



Reproductive success of the European Roller (*Coracias garrulus*) using nest boxes and natural cavities in the Vallée des Baux during the 2018 breeding season.

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Introduction

The reproductive success of the European Roller (*Coracias garrulus*) using nest boxes and natural cavities in the Vallée des Baux, outside Arles, France was monitored by Kyle Coughlan, Jack O’Callaghan, Theo Delachat and Alois Roy, under the supervision of Timothée Schwartz, the scientific director of A Rocha France.

Methodology

In total 51 nest boxes have been placed in the study area since the beginning of the project in 2002 and a total of 93 available natural cavities have been identified for the 2018 breeding season.

During the winter the nest boxes are cleaned and closed off to use for other large animals by a mesh cage. The boxes in the study area were opened between 17/04/18 and 02/05/18 just before the Rollers return to breed from Southern Africa.

These boxes were then checked between the 04/06/18 and 10/08/18. The occupation of the nest boxes and cavities is first done through visual observation of adults visiting the nests and then to ascertain whether breeding has taken place, and the contents of the nest are checked. This is done by either climbing a ladder to the nest box or cavity and checking directly or through use of an endoscopic camera probe, and also this year camera traps were utilized in the monitoring of the entrance holes of nest boxes and cavities, (manufacturer WOSPORTS, model name Big Eye 3D).

Before the beginning of the laying period adults were captured through placement of nets outside of the nests. Adults not previously captured before were ringed with identification numbers and also with colour tags for visual identification during future seasons, while those previously ringed were recorded.

Chicks hatched over the course of the season also had id rings and colour tags attached to their legs to ascertain return rates in future seasons.

During the 2018 breeding season the primary focus was on the nestboxes in the Vallée des Baux and as such cavities were not checked as often as previous years so it is likely that data for breeding success in cavities is not entirely accurate and it is also likely to underestimate the breeding population in cavities due to this lowered sampling effort. Due to this lowered sampling effort and therefore likelihood of data being misleading this report will focus solely on data obtained from nest boxes in regards to clutch sizes, fledging success etc.

Results

Total Roller Population:

During the season a total of 29 roller nests with chicks were observed. Hence the total population on the study area is of minimum 29 different breeding pairs. 16 pairs breed in nest boxes (figure 1) which were monitored continuously throughout the breeding period and 13 cavities were seen to have successful breeding pairs.



Figure 1. Successful breeding pairs of rollers in nest boxes in the Vallée des Baux 2011-2018.

Occupation Rates:

In total there were 29 nest found to be occupied by rollers. Of the 51 nest boxes used in the study area a total of 16 were occupied by Rollers in the breeding season which is a 31.3% occupation rates (figure 2). There were 93 observed cavities in the study area of which 13 were occupied which is a 13.9 % occupation rate.

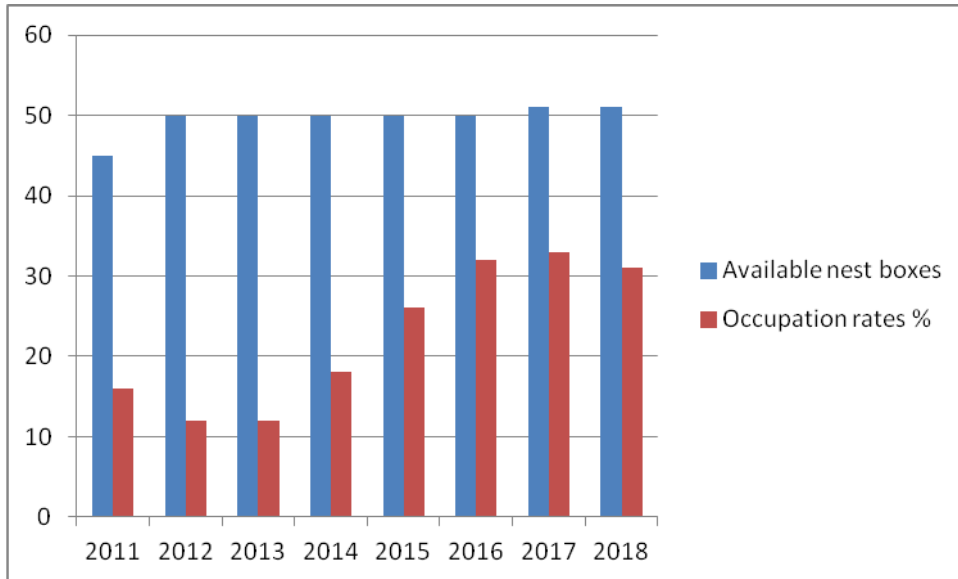


Figure 2. Available nest boxes and occupation rates in the Vallée des Baux 2011-2018.

Breeding and Reproductive Success of nest boxes:

2018 was the best year regarding eggs produces, chicks hatched and fledged in the Vallée des Baux nest boxes during the study period. A total of 83 eggs were laid of which 77 hatched. Of the eggs which produced chicks 100% went on to fledge (Figure 3).

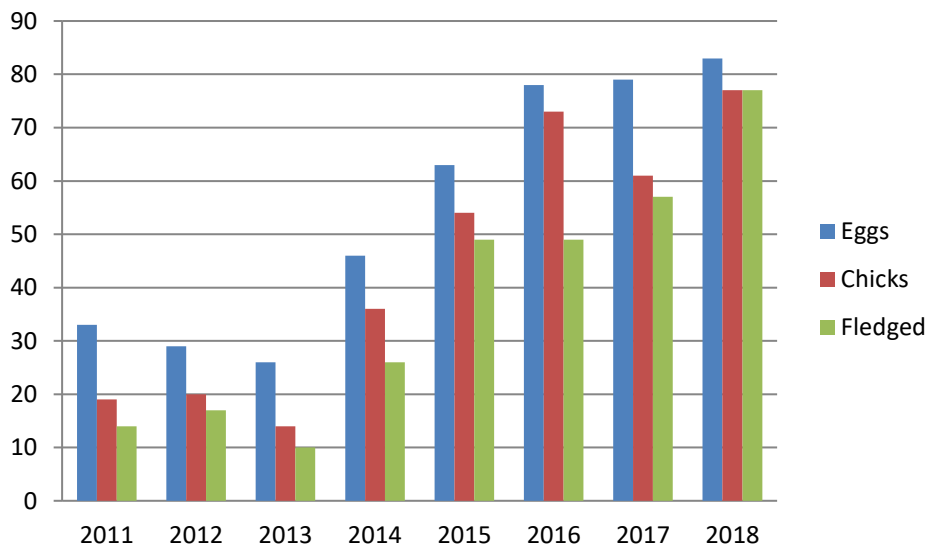


Figure 3. Total sum of eggs laid, hatched and chicks fledged in nest boxes in the Vallée des Baux between 2011 and 2018.

Clutch and brood size:

In total 16 successful nest boxes were observed with eggs contained within, with 83 eggs being counted in total. Of these counted eggs, a total of 77 were seen to have hatched which is a hatch success rate of 92.7%. The average number of eggs hatched in total was 4.8 eggs per nest.

The average clutch size in nest boxes was an average of 5.2 eggs per breeding pair, the highest of any year in the study period as can be seen in figure 4 below and the average brood size of 4.8 chicks is also the highest during the study period.

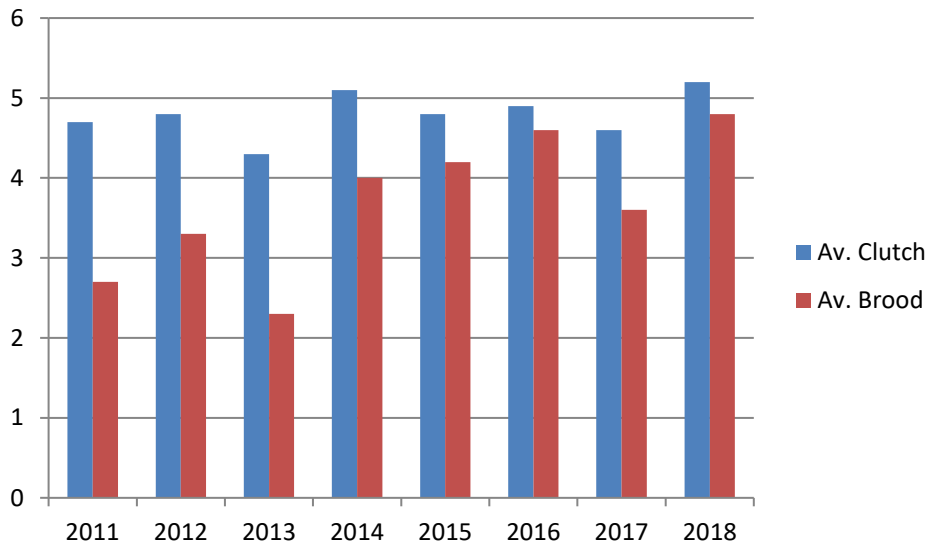


Figure 4. Average clutch and brood size for nest boxes in Vallée des baux 2011-2018.

Fledging success:

This is defined by different by different authors in several different ways the most common being as the number of fledging as a percentage of the number of eggs laid. Of the 83 eggs counted in total in the study area 77 fledged, which is a 93% fledging success with an average of 4.8 chicks fledged per nest.

Other authors define fledging success by the number of fledglings as a percentage of the number of chicks observed in total. Of the 77 chicks observed in the nest boxes in 2018 all were seen to have fledged, which is a fledge success of 100% per chick (Figure 5).

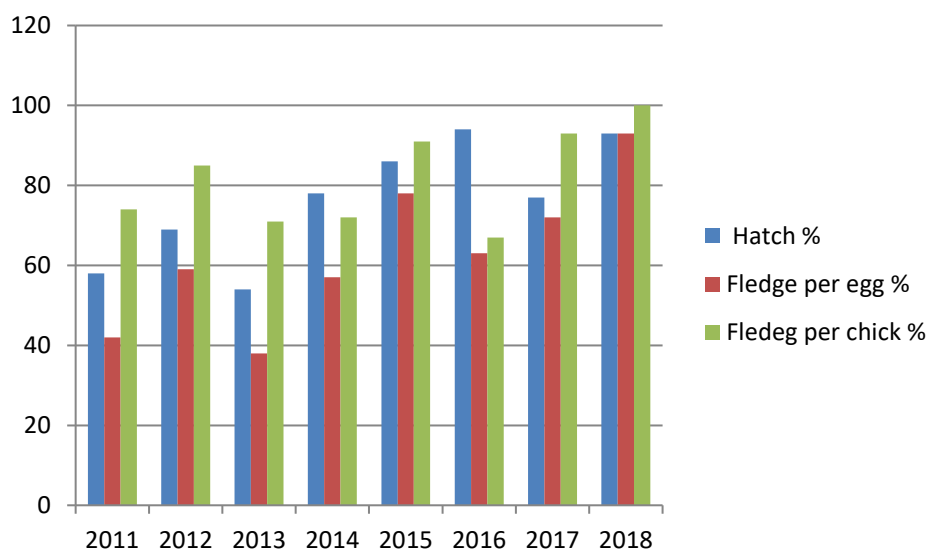


Figure 5. Hatching and fledging rates per egg and chick in nest boxes in Vallée des baux 2011-2018.

Ringling:

A total of 16 adults were captured during the course of the season, of which 5 were controls from previous years with the remaining 11 newly tagged, in addition to this camera traps captured two previously ringed adults at a nest box and a cavity, see added photos at the end. 77 chicks were counted over the season of which 76 were fitted with id rings and colours tags.

Comparisons of nest boxes in the Valle des Baux 2011-2018

The data collected between 2011 and 2018 on nest boxes in the Vallée des Baux is compared in the above figures These years are the only years for which data on egg numbers has been collected and there for accurate clutch, hatchling and fledgling numbers can be calculated.

As can be seen from figure 2 there has been an increase from 45 nest boxes in the valley to 51 over the previous 6 years while occupation rates have risen from 16% to 31% in the same years indicating an increase in population size of the roller in the study area, while there was a decrease in breeding pairs from 17 to 16 using nest boxes from 2017-2018, there was an increase in the number of chicks born and fledged (figure 1 and 3).

Conclusions and Discussion:

A total of 77 chicks were observed in nest in the study area in 2018 which is an increase on previous years. In general there has been an upward increase in the number of rollers in the study area as well as the number of chicks being fledged by these breeding pairs in nest boxes.

The supplementation of breeding sites for the Roller through the installing of nest boxes seems to be having a positive effect on population numbers in the Vallée des Baux. An increase in the number of boxes available could help the population continue to increase however density is based not just on nest site number but also on resource availability such as prey numbers and suitable hunting sites.

Also, during the 2018 breeding season 5 rollers were fitted with 5g PTT Argos trackers. These five individuals were not from the Vallée des Baux but were captured at natural cavities along the Canal du Midi. While they are from separate areas it is highly likely that the individuals with trackers and those from the Vallée des Baux will share a migratory route across the Sahara and down to southern Africa where they wspend the winter. This data will inform local conservation efforts which may in turn increase the proportion of rollers who will then return to France to breed in subsequent years.

Additional Photos



Control adult with tag X/Y[Y(L2)] captured by camera trap at cavity 67.



Control adult with tag X/Y[Y(N2)] captured by camera trap at nest box 85.