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## TWO IS A COMPANY, THREE'S A CLUTCH IN A SUBURBAN POPULATION OF RED-EYED DOVES


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## BREEDING BIOLOGY

# TWO IS A COMPANY, THREE'S A CLUTCH IN A SUBURBAN POPULATION OF RED-EYED DOVES

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**Abstract**
The doves and pigeons are characterized by small clutch sizes of 1–2 eggs and the production of crop milk. Reports of supernormal clutch size of three or more eggs are extremely rare. Here we provide the first evidence of three separate records of supernormal clutches/broods of three in the Red-eyed Dove. It is possible that a relatively high quality, protein-rich diet of adults and nestlings in this urban population may partially offset the lower protein content of seeds when the production of crop milk becomes insufficient to sustain the growing nestlings. This may enable parents to successfully produce and raise clutches of three.

**Introduction**
The pigeons and doves are one of the most adaptable groups of birds as they occupy a range of habitats from forest to open country in hot and cold environments, at high and low altitudes on all continents (except Antarctica) and most oceanic islands (Baptista *et al.* 1997). The family represents an interesting evolutionary enigma as clutch sizes are invariably small (1–2 eggs) and the species exhibit very little intraspecific variation in clutch size despite considerable temporal and regional variation in resource abundance or the effects of competing energy demands (Westmoreland & Best 1987; Baptista *et al.* 1997). Several hypotheses attempt to explain the small clutch sizes of pigeons and doves, for example:

i) Clutch size may be limited by the inability of parents to incubate/brood three eggs/nestlings,
ii) Crop milk production in the early nestling period may be insufficient to raise three young,
iii) Clutch size could be limited by the inability of the parents to gather enough seeds for nestlings following the crop milk period, and
iv) The predation hypothesis predicts that clutch size is small to reduce the nesting period and hence exposure time of the nest to a potential predator (Westmoreland and Best 1987; Blockstein 1989).

Clutch size may also partly be determined by the quality of the diet (Baptista *et al.* 1997). For example, frugivorous doves almost invariably lay single-egg clutches whereas granivorous doves tend to lay two eggs per clutch. It has been suggested that the relatively low protein content of fruit may make it too energetically expensive to produce two eggs. Seeds contain comparatively more protein which may facilitate the production of two eggs. Although two-egg clutches are the norm (usually >90% of clutches) and single-egg clutches are uncommon (usually <5%), cases of three, four and even an exceptional case of a clutch of six eggs are known for granivorous doves but are extremely rare (Dean 1980; Rowan 1983; Baptista *et al.* 1997). However, clutches of four or more eggs are usually attributed to intraspecific egg dumping rather than exceptional fecundity. Clutch sizes of more than two eggs are known for two species in the genus *Streptopelia*, namely the Cape Turtle-dove *Streptopelia capicola* (Rowan 1983) and the Red Turtle-dove *S. tranquebarica* (Rana 1987).

**Records**
Here we report on three separate records of supernormal clutch and brood sizes of three in the Red-eyed Dove *Streptopelia semitorquata.* The observations were made in a suburban garden in Polokwane in the Limpopo Province, South Africa.

i) 6 June 2014: A nest with three almost fully grown nestlings was found (Fig. 1). One nestling fledged the

next day but remained in the nesting tree the entire day. The other two nestlings fledged on the 8th June 2014.

ii) 2 August 2016. A nest containing three eggs was found (Fig. 2). Only two eggs hatched and both nestlings survived to fledging.

iii) 10 and 12 August 2016. Three well-grown fledglings able to fly well were seen begging for food from two adult birds.

**Fig. 1.** A nest containing three fully feathered Red-eyed Dove nestlings close to fledging (Polokwane, June 2014).

## Discussion

These records suggest that three-egg clutches are possibly fairly common in this population of Red-eyed Doves. We could not find any records of three-egg clutches for Red-eyed Dove in the literature. According to Lack (1947), the clutch size of nidiculous birds corresponds to the maximum number of young that can, on average, be fed and raised. The local population of doves have access to seed and grains on a daily basis. Furthermore, they also regularly eat dog pellets, sometimes even entering the kitchen to get to it! In light of this it may therefore not be entirely surprising that an urban population with a constant supply of seeds, grains and a source of high quality protein, as well as fewer potential nest predators could produce supernormal clutches.

**Fig. 2.** A Red-eyed Dove nest containing three eggs (Polokwane, August 2016).

Doves are unique amongst birds in that they produce crop milk. This is a lipid- and protein-rich mixture of sloughed, epithelial cells of the crop, which is the exclusive food of nestlings for the first few days of the nestling period (Mirarchi & Scanlon 1980; Vandeputte-Poma 1980). This rich diet results in some of the fastest growth rates of any bird species (Baptista *et al.* 1997). When nestlings are 4–5 days old, the demands of the growing nestlings exceed the supply of crop milk by the parents and seeds become increasingly important in the diet. Compared to crop milk, seeds contain less protein and hence the growth rate slows down. It is unlikely that the normal growth rate can be sustained in broods of three nestlings which will result in undernourished individuals with poor post-fledging survival possibilities. However, access to a constant supply of seeds supplemented by high quality protein (dog pellets) in close proximity to the nest may sustain the normal growth rates of nestlings when the supply of crop milk starts to diminish.

In conclusion, this is the first report of supernormal clutch sizes in the Red-eyed Dove and indications are that it may be more common than expected. It is possible that a relatively high quality, protein-rich diet of adults and nestlings in this urban population may partially offset the lower protein content of seeds when the production of crop milk becomes insufficient to sustain the growing nestlings. This may enable parents to successfully produce and raise clutches of three.

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