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A comparison of the reproduction of collared doves *Streptopelia decaocto* and turtle doves *Streptopelia turtur* in the Ziban Oases (Biskra, Algeria)

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Abstract

The expansion of the palm groves of the southeasterly oases of the Ziban (Biskra, Algeria), from 2 to 4 million palms of it spaces in the last decade seems to have permitted a fast colonization by the Columbidae. During five and half months in 2008, from the end of March until the end of August, we led the observations and a regular follow-up in order to surround the main parameters of the nest building and reproduction among the doves *Streptopelia decaocto* and *S. turtur*. We followed the activity of two samples of reference, composed of N1=21 nests of *S. decaocto* and N2=30 nests of *S. turtur*. The nests were constructed by two varieties of date Palm (*Phoenix dactylifera*): Mech degla and Deglet nour. The respective mean heights of the nests for *S. decaocto* were $HS_{T1} = 6, 11 \pm 1,006$ m (N=14) and $HS_{T2} = 4, 57 \pm 1,12$ m (N=7). While, the mean heights of *S. turtur* were $HS_{B1} = 5, 28 \pm 1,15$ m (N=16) and $HS_{B2} = 4, 04 \pm 1,29$ m, (N=14). The global breeding success for the two species of doves was homogeneous enough; it oscillated between 0, 50 for *S. decaocto* and 0, 56 for *S. turtur*. It was in the same way for the rates of daily survivals ($\$_T = 0, 9424$ *S. decaocto* and $\$_B = 0, 9511$ for *S. turtur*).

Keywords: Doves, Nesting, Oasis, Breeding success, Survival

1. Introduction

In Algeria, Turtle dove *Streptopelia turtur* is a migratory breeding which is distributed over a large area of northern territory of the country to the oases and palm groves in the southern of Algeria [1, 2, 3, 4, 5], while the collared dove *S. decaocto* is a resident species occupying the forests, oases and especially urban areas [5]. The first observation of this species was signaled in 1994 to Annaba (the extreme east of Algeria) and the first nest building was noted in 1996 [3, 6]. Wealth and the diversity of the oases ecosystems have all times constituted to the ecological plan of the areas tampons permitting the welcome of numerous avifaunistic species. The palm groves of the Ziban constitute the traditional environment of the nest building of the doves. However, the fast expansion of the palm grove was doubled surface in the space and the 20954 ha in 1993 pass on to the surface of 41714 ha in 2011 [20]. To drives this population localized well in the south Algerian, because the oases of date palm present a very interest ecological habitat [21]. Up to date, there is a lack of knowledge on the ecology and the biology of the different species of doves frequenting the oases ecosystems. It is for this reason; our study is particularly interested in breeding success and the occupation of the vertical structure of the oasis environments.

2. Materials and methods

The region of Biskra is located east of Algeria, in the foothills of the Aures (34, 48 N & 5, 44 E). It appears at the big door that opens up on the Sahara and her arid climate. It is limited in the north by the province of Batna, to the North - West of the province of M'Sila, to the Northeast of the province of Khenchela, to the south by the province of El Oued and Ouargla and to the Southwest of the province of Djelfa [Fig.1]. The study area is located in Sidi Okba, 20 km from the capital - instead of Biskra (31 ° 59 'N and 5 ° 20' E). We achieved the present work during five and half months in 2008.

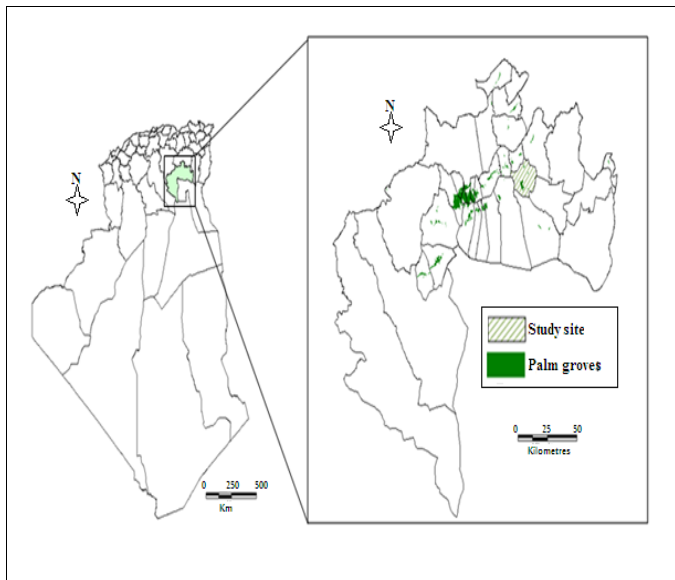


Fig 1: Geographical location of the study site (Biskra Province (Ziban), Algeria)

2.1 Methodology of sampling

According to [7] the method of the grided plan consists in localizing with care on a plan, for every session, all demonstrations of the birds that the observer can record. Marion and Frochot say that the method of the quadrat is used for the censuses of the small sparrows on surfaces of 10 to 20 ha [22]. In the present work an area of 10 ha is delimited of the palm grove, that it contains 1100 feet of palm (the total surface of the palm grove is 55 ha). The parcel is shared in 42 squares of 50 on 50 m. Indeed 8 passages are done in the sampled palm grove. In every exit we have changed the leaf. To determine the breeding success of the population of the doves, we used the method of Mayfield [8] (an unbiased estimator of breeding success in birds). During the breeding season of doves, that spread of the end of March until August (2008). At each visit, we noted the contents of the nest (number of eggs, number of chicks hatched and / or flown, losses and nature of losses), nature (old or new). The comparison of the breeding success between the two species of doves was tested by the test of Chi-two. The null hypothesis being the equality of the daily survival probability (\hat{s}), while (\hat{s}) is estimated according to the formula proposed by MAYFIELD. The phase of incubation corresponds on average to a length of 15 days for two species of doves. One also we used « XLSTAT 2007 » for the measures of the middle heights of the nests so their gap-type (height middle HS \pm gap-Type).

3. Results and discussion

3.1 Breeding

To the level of the palm grove, the nests of doves were constructed on two varieties of date palm, for *Streptopelia decaocto*, the majority of nests (21 nests) were established on the variety Mech degla with 14 nests (67%), and a percentage of 33% (7 nests) the variety Deglet nour [Fig.2, 3], the same variety chosen for nesting *Streptopelia turtur* [Fig.4, 5] Mech degla was with a percentage of 53% (16 nests) and 14 nests (47%) are located on the variety Deglet nour. According [9], the majority of *S. decaocto* nests are built on the *Casuarina torulosa* in eastern Ziban (Windbreaks). In the North of Algeria, [10] noted that *S. turtur* favors Oleaster, in the Oasis Ziban this species prefers the date palm (*Phoenix dactylefera*) especially the variety Mech degla. This attraction appears to be related to the abundance of this tree.

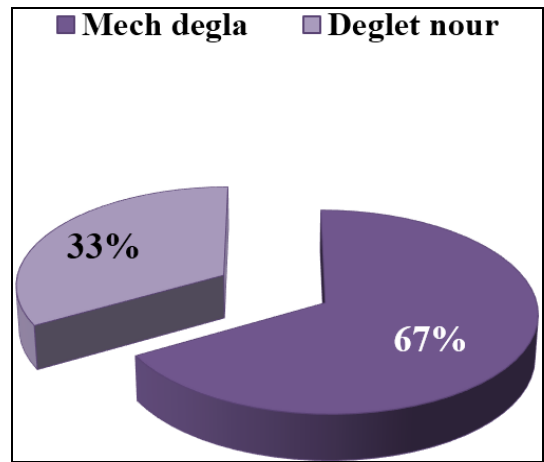


Fig 2: Spectrum of varieties of date palm (*Phoenix dactylifera*) used as carriers of collared dove *Streptopelia decaocto* nest



Fig 3: A chick of collared dove two (2) days on date palm (Deglet nour).

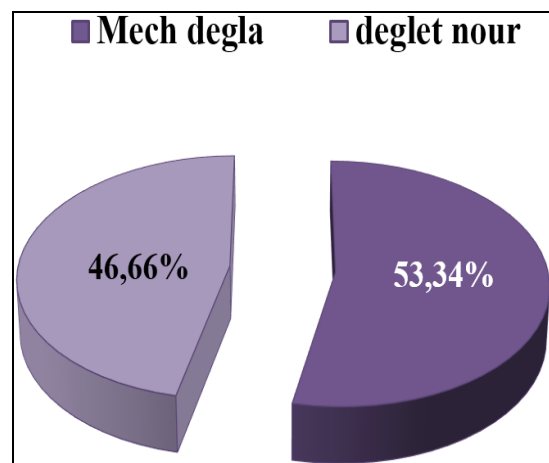


Fig 4: Spectrum of varieties of date palm (*Phoenix dactylifera*) used as carriers of Turtle dove *S. turtur* nest



Fig 5: Female of turtle dove in state brooding on date palm (Mech degla)

In the region of Touggourt ^[11] identified 44 Doves prefer tonest on some stations or types of trees, 22 nest on the *Casuarina torulosa* (50%) followed by 9 nest (20, 5%) on *Tamarix gallica*, 3 nest on *Phoenix dactylifera*, other supports like *Lonicera japonica* and metal supports with percentage (6, 1%), 2 nest on *Eucalyptus sp.* (5, 6%) and on *Punica granatum* with (2, 3%). In a study in Spain 53% of nests of *S. turtur* were installed on olive trees (*Olea europea*) and 23, 5% in oak (*Quercus rotundifolia*) (Icona 1989). Nevertheless, ^[12] reports that in Orchards intensive olive cultivation in Spain the density is very low with only 0, 5 pairs /100 ha. In a survey in England, the favorite sites of nest building of *S. decacocto* were in the bushes Hawthorn (*Crataegus monogyna*) ^[13] and the black Elder (*Sambucus niger*), this two representative 43% and 17% respectively of the bushes sheltering some nests ^[14]. The choice of the site of the nests seems to be bound especially to the availability of the supports, which can vary according to the predominant culture or the type of the formations plant.

The choice of the variety Mech degla for nestis more important than the variety Deglet nour, because the first variety requires less cultural intervention, therefore less disruption. In the urban environment, the collared dove can change mode of nest building practically while opting for artificial supports.

3.2 The Orientation of nests

The most frequent orientation for *S. decacocto* was toward the Northeast N₁=13 (61, 90%), while the least orientations were toward the west and the Southeast was with a very weak N₄ frequency = N₅ = 1 of 4, 67%. While the most frequent orientation for *S. turtur* was toward the East N = 16 (53, 33%). On the other hand, the nests oriented toward the west and Northbound N=1 with a negligible percentage of 3, 33%. According to ^[9] in the Ziban (Biskra) most nests of *S. decacocto* are exposed to the East with 40, 7%. In the region of Touggourt, ^[11] notes that the nests of *S. decacocto* are exposed toward the west. In the Ziban, this preference translates the preservation by the females of their broods against the winds that come from the west in our region.

3.3 The height of the nests

The height of nest building according to the varieties of date palm (*Phoenix dactylifera*) to the level of the survey station was as the next one; for the collared dove *Streptopelia decacocto*, the variety Mech degla (HS_T) that was support the highest nests with a height to soil varied from 4,5 to 8m (HS_{T1} mean = 6,11± 1,006m, N=14). In the same way, the height to the soil of the nests for the variety Deglet nour (HS_{T2}) for the same species varies 3 to 6m (HS_{T2} mean = 4,57± 1,12m, N=7). According to ^[9] in the Ziban (Biskra) the mean height of the nests for *S. decacocto* is 5, 37 ± 0, 5 m. Whereas, for the turtle dove *S. turtur* the height to soil (HS_{B1}) of the nests for the variety Mech degla was varied from 3 to 7,5m (HS_{B1} mean = 5,28± 1,15m, N=16) as well as for the variety Deglet nour the height to soil (HS_{B2}) of the nests was varied from 1,50 to 5,5m (HS_{B2} mean = 4, 04 ± 1, 29m, N=14). *Streptopelia decacocto* seemed to prefer to place his nests higher in relation to *S. turtur*. However, that in the North Algeria (Zéralda) for the same specie the mean height of nest is 3, 93 ± 1, 86 m ^[16]. While in Morocco, according to ^[15], the mean height of the nests was 2,7m ± 0,61m. Including the height of the nest to the ground is dependent on the species of the tree, whatever olive, orange, eucalyptus, bushes Hawthorn and date palm.

3.4 Size of Egg-laying

The table 1 below shows the date of egg-laying for both species of doves.

Table 1: Date of lay.

species	Date	
	first egg-laying	Second egg-laying
<i>S. decacocto</i>	15/04 /2008up to 28/05/ 2008	23/06/2008 up to 05/07/ 2008
<i>S. turtur</i>	20/04/ 2008up to 05/06/ 2008	21/06/2008 up to 11/08/ 2008

The egg-laying from *S. decacocto* started during the second weeks of April (day 15), and with the latest recorded during the first weeks of June (day 05). While, the egg-laying from *S. turtur* started during the third week of April (day 20), and with the latest recorded during the second weeks of August (day 11). For doves, the breeding season was from March to October ^[17].

3.5 Breeding success

The breeding success was of 50% for *S. decacocto* and 56% for *S. turtur* these values were superior to those noted in Morocco by ^[15] with rates of 48, 8% for *S. turtur*. To Morocco, the total of breeding success is of 42, 6 ± 5, 90 ^[18] from *S. turtur*. In the United Kingdom ^[13], signaled that the rate of breeding success means of *S. decacocto* are of 53% during the incubation and 65% during the phase of raising, so that only 35% of the nests produce with success of the young. While in Spain, the rate of breeding success of *S. turtur* reaches 53% in Estremadura and 36-58% in the zone of Madrid ^[19]. In urban environment, the use of buildings like induced nest building site a gain of breeding success about 85% ^[17]. In the station of survey, the availability of the supports of nest building and the important food availabilities lead to a weak competition between the two species of doves. Indeed, the value of Chi-Two = 0, 198 gotten were lower to 5,991 for ddl = 2 in the P doorstep p = 0, 05. Therefore the H₀ hypothesis is accepted with a p probability = 0,905. The daily probability of survival doesn't differ for the two species of doves during the year 2008.

4. Conclusion

The diversity of the plant support use by the doves depends on the species and the nature of biotope in which the doves nest. Nevertheless, the choice of these supports nests of both species does not indicate a particular attraction, but reflects especially their availability in the study area (palm grove). The preference of orientation was translating the preservation by the females of their broods against the winds that come from the west in our region. The values of breeding success for *Streptopelia turtur* and *S. decacocto* are very important, whereas the survival is very near, because of the availability of the food in the study areas well as a good adaptation of the migratory species to the local conditions particularly those of the palm groves. Moreover, in the future we will wish to determine the diet of sedentary species such as laughing and collorad doves and migratory species *Streptopelia turtur* in the palm groves of Ziban.

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