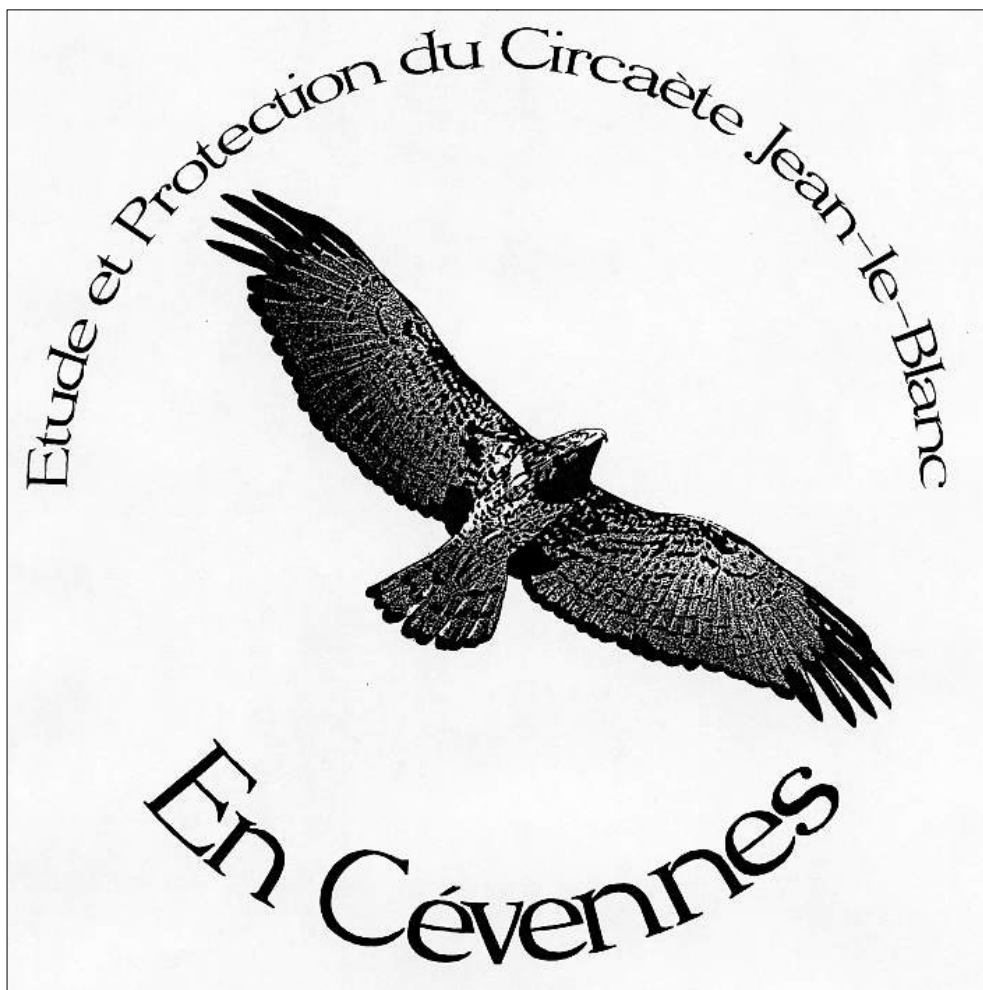


MONITORING OF FOREST RAPTORS IN LOZÈRE AND
THE CÉVENNES NATIONAL PARK:
SHORT-TOED SNAKE EAGLE

Results of 2016

Jean-Pierre & Isabelle MALAFOSSE



The Cévennes National Park

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Spring weather was quite adverse again for the nesting pairs in the uplands. 2014 and 2015 gave our pairs a short rest and the possibility to recover, but shouldn't we look at the big picture and think in longer intervals in case of a long-lived creature like the Short-toed Eagle. 2016 has put all in order, as described below.

I) - Inventory:

The table below contains the number of pairs and their density in the survey area in 2016.

Biogeographical regions	Certain	Probable	Possible	Total
Cévennes (CEV)	46	3	7	56
Causses (CAU)	48	5	10	63
Aigoual (AIG)	48	0	0	48
Mt Lozère (LOZ)	18	6	7	31
Aubrac (AUB)	15	1	-	16
All total	175	15	24	214

Table n° 1: number of breeding pairs by regions in the survey area (certain, probable, possible pairs).

Biogeographical regions	certain pairs	probable pairs	possible pairs	total	area (ha)	number of pairs 100km ²	ha/number of pairs
Cévennes	46	3	7	56	60 000	9,33	1071
Causses	48	5	10	63	90 000	7	1429
Aigoual	48	0	0	48	45 000	10,67	937
Mt Lozère	18	6	7	31	70 000	4,43	2258
ZONE	160	14	24	198	265 000	7,47	1338

Table n° 2: number of pairs and their density in four biogeographical regions in the Cévennes National Park in 2016.

II) - Breeding:

The **66 checked territories** comprise 37% of **179 known Short-toed Eagle pairs**. Occupation rate grew to 95% in 2016, only three territories were abandoned.

Table n°3 shows the breeding results broken down to biogeographical regions in relation to all observed pairs (their numbers in parentheses) in 2016.

<p>Cévennes (18 pairs)</p> <ul style="list-style-type: none"> - Egg-laying: 14 out of 17 = 0,82 - Hatching: 9 out of 17 = 0,53 - Fledging: 7 out of 18 = 0,39 	<p>Causses (10 pairs)</p> <ul style="list-style-type: none"> - Egg-laying: 6 / 8 = 0,75 - Hatching: 3 / 7 = 0,43 - Fledging: 2 / 10 = 0,2
<p>Aigoual (9 pairs)</p> <ul style="list-style-type: none"> - Egg-laying: 8 / 9 = 0,89 - Hatching: 7 / 9 = 0,77 - Fledging: 6 / 9 = 0,67 	<p>Mt Lozère (7 pairs)</p> <ul style="list-style-type: none"> - Egg-laying: 7 / 7 = 1 - Hatching: 6 / 7 = 0,86 - Fledging: 5 / 7 = 0,71
<p>All regions (44 pairs)</p> <ul style="list-style-type: none"> - Egg-laying: 35 / 41 = 0,85 - Hatching: 25 / 40 = 0,62 - Fledging: 20 / 44 = 0,45 	

Table n° 3: Details of breeding success of 44 pairs in 2016 in four biogeographical regions. For further details see the text above.

Breeding success in previous years:

1992 = 0,33 (N=15)	1998 = 0,64 (N=33)	2004 = 0,31 (N=64)	2010 = 0,22 (N=50)	2016 = 0,45 (N=44)
1993 = 0,66 (N=15)	1999 = 0,71 (N=38)	2005 = 0,54 (N=48)	2011 = 0,42 (N=50)	
1994 = 0,47 (N=17)	2000 = 0,58 (N=59)	2006 = 0,79 (N=42)	2012 = 0,23 (N=52)	
1995 = 0,78 (N=27)	2001 = 0,57 (N=67)	2007 = 0,56 (N=48)	2013 = 0,41 (N=49)	
1996 = 0,65 (N=37)	2002 = 0,52 (N=62)	2008 = 0,50 (N=56)	2014 = 0,69 (N=52)	
1997 = 0,40 (N=35)	2003 = 0,59 (N=61)	2009 = 0,41 (N=49)	2015 = 0,74 (N=38)	

Average breeding success of 25 years = 0,53 fledgling/pair (N=1109 breeding attempts)

The monitoring of 44 pairs in 2016 provided us enough data to describe the species' breeding cycle in details. The weather was pleasant at the time of their arrival until late March. During this time, females could feed well, and 85% of the pairs laid egg. From early April on, the weather got bad gradually and the southern wind became strong. This kind of weather held until mid-June (see Chart n° 2) then overcast days followed (during these three months, high wind, storms and fog were typical). These anomalies highly influenced the egg-laying and the beginning of chick-rearing periods (causing egg desertion and chick mortality). Diagram of 2016 in Chart n° 3 well depicts this. The average egg-laying date in 2016 was very similar to those years when the spring weather was cold and wet.

The average egg-laying date in 2016: 19 April (N=19)

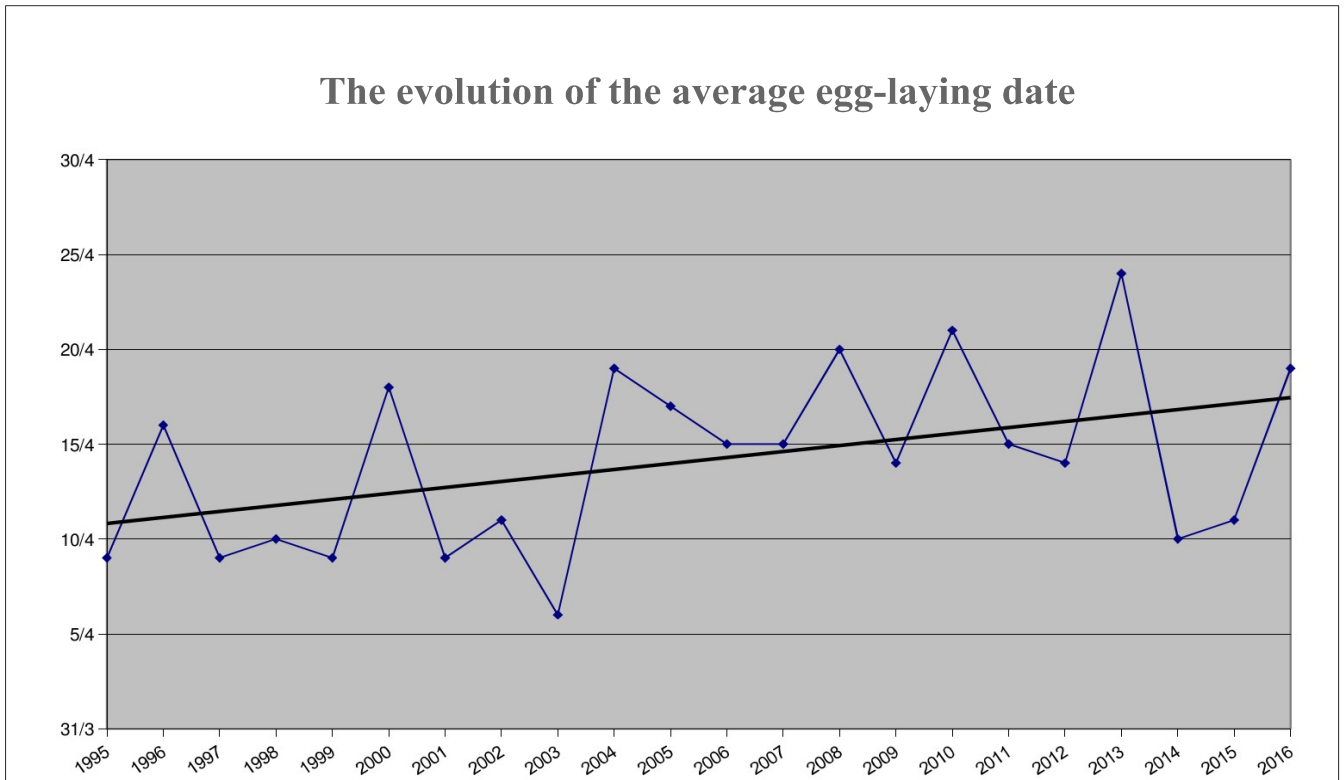


Chart n° 1: Changes of the average egg-laying date in the past 22 years. Overall average date is 14 April (N=476).

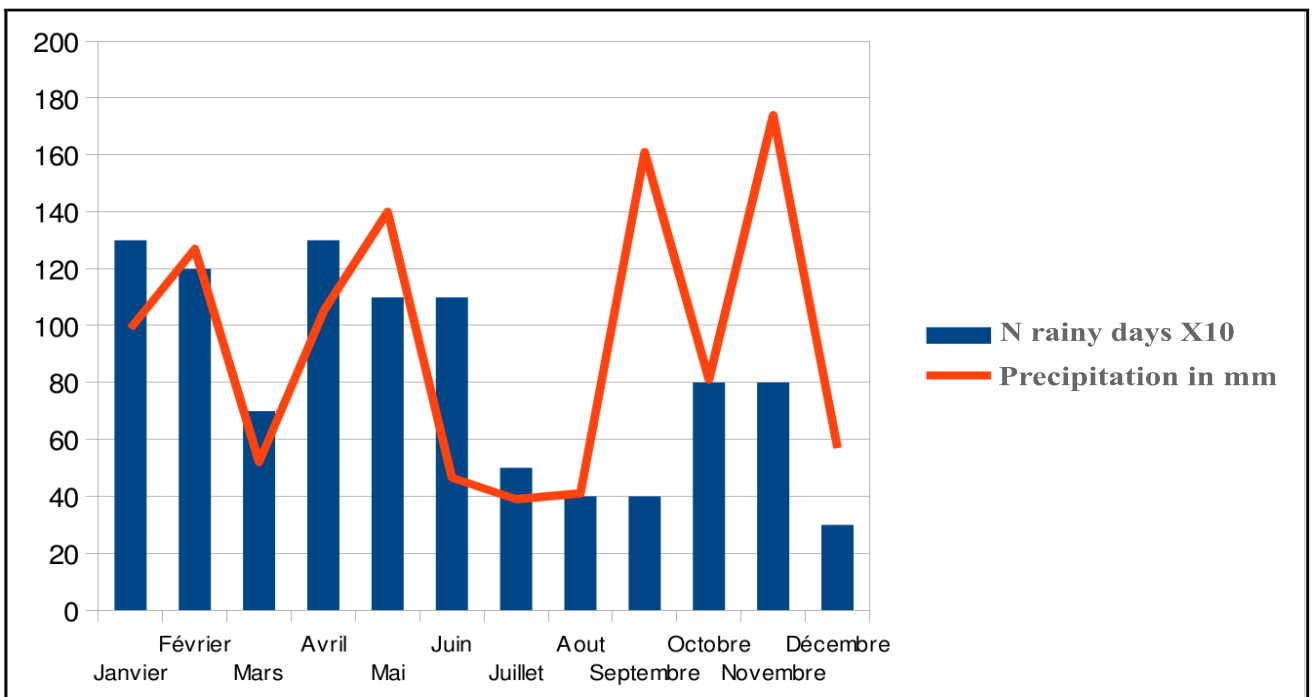


Chart n° 2: Precipitation (mm) and number of rainy days (multiplied by 10) in 2016 (Saint Étienne du Valdonnez 48).

At the end of March we recorded one egg-laying attempt. Half of the rest recorded between 5 and 15 April. The other half occurred between 25 April and 8 May without any attempts on those ten days between these two „waves”. The pool of 19 attempts is not big enough but this pattern occurred the third time during the observations of 22 years (in 2000 and to a smaller extent in 2013)

April weather most likely contributed to that some pairs skipped laying eggs or failed to reclutch after an early failure.

24 unsuccessful egg-laying attempt were recorded among our monitored pairs. The reason of eight of those were unclear, but the other 16 were as follows:

- Not breeding : 4
- Bad weather : 3
- Disturbance : 1
- Predation : 5
- Infertility : 3

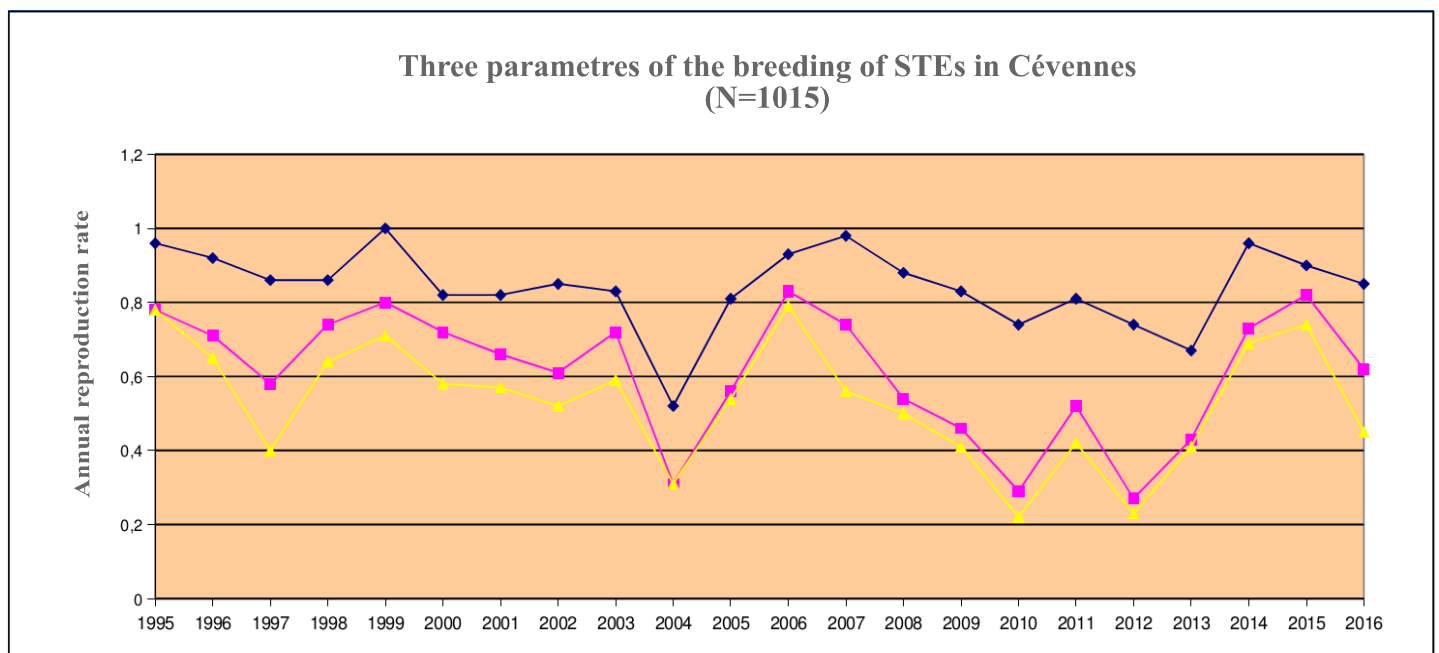


Chart n° 3: Recorded breeding attempts between 1995 and 2016.

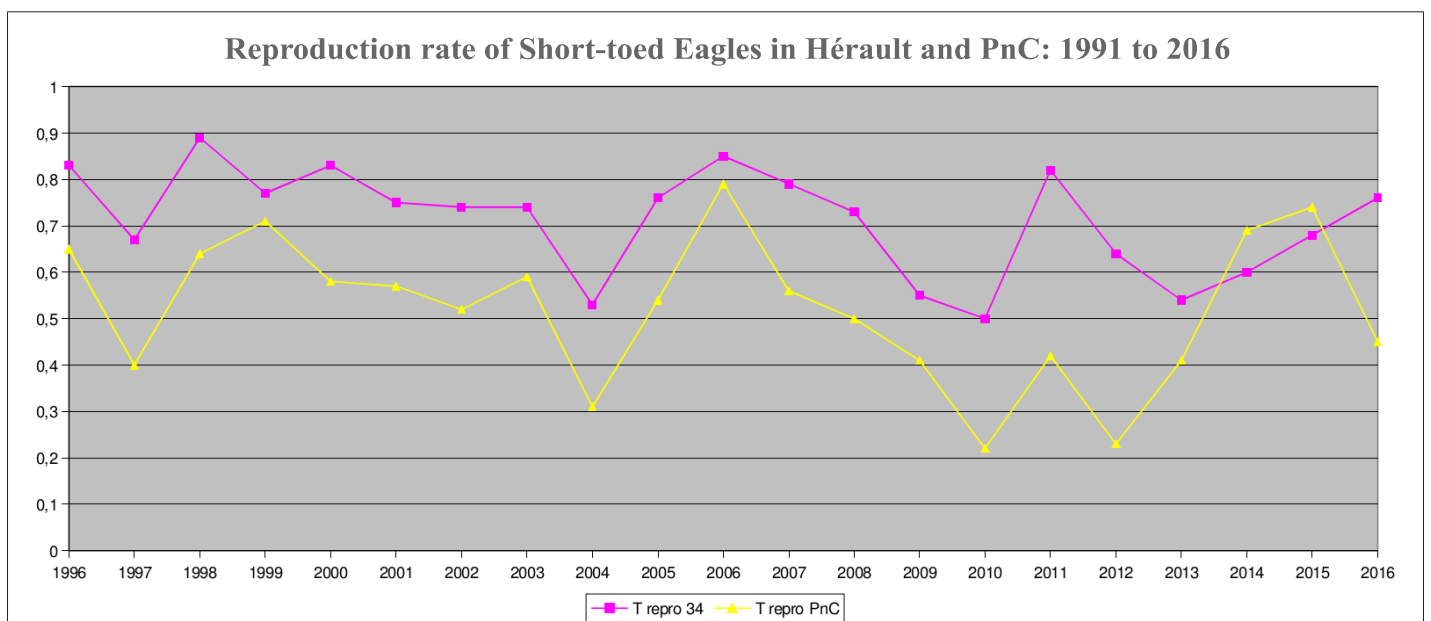


Chart n° 4: Annual breeding success rate of Short-toed Eagles in Hérault County (34), Cévennes National Park, 1996-2016.

This year, Jean-Pierre Céret and I decided to compare the breeding parameters of the past 20 years in our populations. Jean-Pierre's STEs nest on low elevation limestone plateaus in Hérault County, where Mediterranean climate may suit the species' needs better.

Chart n° 4 helps to compare the annual breeding success. Overall, we can conclude that the two diagrams are parallel, pretty much alike; naturally values of Hérault County somewhat higher. Lows and highs of the diagrams most of the time are similar, with greater amplitude in our population. By now, it is clear that bad weather conditions (turbulences arriving from the Mediterranean Sea) are the biggest threats to the breeding success.

Our figures could reach and exceed those of Hérault only in the past two years (2014 and 2015)! What might be the reason behind this? JP Céret believes that during those two extremely hot summers of 2014 and 2015 snakes were hiding during the day and emerged only at night depriving STEs from their main preys meanwhile in Cévennes spring and summer were pleasant regarding temperature.

III) – Diet of juveniles in the area:

As in 2015, we found nine additional food remains. Table n° 4.

Colubridae	271	
Aesculapian Snake	53	(2)
Green Whip Snake	81	(1)
Grass Snake	15	
Montpellier Snake	35	
Vperine Snake	3	
Southern Smooth Snake	1	
Smooth Snake	3	
Snake. (spp)	79	(5)
Aspic Viper	36	
Ophidia (sp)	17	(1)
European Green Lizard	21	
Slow Worm	21	
Hedgehog	7	
European Mole	1	
Vole (spp)	5	
European Water Vole?	3	
European Hare (young)	1	
European Rabbit (young)	1	
Rodentia (spp)	13	
European fire-bellied toad	3	
Toad	4	
Aves	7	
Total	411	(9)

Table n° 4: Food remains between 1991 and 2016 (N=411). Prey remains found in 2016 are in parentheses.

IV) – Ringing – Biometrics:

Since our ringing scheme has ended, no chicks were ringed this year.

Observation of ringed birds in 2016

We observed two birds and received informations regarding a third individual in 2016.

- Live, identified birds which were observed already in the past:

The well-known 20 years old male (class 21A) is observed every year at his nesting site near Mont Mirat (in a state forest in Mende). He still sports a blue ring on his right leg, after having lost the red ring and the aluminium rings in 2015 (see photo in the 2015 report). This year, his breeding attempt was unsuccessful after the pair built a new nest.

- Live birds, which has never been observed before:

We observed another male in the national park on the Méjean limestone plateau. We couldn't identify him despite his colour ring. He also failed to breed this year. We will try it again in 2017.

Data of the third bird came from German birders with the help of the internet connecting circaetophils all over Europe. After analysing the pictures we received carefully we identified one of our birds originated from Lozère. Furthermore, the data was even more important since it was about a 2nd-cy-old individual.

This constitutes the seventh bird that returned to Europe from this age group, and the second which was seen well beyond its nesting site while the first one was seen in Italy in 2010 (Malafosse et Maigre 2014)*.

Returning from Africa, for the first time in its life, it was observed in Germany, where the species is absent and which falls quite far from its natal area in the Cévennes (2014, Ispagnac).

Spanish colleagues informed us in 2011 that a Spanish satellite-tagged one year old individual (class 2A) was seen returning to the Iberian Peninsula (Yanez et al. 2014)**.

Special thanks to Bastin MEISE for the pictures. We also thank to our Ukrainian friends and others in Europe who are always up-to-date regarding the species and were able to determine the age of the bird to have a definitive ID on it. See pictures 1 an 2 for further detailed analysis of this bird.

* MALAFOSSE J.P., MAIGRE P. (2014).- Dispersion post-natale des jeunes circaètes Jean-le-Blanc *Circaetus gallicus* . Alauda LXXXII (2) : 81-84.

** YÁÑEZ B., MUÑOZ A.-R., BILDSTEIN K. L., NEWTON I., TOXOPEUS A.G., FERRER M. (2014).- Individual variation in the over- summering areas of immature Short-toed Snake Eagles *Circaetus gallicus*. Acta Ornithol. 49 : 137-141 .

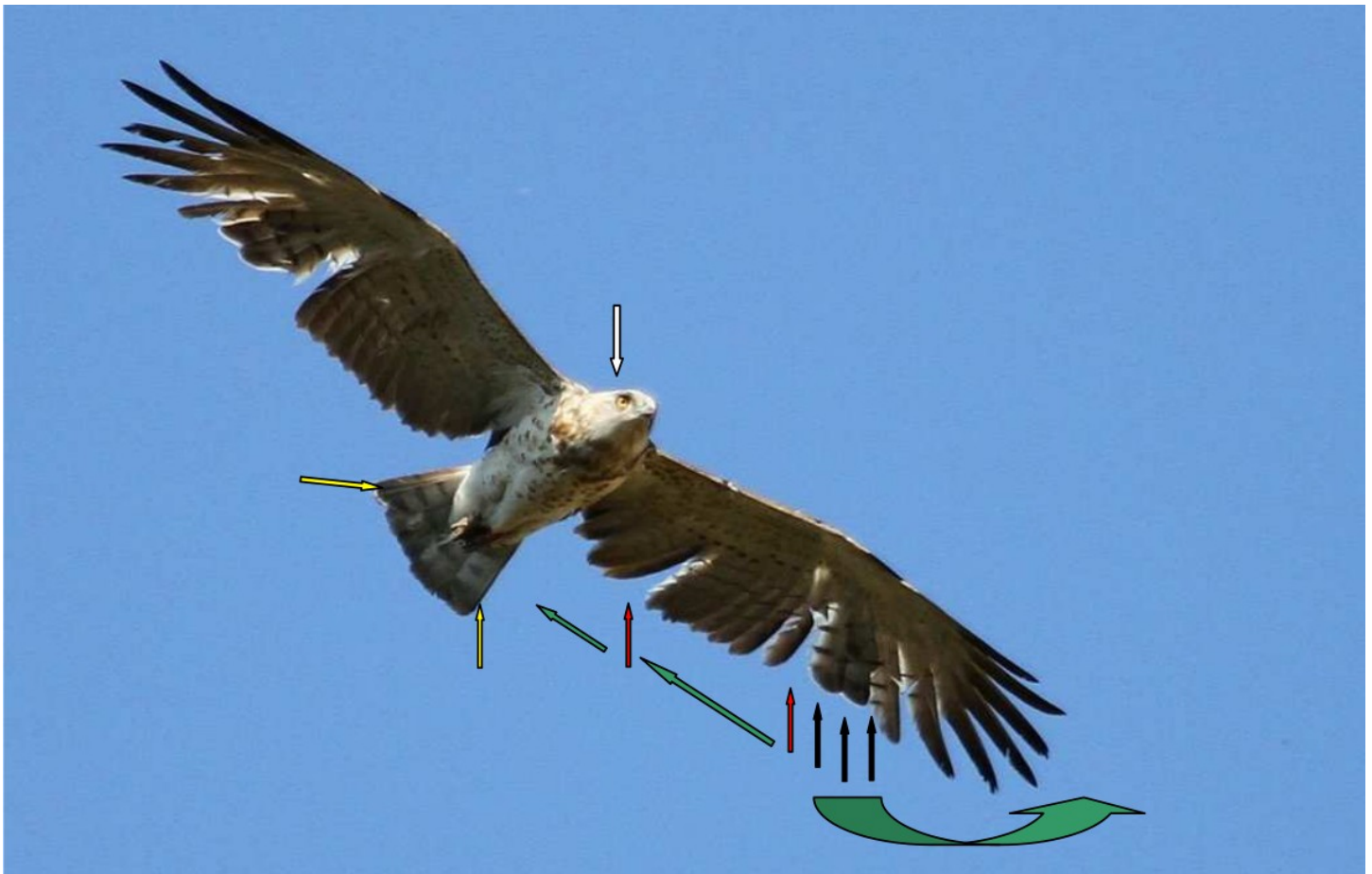


Photo 1 (© Bastin MEISE): Immature STE (probably a female), born in Ispagnac in 2014 (48), and photographed on 01.08.2015 in the central parts of Germany. Note pale eyes and typical moulting state: P1-2 inner primaries replaced, P3 is growing (black arrows); S1 and S9 (10?) secondaries dropped (red arrows); outer tail feathers renewed (yellow arrows), it's visible better on Photo 2. Moul't continues to the outer part of the wing while it goes the opposite way on the secondaries in two waves in parallel (green arrows). The head quite pale, patches on the underbody are still quite rufous, which is an immature trait (see Photo 2).



Photo 2 (© Bastin MEISE): Good expertise and photos we needed to figure out the code. The first photo suggests 051, however, it is rather 061 as proved by the other photos („6” is very similar to „0” when rounded off). Furthermore, 051 would suggest a 3cy bird, which would sport the ring on the right leg. This case well presents the hardships of code ringing at times.



Photo 3 (© Bastin MEISE): To honour the photographer and the bird here is a picture without any disturbing marks.



Photo 4 (© Christian RAMBAL): Another 2cy immature photographed on 24 May, 2010. Note the moulted three inner primaries and outer tail feathers.

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