

## On the breeding phenology of the common housemartin *Delichon urbicum* in Guelma city (northeast of Algeria)

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Abstract	The common house martin <i>Delichon urbicum</i> is a nesting migratory species in Algeria. In Guelma, it nests regularly in Hakim Okbi Hospital (an old building in the city center) with a colony of 352 nests. Monitoring the breeding biology of this passerine here showed that the species nests twice per year, in March-May and June-July. The characteristics of nests and eggs are similar to those recorded in other parts of the country. The number of eggs and their characteristics in the first brood are greater than the second (e.g. length was 19.48 mm in first brood then decreasing to 12.73 mm in the second). The weight and width were respectively 1.63 g and 17.98 mm in the first brood, versus 1.46 g and 12.15 mm in the second. A monitoring plan is imperative for this species in Algeria in order to sustain a dynamic population of martins.
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Keywords	Common House Martin, breeding, Guelma, Algeria.
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## Sur la phénologie de reproduction de l'hirondelle de fenêtre *Delichon urbicum* au niveau de la ville de Guelma (Nord-Est de l'Algérie)

Résumé	L'hirondelle de fenêtre <i>Delichon urbicum</i> est une espèce migratrice nicheuse en Algérie. À Guelma, elle niche régulièrement à l'hôpital Hakim Okbi (un ancien bâtiment du centre-ville) où elle se reproduit en colonie de 352 nids. Le suivi de la biologie de reproduction de ce passereau y a montré que l'espèce niche deux fois par an, en mars-mai et juin-juillet. Les caractéristiques des nids et des œufs sont similaires à celles enregistrées dans d'autres régions du pays. Le nombre d'œufs et leurs caractéristiques dans la première couvée sont supérieurs à ceux de la seconde (la longueur, qui est de 19,48 mm dans la première couvée, diminue à 12,73 mm pendant la deuxième). Le poids et la largeur sont respectivement de 1,63 g et 17,98 mm dans la première couvée, contre 1,46 g et 12,15 mm dans la seconde. Un plan de suivi est impératif pour cette espèce en Algérie, afin de maintenir la dynamique de la population d'hirondelles.
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Mots-clés	Hirondelle de fenêtre, reproduction, Guelma, Algérie.
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## Introduction

The common house martin *Delichon urbicum* (Linné, 1758) is a migratory bird nesting in North Africa and mainly in the majority of Algerian cities (ROUAIGUIA, 2015; FENGHOUR, 2019, FENGHOUR et al., 2018). This bird colonized domestic buildings and windows from March till September/October each year (MERZOUKI et al., 2014; ROUAIGUIA et al., 2015). It nests in colonies (DAOUDI-

HACINI, 2004; HAMLAOUI, 2018). This particular mode of social and life-history trait where individuals defend their breeding territories concerns 13% of bird species (BRYANT, 1973; BRYANT, 1979; PIERSMA & van der VELDE, 2012). The coloniality is an advantage over a solitary life due to limitation of predation impact through the development of defensive behaviors such as harassment of predators and synchronization of broods (SCHMID, 1995; HADDAD et al., 2015).

This paper describes a first inventory of one of the largest colonies of nesting common house martin in north-eastern Algeria (an attached colony to the outer wall of the Hakim Okbi hospital - city of Guelma). The study was carried out during two consecutive breeding seasons (2019 and 2020), where we monitored the breeding parameters (first and second brood), namely the date, the size of brood and the traits of the eggs (length, width, weight and density).

## Material and methods

### Study area

The main study was carried out in the city of Guelma located in the North-East of Algeria about 60 km from the Mediterranean ( $07^{\circ}28'E$ ,  $36^{\circ}28'$  and an altitude of 290 m) (Figure 1). It is limited in the north by Houara mountains (peak of 932 m), in the north-west by Djebel Debagh (peak of 1 408 m) and in the east by Beni-Mezline and Beni Salah mountains (peak at 900 m) (ROUAIGUIA, 2015; HADDAD et al., 2015; BOUKHEDIM et al., 2018). The region has a semi-arid climate characterized by a cool or cold and humid winter (from October to May) and a hot and wet summer from June to September.

### Sampling method

Regular monitoring of breeding was carried out during two successive breeding seasons (2019 and 2020). About a hundred nests were tracked. The parameters measured during our study were: (1) location of the nests in relation to the ground using a decameter, and (2) demographic parameters of the two broods from March until August. The occupied nests were visited twice a week after the initiation of the laying (laying date) which represents the date on which the first egg is laid per nest, until the success of the laying.

After the first brood, the nests were revisited according to the criteria illustrated by MØLLER (1989) where a second brood is recorded as at least two newly laid eggs per nest after the completion of the first brood. In case of a single egg per nest, the second brood was discounted due to possible "egg-abandonment" (HAMLAOUI et al., 2016; HAMLAOUI, 2018). If a second brood is confirmed, the same monitoring protocol was followed.

## Results and discussion

First individuals of *Delichon* arrived in Guelma city in early February, and remained there till mid-October before



**Figure 1**

Geographical situation of the study area (Guelma, northeast Algeria).  
Situation géographique de la zone d'étude (Guelma, Nord-Est de l'Algérie).

**Table I**

Nest numbers of common house martins in Guelma during 2019 and 2020.

*Nombre des nids de l'hirondelle de fenêtre au niveau de Guelma durant les années 2019 et 2020.*

Breeding season	Occupied nests	New nests	First brood	Second brood
2019	334	31	30	30
2020	348	35	30	30

migrating to their usual winter quarters. We observed that this house martin breeds twice per season.

These passerines occupied a usual breeding site, consisting of 352 nests built on the wall of the Hakim Okbi hospital in the city center of Guelma (mean height of nests was  $15 \pm 4$  m). Data on breeding house martins (in 2019 and 2020) show that totals of nests monitored were 334 and 348, respectively. Late pairs of martins start construction of new nests at the end of March. The number of newly constructed nests was 66 (31 in 2019 and 35 in 2020) (Table I).

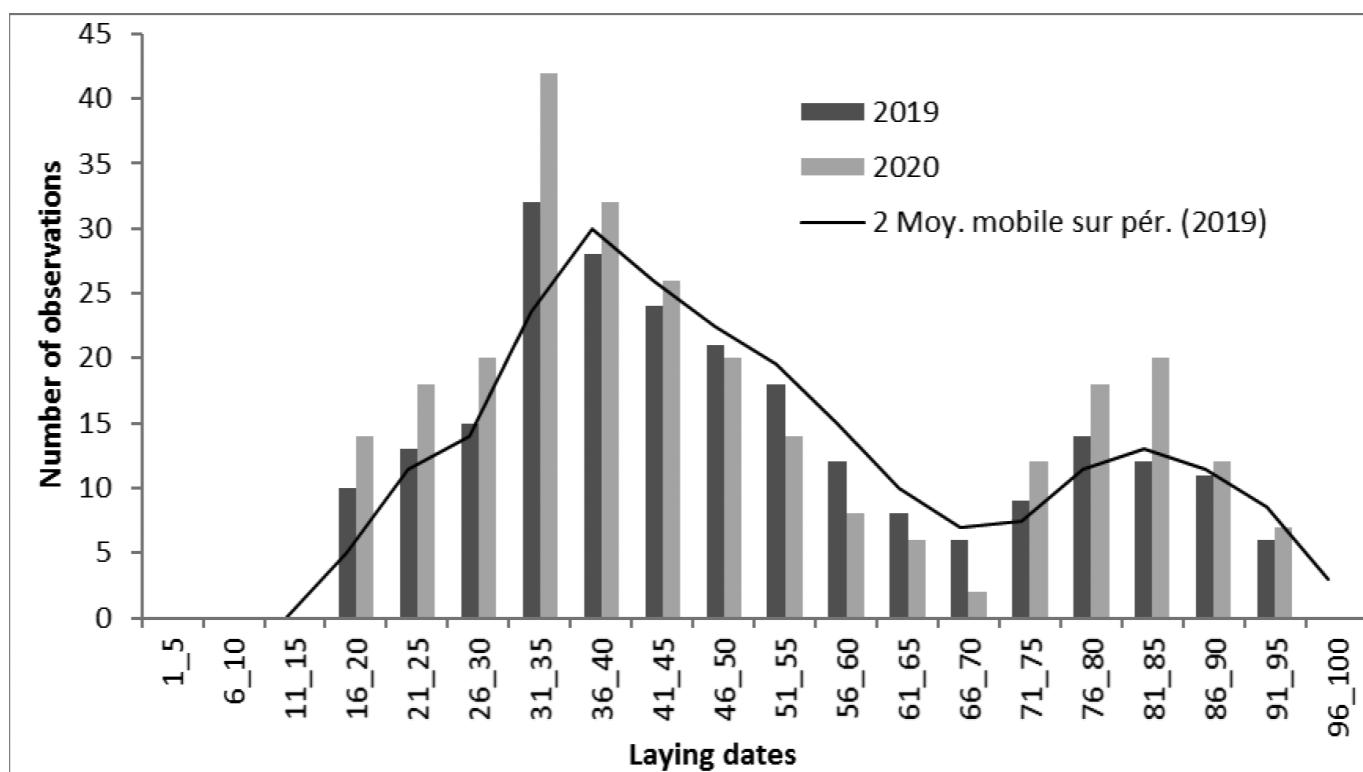
The mean laying date was recorded during the first fortnight of May (May 09, 2019 and May 05, 2020) (Figure 2). The earliest pair's first eggs were laid on April 18, 2019 and April 15, 2020, respectively, and the latest on May 19, 2019, and May 09, 2020. For the second laying attempt, the mean date is June 18. The first eggs were laid on June 05, 2019 and June 02, 2020, and the latest on July 05, 2019, and June 30, 2020, which amounts to a laying period equivalent to 76 days. The maximum laying was noted in early May (in the first week) (Figure 2).

The size of the first clutch varied between 3 and 6 eggs per brood. The most frequent are those of 5 eggs with a percentage of 68% (Figure 3). During the second laying, the most frequent clutch sizes are those of 4 eggs (44%) followed by those of 5 eggs with a percentage of 42%. The clutch size varies from 1 to 5 eggs per nest (Figure 3).

The mean incubation time lasted 15 days for the first laying attempt. It varied between 10 and 17 days. During the second laying attempt the mean incubation time is 13 days. It varies between 10 and 16 days. The mean number of fledglings for the first brood is 3 chicks per pair with limits of 1 to 5 and it is 1 for the second brood with limits of 0 to 3 chicks. Mean hatching success was 83% for the first brood and 43% for the second brood.

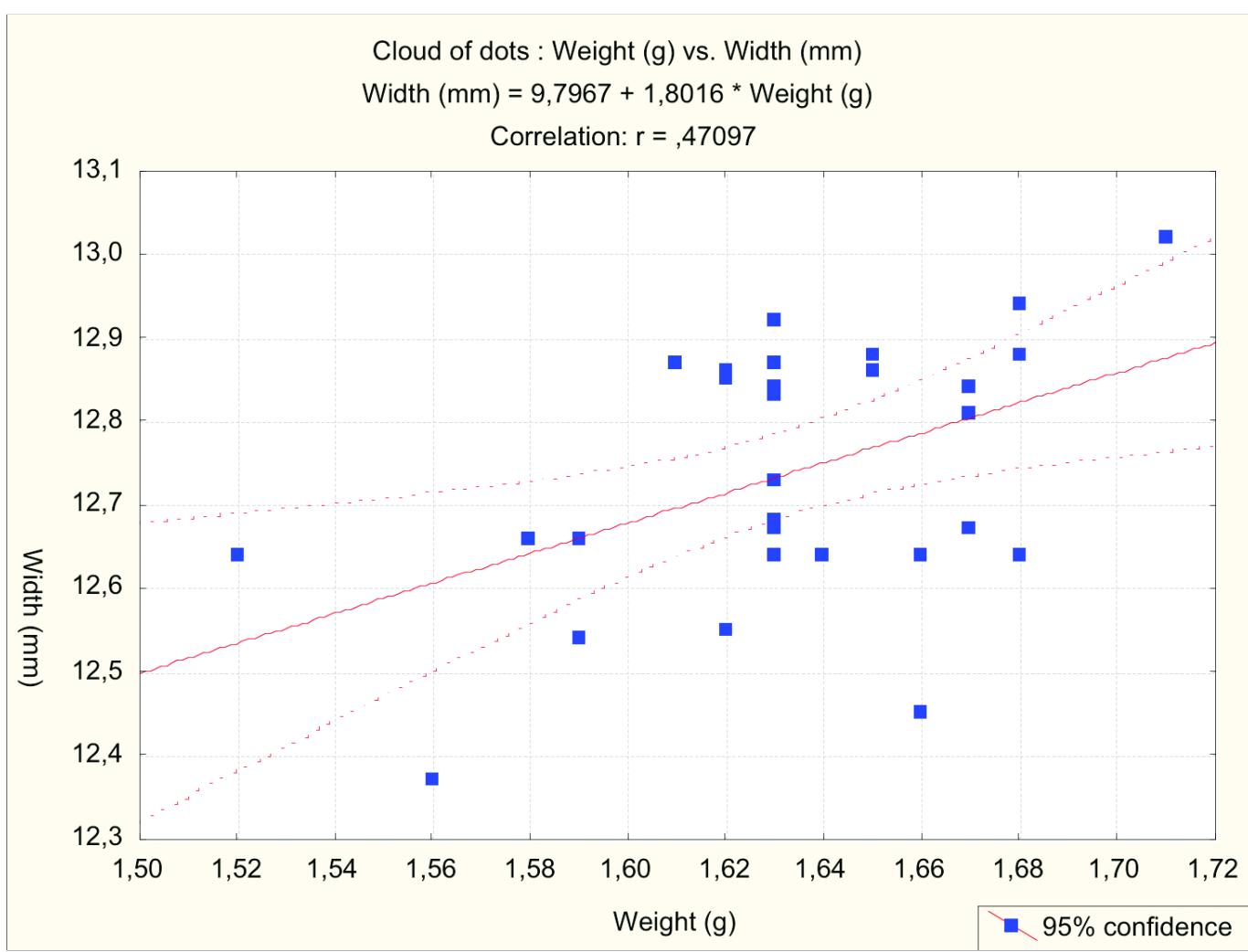
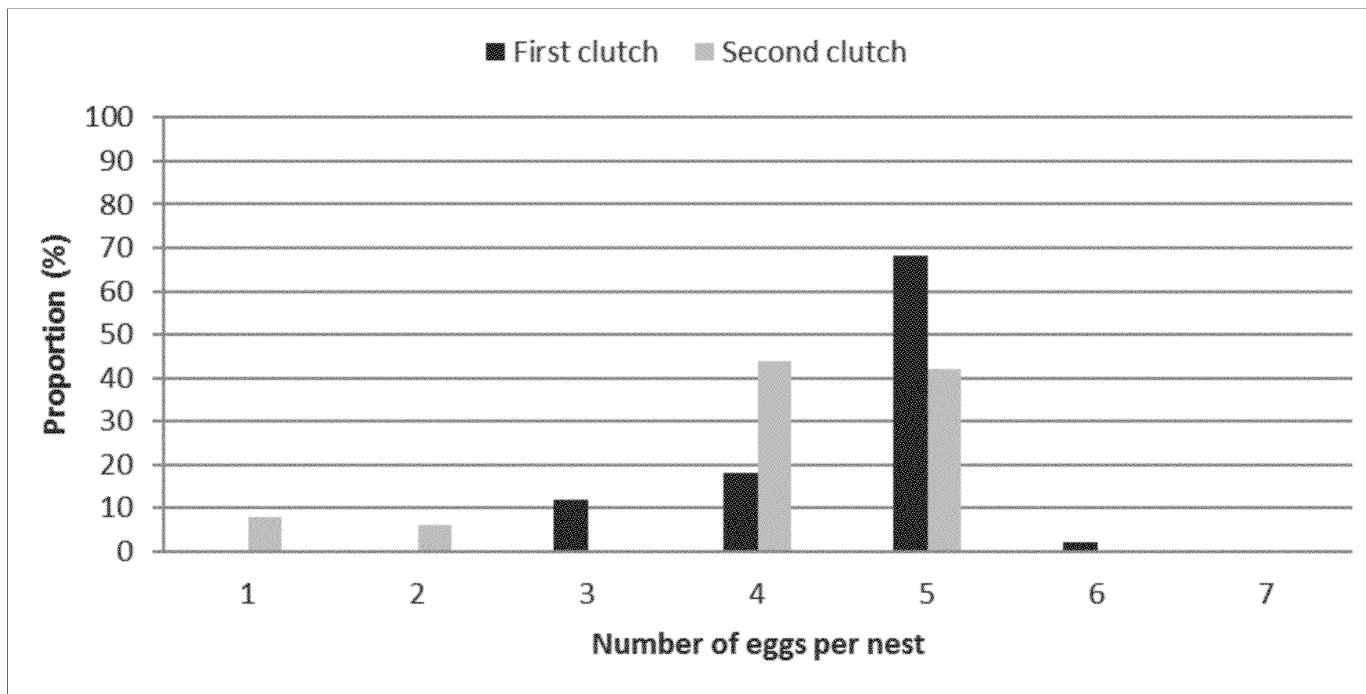
The first house martin individuals to arrive occupied the old nests of previous breeding season (due to adaptability to position and easy access). The number of nests built depends mainly on the number of nesting pairs, the availability of old nests and the number of nests destroyed before the breeding season.

Mean egg length is greater during the first attempt compared to second one ( $19.48 \pm 0.53$  mm and  $17.98 \pm$

**Figure 2**

Seasonal nesting trend of house martins in Guelma (2019 and 2020).

*Variation saisonnière de la nidification des hirondelles au niveau de la ville de Guelma (2019 et 2020).*



**Figure 4**  
Weight/width correlation of common house martin eggs for the first brood.  
*Corrélation poids/largeur des œufs chez les hirondelles de fenêtre durant la première ponte.*

0.33 mm), respectively. Student's t test shows a significant difference between the first and the second brood, with respect to the length ( $t = -13.13507$ ;  $p = 0.000000$ ). The Kolmogorov-Smirnov test (Significant tests marked at  $p < 0.05$ ) also confirms a significant difference between the first and the second broods ( $p < 0.001$ ).

The mean egg width is similar during the two laying attempts ( $12.73 \pm 0.47$  and  $12.15 \pm 0.16$  mm, respectively). However, Student's t test shows a significant difference between the first brood and the second brood, compared to the width ( $t = 14.27940$ ;  $p = 0.000000$ ). Even the Kolmogorov-Smirnov test (Significant tests marked at  $p < 0.05000$ ) also confirms a significant difference between the first brood and the second brood ( $p < 0.001$ ).

The mean egg weight is also similar ( $1.63 \pm 0.03$  and  $1.46 \pm 0.04$  mm, respectively). However again, Student's t-test ( $t = 15.44687$ ;  $p = 0.000000$ ) and the Kolmogorov-Smirnov test show significant differences between the first brood and the second brood.

A significant and positive relationship is noted between weight and width ( $r = 0.47$ ,  $p = 0.009$ ) for the first brood. Regarding the second brood, there are no significant correlations between any of the parameters measured (Figure 4).

These data on common house martin breeding illustrate a key significance of this region for the maintenance of this migratory bird's population. Several studies on the characterization of the nesting of this bird have been published in recent years (ROUAIGUIA et al., 2015; FENGHOUR et al., 2018). In contrast, no previous study has reported a significant relationship between egg size and reproductive variables over two successive broods. The results obtained indicate the need for future monitoring of the species for preservation. It is imperative to set up a monitoring and surveillance network for this species in this region of Algeria, in order to safeguard its habitats.

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