

A juvenile Spanish Imperial Eagle *Aquila adalberti* in the northwestern Italian Alps: first accepted record for Italy

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Abstract

The first accepted record of the Spanish Imperial Eagle *Aquila adalberti* for Italy is reported, based on a juvenile individual observed in the northwestern Italian Alps (Aosta Valley) on August 24, 2025, at approximately 2,650 m a.s.l. The sighting was documented by several photographs. Diagnostic plumage characters, including uniform tawny coloration and dark flight feathers with a translucent window on the inner primaries, allowed confident separation from similar species. This Italian sighting represents the twelfth European record (since 1999) of the species outside its breeding range in the Iberian Peninsula, and may reflect the current positive population trend. A review of extra-limital records indicates that most observations involve juveniles or immatures during the dispersal period. Many eagle species can be difficult to identify in the field. For this reason, to ascertain vagrant species careful documentation is needed, also in view of the possible presence of anomalous or hybrid individuals.

Keywords: *Aquila adalberti*, vagrancy, juvenile dispersal, Italy, raptor identification.

INTRODUCTION

Vagrancy is defined as the process by which organisms undertake long-distance dispersal movements outside the normal geographic range of their species (Dufour *et al.* 2024). Mechanisms that can lead to vagrancy are various (both endogenous and exogenous factors), and their magnitude may vary greatly in relation to the life-history of the species (Lees & Gilroy 2021). Birds are highly vagile compared to most other terrestrial vertebrates (Lees & Gilroy 2021). As a result, vagrant birds are a more or less important component of every avifauna (e.g., 24%, $n = 133$ species of the Italian avifauna, $n = 551$ species; Baccetti *et al.* 2021). A growing body of evidence shows that such a rare phenomenon can have an important role in eco-evolutionary processes (Dufour *et al.* 2024).

The Spanish Imperial Eagle *Aquila adalberti* is an endemic raptor of Western Mediterranean, currently breeding in the Iberian Peninsula (central and south-west Spain and adjacent areas of Portugal) (Bauer 2020). Adults are non-migratory (resident on their breeding area throughout the year), whereas juveniles leave their natal area once the post-fledging period has ended (González *et al.* 1989). In most cases, juveniles' dispersal distance does not exceed 350 km (González *et al.* 1989, 2006).

On August 24, 2025, one of the authors (VG, together with Mrs M. Bonjean) observed an eagle with distinctive plumage flying along the slopes of “Becca dei

Quattro Denti” (coordinates 45.620916° - 7.093279°), within the municipality of Valgrisenche (Aosta Valley, North Western Italian Alps), at approximately 2,650 m a.s.l., in a landscape of high-alpine tundra. The bird, repeatedly photographed (see Fig. 1-2), exhibited glides and short dives in flight. It was observed for about five minutes (from 10:00 to 10:05 local time), before heading westwards.

The photographs were carefully examined by all authors and subsequently submitted for confirmation to other raptor specialists (A. Corso, D. Forsman, J.-L. Grangé). The pictures from different angle of view allowed the identification of *Aquila adalberti* juvenile, the sighting representing the first accepted record of this species for Italy (Baccetti *et al.* 2021; Fulco & Liuzzi *in prep.*).



Fig. 1-2. The juvenile Spanish Imperial Eagle *Aquila adalberti* photographed in Valgrisenche (Aosta Valley, Italy) at 2650 m a.s.l. on August 24, 2025 (photos V. Giacchetto).

DIAGNOSTIC FEATURES

As outlined by Clark (1999), Forsman (2016), and Svensson (2022), the key diagnostic features consistent with juvenile of *Aquila adalberti* were: a) a uniformly tawny head and body; b) dark flight feathers with a distinct translucent window in the inner primaries; c) homogeneous reddish-brown tertiaries darker than the cov-

erts; d) no signs of wear or molt on the tail and primary and secondary remiges.

Any confusion with juvenile Eastern Imperial Eagle *Aquila heliaca* and Greater Spotted Eagle *Clanga clanga* (particularly the pallid morph *fulvescens*) could be confidently ruled out because: for *A. heliaca*, the absence of streaking on the head, body, and scapulars is notable; for

Tab. 1. Validated sightings of the Spanish Imperial Eagle *Aquila adalberti* in European countries outside Iberian Peninsula over the last fifty years.

Rec N	Year	Month	Day(s)	N ind	Age	Country	Dep/Administr region	lat (d)	long (d)	Obs	References
1	1999	1	14	1	2 nd cy	F	Bouche-du-Rhone	43.584897°	4.567450°	Paul J.P. et al.	Duchateau & Pèrès 2004; Weenink et al., 2011; CHN France 2026
2	2001	9	12	1	1 st cy	F	Pyrenées Atlantiques	42.961070°	-0.255728°	Duchateau S. & Pèrès S.	Duchateau & Pèrès 2004
3	2002	9	16/19	1	1 st cy	F	Pyrenées Atlantiques	43.034907°	-1.022901°	Bendelè R. et al.	Duchateau & Pèrès 2004
4	2004	6	5	1	2 nd cy	F	Pyrenées Atlantiques	43.054839°	-0.433121°	Duchateau S.	Duchateau, 2007; CHN France 2026
5	2005	6	11	1	3 rd /4 th cy	F	Pyrenées Atlantiques	43.395772°	-1.456184°	Lamothe B.	Duchateau, 2007; Weenink et al., 2011; CHN France 2026
6	2007	5	6	1	2 nd cy	NL	Limburg	51.24179°	5.6209°	Kessels C. & Weenink R.	Weenink et al., 2011
7	2014	8	25	1	2 nd cy	F	Pyrenées Atlantiques	43.134070°	-1.146038°	Tardy S. et al.	CHN France 2026
8	2015	7	13	1	3 rd /4 th cy	F	Aude	42.956295°	2.564079°	Vaslin M.	CHN France 2026
9	2016	8	26	1	1 st cy	F	Pyrenées Atlantiques	43.034907°	-1.022901°	nd	CHN France 2026
10	2016	9	12-13	1	2 nd cy	F/E	Pyrenées Atlantiques	42.800176°	-0.383704°	fide Grangé J-L.	CHN France 2026; Duchateau S. in litt
11	2017	5	11	1	2 nd cy	F	Haute-Garonne	42.867466°	0.759024°	Roques S.	CHN France 2026; Duchateau S. in litt
12	2025	8	24	1	1 st cy	I	Valle d'Aosta	45.620916°	7.093279°	Giacchetto V.	present paper

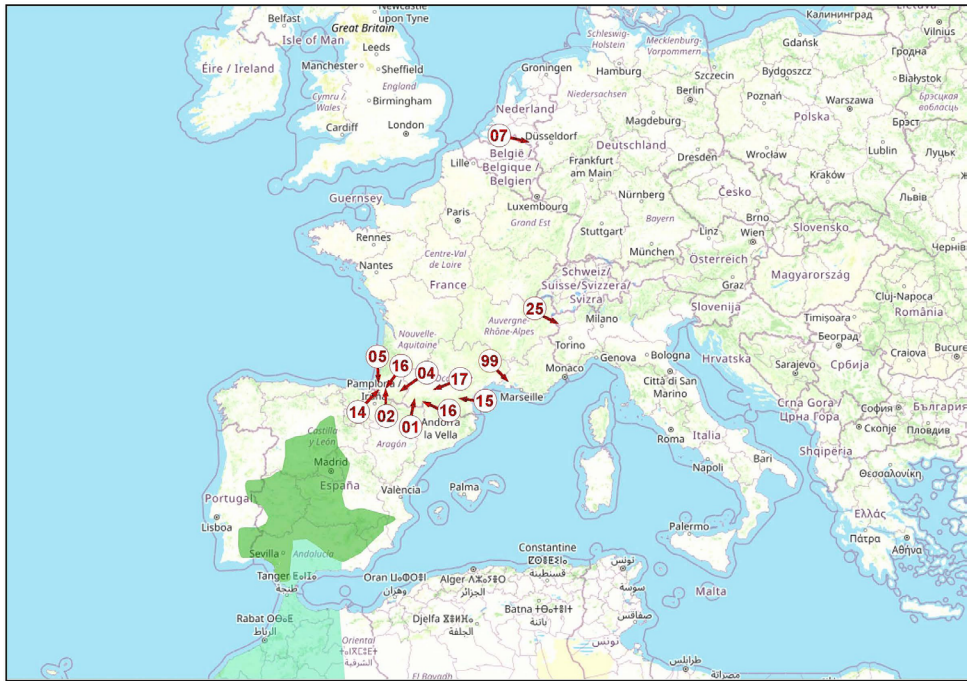


Fig. 3. Distribution map of the validated sightings of the Spanish Imperial Eagle *Aquila adalberti* in European countries outside Iberian Peninsula over the last fifty years (see Tab. 1 for details). Base map from BirdLife International 2026. Green area: breeding range in the Iberian Peninsula; red encircled numbers: last two digits of the years of recovery locations (n = 12).

C. clanga, differences include the pattern of the remiges and the lack of dark brown coloration around the periocular region and on the throat. Moreover, juveniles of these species in late August remain dependent on adults and typically do not stray far from their natal territories (D. Forsman *in litt.*). The reproductive phenology of *A. adalberti* is significantly earlier, with nesting documented from as early as February 9, and juvenile dispersal generally beginning in mid-summer (Margarida *et al.* 2007). Early dispersal is especially prevalent among individuals born early in the season and in good physical condition during their nestling period (Ferrer 1992).

Confusion with the Tawny Eagle *Aquila rapax* can also be excluded, as it has a longer tail and shorter wings and, compared to the juvenile *A. adalberti*, has more uniformly colored secondary and primary feathers, without a marked translucent window in the inner primaries. Tawny Eagle, currently present in North Africa with a very small number of breeding pairs (MaghrebOrnitho, 2018), was reported twice in Italy only in the 19th century (Sardinia, 1850 and 1898; Brichetti & Fracasso 2018), while a recent observation in France is tough of doubtful origin (Grangé & Wentworth 2022).

DISPERSAL MOVEMENTS

As stated above, *Aquila adalberti* is a strictly non-migratory species, with juvenile dispersal movements quite restricted in Europe within the breeding area,

with a median natal dispersal distance of 80 km (range 3–310, $n = 12$) (González *et al.* 2006). The different settlements used for hunting by GPS-tagged dispersing Spanish imperial eagles, all located in the Iberian Peninsula, were on average 189.53 km apart (Ormazabal-Santa Cruz *et al.* 2025). However, major dispersal movements toward northwestern Africa were recently discovered (Morandini *et al.* 2016), where sporadic nesting has also been reported (BirdLife International in Keller *et al.* 2020).

In Europe, outside the Iberian Peninsula, *A. adalberti* has been observed only in southern France (Duchateau 2007; CHN 2026) and exceptionally once in the Netherlands in May 2007, about 1300 km NE of the nearby breeding grounds (Weenink *et al.* 2011). In France, out of the sixteen verified records in all time (Duchateau 2007; CHN 2026), ten dated back to the last fifty years (since 1975), namely from 1999 to 2017 (see Tab. 1, and Fig. 3). They were primarily located along the Pyrenean mountain range, with just one sighting in the Camargue. All individuals were juveniles (1st cy = 4) or immatures (2nd-4thcy = 8), and six sightings (60%) occurred in post-fledging month (July to September).

The juvenile *A. adalberti* observed in Aosta valley on August 24 was approximately located at 1000 km from the nearest known breeding sites, making it the most easterly record in Europe, further east than the previous Dutch sighting. As already pointed out, this observation represents the first accepted record of *Aquila adalberti* in Italy. An earlier record (a 3rd

cy in Pisa province, January 8-10, 2017) initially attributed to *A. adalberti*, was thereafter identified as *A. heliaca* (Fracasso *et al.* 2018).

CONCLUSIONS

Following a severe decline in the 1960s, the population of *Aquila adalberti* has gradually increased over recent decades. In Andalusia, the average annual growth rate has been approximately 5.8% since 1989. The total number of breeding pairs in the Iberian Peninsula rose from 38 in 1974 to 841 in 2021-22 (González 2016; www.miteco.gob.es). This positive trend has led to more frequent dispersal events, being that a strong link between high rates of population growth and vagrancy was recently identified in birds (Veit *et al.* 2022).

Based on current knowledge, the sister species *A. adalberti* and *A. heliaca* (Eastern Imperial Eagle) show an overlap in their respective dispersal areas in central-southern France, where fourteen observations of *A. heliaca* were recorded, 10 of which occurred after 2000 (CHN 2025). If the current positive population dynamics of the Spanish Imperial Eagle continues, this situation could potentially extend to Italy, where the Eastern Imperial Eagle is considered an uncommon vagrant and rare winter visitor (more than seventy records 1990-2025, from September to June; Brichetti & Fracasso 2018; Ornitho.it).

In this context it should be highlighted that the four eagles mentioned (*A. adal-*

berti, *A. heliaca*, *A. rapax*, *C. clanga*) can be difficult to distinguish in the field in some plumages. However, correct specific attribution is feasible in most cases through the analysis of multiple characters, even if the possible presence of anomalous individuals (including some rare case of hybrid birds) can make the correct determination more complicated (Corso & Forsman 2008; Väli *et al.* 2010; Forsman 2016; Katzner *et al.* 2020; Angelov 2025).

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CONFLICT OF INTEREST

There are no conflicts of interest in the current work.

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