

Red-billed quelea

Quelea quelea



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Summary

The red-billed quelea is a small finch native to Africa. Often referred to as ‘feathered locusts’, queleas can form nomadic super-colonies of up to 30 million, feeding on ripe sorghum, wheat, barley, rice, sunflowers and corn. A flock of 2 million can consume 50 tonnes of grain in a day. Queleas are one of the most abundant and destructive birds in the world, causing \$US70 million damage to grain crops per annum.

Queleas are occasionally kept as pets in Australia. Escape or deliberate release in suitable habitats could be disastrous, as queleas are well suited to Queensland’s tropical and subtropical savannahs and could cause significant damage to Queensland’s \$400 million per annum cereal grain crops. Queleas could also replace native finches, such as the endangered Gouldian finch, and other native animals that feed on grass seeds.

Introduction

Name and taxonomy

Species: *Quelea quelea*

Common names: Red-billed quelea, common quelea, African weaver bird, African weaver finch, common dioch, black-faced dioch, Sudan dioch

Family: Ploceidae

Related species: *Quelea cardinalis* (cardinal quelea), *Quelea erythrops* (red-headed quelea)

Subspecies: *Q. quelea aethiopic*, *Q. quelea latham*, *Q. quelea quelea*

Several subspecies occupy different parts of Africa. Each has its own migration pathway, as determined by local rainfall patterns and the availability of grass seeds (Jones et al. 2000).

Description

Red-billed queleas are approximately 12.5 cm long and weigh 15–20 g. They are mostly brown, with conical, red bills and legs. Juveniles have a pale brown bill. During the breeding season, the females' bill colour changes from red to a waxy bright yellow. Males develop colourful plumage and a bright red bill. Male breeding plumage is variable, comprising a facial mask ringed with pink or dull yellow (which ranges from black to white) and breast and crown plumage that varies from yellow to bright red. After the breeding season, males revert to plain brown plumage (Burton & Burton, Sinclair et al. 2005, Wikipedia 2008).

Biology

Life history

Incubation period: 10–12 days

Number of eggs: 1–5 (average 3)

Breeding interval: May breed several times in the same season, depending on local food supply. 1–2 year interval between breeding seasons.

Fledging: 11–13 days

Sexual maturity: 12 months

Life span: 2–3 years

Red-billed queleas are nomadic birds, forming huge colonies up to 30 million individuals (Jungle Photos, 2006).

The breeding season begins with the onset of seasonal rains. Males begin to construct an oval-shaped nest from strips of green grass and use the half-finished nest to attract a female. Once the pair mate, they complete the nest together. Nests are often built in acacia trees in or near a swamp. A single colony may comprise millions of nests, with 500 nests per tree. Breeding colonies exhibit biological synchrony with millions of eggs hatching on the same day. If the dry season starts early, a breeding colony may be abandoned. Alternatively, if the rainy season is prolonged, then several more clutches of eggs are laid (Answers.com, 2008; Burton & Burton, 2002; Shugart, 2007; Wikipedia, 2008).

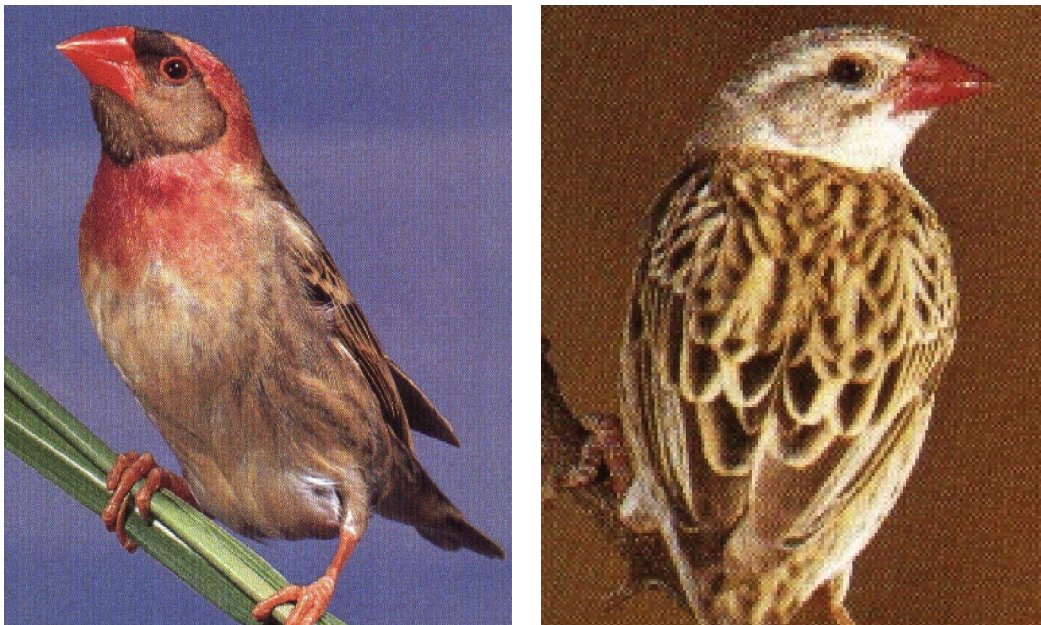


Figure 1. Male red-billed quelea (left) and female (right) showing differences in plumage (sexual dimorphism) (Photos: Western Australia Department of Agriculture).

Colonies feed in the early morning and late afternoon, gathering in the middle of the day in a shady area to preen. Overnight, members of the colony roost together (Burton & Burton, 2002).



Figure 2. A flock of red-billed queleas.

(Photo: Alastair Rae. Image from Wikimedia Commons under a *Creative Commons Attribution ShareAlike 2.0 Licence*).

Diet and feeding behaviour

Red-billed queleas are generalist granivores, feeding on seeds from native annual grasses such as *Echinochloa*, *Panicum*, *Sorghum*, *Tetrapogon*, *Urochloa*, and *Setaria* spp. and also domesticated annual grasses such as maize (*Zea mays*), tef (*Eragrostis tef*), sorghum (*Sorghum bicolor*), millet (*Panicum miliaceum*) rice (*Oryza sativa*), wheat (*Triticum* spp.), oats (*Avena aestiva*), buckwheat (*Phagopyrum esculentum*), manna (*Setaria italica*), sunflower (*Helianthus annuus*), and barley (*Hordeum disticum*). They have been known to feed on crushed maize from cattle feedlots.

During the breeding season, hatchlings are initially fed caterpillars, grasshoppers and other insects, before being fed grass seeds (Berruti, 2000; Cheke, undated; Erickson, 1979). Colonies feed intensively and each bird will consume its weight in seeds each day. A colony in Namibia was estimated to comprise 4.8 million adults and 4.8 million fledglings, and consumed approximately 13 tonnes of insects and 800–1200 tonnes of grass seeds during its breeding cycle (Berry et al. 2004; Pimentel, 2002).

Queleas can move 48–64 km in a single day to feed and then return to their roost at night (Burton & Burton, 2002). Since preferred grass species are annuals, queleas have developed a migratory strategy to ensure year-round feeding. By eating intensively, queleas can gain sufficient weight to allow migration to new feeding areas.

With the first rains, queleas migrate to dry areas that still have ungerminated grass seeds. As the rain-front progresses, birds move ahead and continue feeding in dry areas with grass seeds. When all dry areas have received rain, they migrate back to the first area that received rain—by that time, the grass seeds have germinated and produced more seeds. Caterpillars, grasshoppers and insects have also emerged. The queleas will then breed. If the season is favourable, they will move to new areas, starting a new breeding cycle each time (Cheke et al. 2007).

Preferred habitat

Red-billed queleas inhabit tropical and subtropical seasonally dry savannahs, grasslands, woodlands and croplands, at altitudes below 2000 m. During the breeding season, they prefer thorny or spiny vegetation such as *Acacia* savannahs and lowveld areas, generally at altitudes less than 1000 m (Mundy & Herremans, undated; Sinclair et al. 2005).

Queleas can be ten times more abundant in agricultural lands compared with natural grasslands (Berruti, 2000).

Predators and diseases

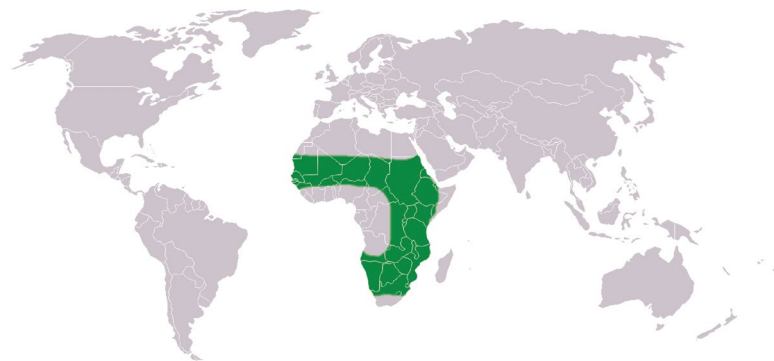
The huge roosts and breeding colonies of queleas attract a large number of predators and scavengers, such as herons, storks, falcons, goshawks, owls, hornbills, rollers, kingfishers, crows, marabou, shrikes, snakes, lizards, and small mammals. Most take nestlings or scavenge dead birds. Juvenile mortality can be 50 per cent (Berruti, 2000). When a colony is moving they form a dense mass, making it difficult for predators to attack (Burton & Burton, 2002). People occasionally collect and eat nestlings, as a good quality source of protein (Elliott, 2000).

Queleas do not suffer any significant diseases and have low levels of gastro-intestinal parasites (Yusufu et al. 2004).

Distribution and abundance overseas

The native range of queleas extends over an estimates 9 400 000 km² in Africa (BirdLife International, 2004), including Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Congo, The Democratic Republic of the Côte d'Ivoire, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Malawi, Mali, Mauritania, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Somalia, South Africa, Sudan, Swaziland, Tanzania, United Republic of Uganda, Zambia and Zimbabwe. They are also vagrant in Djibouti.

In the past, queleas were regularly imported into Europe and North America as pets, but they are now less common (Hinze, 2004).



(Image: Jonathan Hornung. Image from Wikimedia Commons, released to the *Public Domain*)

Conservation status

The quelea ranks as one of the world's most abundant wild birds and has a breeding population in excess of 1.5 billion (Jungle Photos, 2006).

The IUCN 'Red List' lists queleas as a Species of Least Concern (IUCN 2004).

Threat to human safety

Individual queleas do not present a direct threat to human safety. However, huge flocks can devastate cereal crops and have serious impacts in poor parts of Africa.

History as a pest

In Africa, queleas have been an agricultural pest for centuries, with images of farmers cracking whips to scare off queleas recorded within the tombs of pharaohs (De Groot, 1990). Expansion of the total area of cereal grain crops in Africa has been followed by a dramatic increase in abundance of queleas. Today, queleas are referred to as ‘feathered locusts’ and are probably the most abundant and most destructive bird in the world, with agricultural losses estimated at US\$70 million per annum.

Eastern and southern African countries of Botswana, Ethiopia, Kenya, South Africa, Sudan, Tanzania, Zimbabwe, Malawi, Mozambique, Somalia, Swaziland, Uganda, Zambia, Eritrea and Namibia undertake control of queleas, wherever feasible (Elliott, 2000). International control programs coordinated by the U.N. Food and Agriculture Organisation began in the 1960s. As well as the costs associated with loss of produce, there are also costs associated with control. For example, in South Africa there are 173 control operations that kill approximately 50 million birds annually (Answers.com, 2008; Cheke, undated). A five-year control program in Botswana is estimated to cost US\$3.08 million (Government of the Republic of Botswana, 2005).

Red-billed queleas are capable of destroying entire crops, over areas up to 1000 ha (Ibrahim, 2007). An individual quelea consumes an average of 18 grams of grain per day. It is not unusual for flocks to number into the millions, so a flock of 2 million birds can eat up to 50 tonnes of grain in a day, or 1500 tonnes within 30 days, which is worth approximately US\$600 000. The east African countries of Somalia, Kenya, Tanzania, Ethiopia, and Sudan suffer an annual total loss of grain worth US\$15 million (Pimentel, 2002).

With the introduction of modern, large-scale agriculture (i.e. cereal crops, cattle feedlots, large dams with reedbeds that provide suitable breeding sites) large areas of highly favourable habitat have been created, supporting a dramatic increase in quelea abundance. In parts of Africa, quelea numbers have increased 10–100 times since the 1970s. In agricultural areas, queleas have also become less migratory, in response to a year-round food source (Berruti, 2000).

In the United States, there are reports of pet queleas escaping. However, wild populations have not yet naturalised (Simberloff et al. 1997).



Figure 4. *Quelea quelea* flocking at a waterhole.

(Photo: Alastair Rae. Image from Wikimedia Commons under a *Creative Commons Attribution ShareAlike 2.0 Licence*)

Potential distribution and impact in Queensland

Climate is a primary factor that determines a species' distribution. Climate-modelling software (CLIMATE version 1) was used to predict the area of Australia where climate is considered suitable for red-billed queleas (Figure 5).

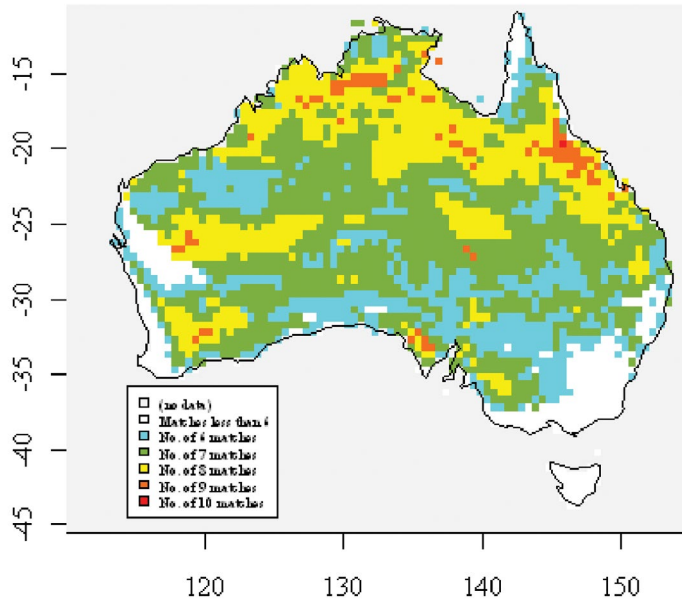


Figure 5. Potential distribution of red-billed queleas (red indicates areas where climate is most suitable, decreasing to orange, yellow, green and light blue, with white being unsuitable).

Based purely on an assessment of climate, queleas are likely to survive over most of Queensland, with tropical areas being most suitable. It is important to note, however, that other habitat requirements, such as the availability of food, will influence range and abundance.

If permitted to naturalise, queleas have the potential to become super-abundant over vast areas of savannah grasslands and grain-growing regions across Queensland. A range of cereal grains—including sorghum, wheat, barley, corn and sunflowers—worth an estimate \$429 million per annum (Australian Bureau of Statistics, 2008) could be at serious risk.

In addition to economic impacts, it is reasonable to predict that queleas could compete with a number of native seed-feeding native animals, such as the endangered Gouldian finch (Figure 6).



Figure 6. Gouldian finches (*Erythrura gouldiae*).

(Photo: Nigel Jacques. Image from Wikimedia Commons under a *Creative Commons Attribution ShareAlike 2.5 Licence*).

Legal status in Australia and Queensland

The import of queleas into Australia is currently restricted by the *Environment Protection and Biodiversity Conservation Act 1999*.

In Queensland, red-billed queleas are listed as Prohibited Wildlife under the *Nature Conservation (Wildlife) Regulation 2006* and cannot be kept as pets.

Numerical risk assessment using the ‘Bomford assessment’

A numerical risk assessment system developed by Bomford (2006) is widely applied in Australia to assess the level of risk posed by vertebrates. This approach enables numerical ranking and prioritisation of large numbers of species. First, a species’ potential distribution is predicted using climate-modelling computer programs. The remaining steps involve allocation of scores for a number of attributes relevant to a species’ pest status, including biology, costs to the economy, the environment and society, and management efficacy.

Using the Bomford system, red-billed queleas were assessed as an ‘extreme’ threat species (refer to attachment).

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Appendix 1

Using the Bomford (2006) system, red-billed queleas in Queensland were ranked as an *extreme* threat species.

Species:		quelea quelea (red-billed quelea)
Date of assessment:		5 September 2008
Literature search type and date:		See references
Factor	Score	
A1. Risk to people from individual escapees (0–2)	0	Nil risk.
A2. Risk to public safety from individual captive animals (0–2)	0	Nil risk.
Stage A. Risk posed by captive or released individuals = Sum of A 1 to 2. (0–4)	0	Not dangerous
B1. Climate match (1–6)	5	Very high climate match in Australia. CMS = 2527.
B2. Exotic population established overseas (0–4)	0	Queleas are not naturalised outside their native range.
B3. Taxonomic class (0–1)	0	Bird.
B4. Migratory (0–1)	1	Facultative migrant in its native range.
B5. Diet (0–1)	1	Generalist diet of grass seeds, cereals/grains, insects.
B6. Habitat (0–1)	1	Red-billed queleas adapt very well to human agricultural environments.
B7. Overseas range size (0–2)	1	Overseas range size of 9.4 million square kilometres.
B. Probability escaped or released individuals will establish a free-living population = Sum of B 1 to 7. (1–16)	9	Moderate establishment risk
C1. Taxonomic group (0–4)	2	Bird in taxa that is particularly prone to causing agricultural damage.
C2. Overseas range size including current and past 1000 years, natural and introduced range (0–2)	0	9.4 million square kilometres.
C3. Diet and feeding (0–3)	0	Not a mammal.
C4. Competition with native fauna for tree hollows (0–2)	0	Does not use tree hollows.
C5. Overseas environmental pest status (0–3)	3	Major environmental pest throughout eastern and southern Africa.

C6. Climate match to areas with susceptible native species or communities (0–5)	5	The species has more than 20 grid squares within the highest two climate match classes, and has more than 100 grid squares within the four highest climate match classes, that overlap the distribution of any susceptible native species or communities.
C7. Overseas primary production pest status (0–3)	3	Major pest of primary production in eastern and southern Africa.
C8. Climate match to susceptible primary production (0–5)	5	Score = 180 see Table 1.
C9. Spread disease (1–2)	1	Not known.
C10. Harm to property (0–3)	0	\$0
C11. Harm to people (0–5)	3	Social nuisance—annoyance moderate or severe but few people exposed (see A1).
C. Probability an exotic species would become a pest (for birds, mammals, reptiles and amphibians) = Sum of C 1 to 11. (1–37)	21	Extreme pest risk
A = 0 = not dangerous; A = 1 = moderately dangerous; A ≥ 2 = highly dangerous	0	Not dangerous
B. Risk of establishing a wild population		
For birds and mammals: B < 6 = low establishment risk; B = 7–11 = moderate establishment risk; B = 12–13 = serious establishment risk; B > 14 = extreme establishment risk	9	Moderate establishment risk
For reptiles and amphibians: B < 3 = low establishment risk; B = 3–4 = moderate establishment risk; B = 5–6 = high establishment risk; B > 6 = extreme establishment risk		
C. Risk of becoming a pest following establishment		
C < 9 = low pest risk; C = 9–14 = moderate pest risk; C = 15–19 = serious pest risk; C > 19 = extreme pest risk	21	Extreme pest risk
VPC threat category		Extreme