSION

These two observations document rare phenotypic anomalies in wild colonial water birds from North Africa: polymelia in a Cattle Egret and melanism in a Little Egret. Their detection during repeated colony monitoring shows the value of sustained field observation for recording uncommon developmental and plumage anomalies that may otherwise remain undocumented. In both cases, the affected nestlings fledged successfully, indicating that neither anomaly prevented survival during the nestling period, although post-fledging survival remains unknown. These records provide dated, photographic baseline information for future comparisons across sites and years in the region.

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Conflict of Interest Disclosure

The authors declare no conflicts of interest.

Data Availability Statement

The data supporting this study (field notes and photographic records) are available from the corresponding author upon reasonable request.

Ethics Approval Statement

This study was approved by the Algerian Ministère de l'Enseignement Supérieur et de la Recherche Scientifique.

Author contribution

FS. Writing - Original Draft.

BS. Investigation-Review & Editing

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