

# Algerian Nuthatch (*Sitta ledanti* Vielliard, 1976): Current challenges of an endemic species

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**Abstract** The Algerian Nuthatch (*Sitta ledanti*) is the emblematic bird species of Kabylia of Babors. It is a medium-sized passerine bird species of the Sittidae family. Jean-Paul Ledant discovered this species in October 1975, on the Babor Mountain. Twelve other forests in North-East Algeria has been discovered as breeding sites. These are the forests of the Babors region, in Kabylia. The Algerian Nuthatch was observed mainly in oak, cedar and pine habitats. It is mainly granivorous in winter and an insectivorous in spring/summer or breeding season, which starts in March and can last until July. The incubation period lasts from 14 to 17 days, with clutches of six eggs. The Algerian Nuthatch is listed as an endangered species by IUCN and is protected by the Algerian laws. However, many threats to the environment, such as tree felling and fires, are threatening the species.

Keywords: endemic species, *Sitta ledanti*, Algeria

**Összefoglalás** Az Atlasz-csuszka (*Sitta ledanti*) egy emblemikus faj Kabylia Baborsban. A Sittidae családba tartozó, közepes testmretű madárfajt Jean-Paul Ledant fedezte fel 1975 októberében a Babor-hegységben. Északkelet-Algéria 12 hegyiségében költ, főként tölgy-, cédrus- és fenyőerdőkben figyelték meg. Téli elsősorban növényi táplálékot fogyaszt, tavasszal és nyáron, vagyis a költési szezonban rovarokkal táplálkozik. Költési időszaka márciusban kezdődik, és július végéig tart. A költési idő 14–17 nap, a fészekalj általában 6 tojásból áll. Az Atlasz-csuszka az IUCN listáján veszélyeztetett fajként szerepel, valamint az algériai jogszabályok értelmében védettséget élvez. A fajt és élőhelyeit több tényező, de főként a fakitermelés és az erdőtüzek veszélyeztetik.

Kulcsszavak: endemikus fajok, *Sitta ledanti*, Algéria

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## Introduction

Algeria, the second-largest country in Africa, is characterized by emblematic species, some of that are endemic to this country. Two examples are the Algerian Nuthatch *Sitta ledanti* Vielliard, 1976 which is regarded to breed strictly in the Kabylia of Babors (or Petite Kabylie region), and the Algerian fir *Abies numidica* which is solely located in the Babor forest of the same area. We can additionally distinguish the Atlas cedar *Cedrus atlantica* located in North Africa (Ledant 1977, Isenmann & Moali 2000).

The Algerian Nuthatch represents the flagship bird species of the Kabylia of Babors (north-eastern Algeria). Instead, knowledge about this species is limited. Few papers have

mentioned the species only in general (Géroudet 1976, Bellatrèche 1999, Harrap 2002). However, data on breeding (Bougaham *et al.* 2017), feeding (Bellatrèche & Boubaker 1995, Mayache *et al.* 2020, Zemouri *et al.* 2021) and distribution (Bellatrèche & Chalabi 1990, Bougaham *et al.* 2018, Hamitouche *et al.* 2020) available in literature are summarised in this paper.

### **Description of the Kabylia of Babors**

The Kabylia is a vast area of Northern Algeria stretching over more than 300 kilometres. It comprises four essential regions; the Grande Kabylie (or Djurdjuran Kabylia or Kabylia of Djurdjura), the Petite Kabylie (or Kabylia of Babors) in the North-East, the Kabylia of Collo (or Numidian Kabylia) in the extreme North-East, and the Kabylia of Bibans in the South-West (Ficheur 1890, Niox 1890, Dahmani 2004).

The Kabylia of Babors and of Collo are the wettest regions in Algeria due to their proximity to the Mediterranean Sea, their longitudinal gradient of rainfall, and their altitudes. The Kabylia of Babors region, indeed, receives about 1 meter of annual rainfall. Temperatures are particularly homogenous and vary from 0°C to 9 °C in winter and from 28 °C to 31 °C in summer (Ledant 1977, Vielliard 1978, De Smet & Bouaza 1984, Camps 1991, Benslimane *et al.* 2008). The Kabylia of Babors is thus rich in biodiversity, with a wide variety of plants and animals.

### **History of the Algerian Nuthatch's discovery**

On 5 October 1975, Jean-Paul Ledant and his colleagues observed the Algerian Nuthatch for the first time on top of Babors forest in the country of Setif (in the Kabylia of Babors) (Géroudet 1976, Heim de Balsac 1976, Ledant 1977, Vielliard 1978). Independently of this discovery, Eric Burnier also located the species in the same place in June 1976 (Burnier 1976, Ledant 1977, Vielliard 1978). The Algerian Nuthatch was named *Sitta ledanti* in 1976 by the ornithologist Jacques Vielliard, as a tribute to the scientist who discovered it and reported it for the first time (Burnier 1976, Géroudet 1976, Vielliard 1976, Ledant 1977). It was only in 1989 that researchers resumed prospecting in the forests of the Kabylia of Babors. Indeed, Bellatrèche and Chalabi observed the species in the Guerouche national forest in the Taza National Park (Chalabi 1989, Bellatrèche & Chalabi 1990). After that, Bellatrèche, collectively with other researchers, have persisted their investigations and managed to observe the Algerian Nuthatch in the forests of Tamentout (Wilayas of Jijel, Setif and Mila) in June 1990, and of Djimla (Wilaya of Jijel) in July of the same year (Bellatrèche 1990, Harrap 2002). The study of the species has been stopped for almost 30 years, until a discovery in April 2018 when the Algerian Nuthatch was found in a fifth biotope; the Larbaâ forest (Moulai & Mayache 2018). Then, it was once contacted in seven other different forests located in the Kabylia of Babors; El Djarda in June 2018 (Haddad & Afoutni 2019), Floudène and Tazegzeout in July 2019 (Bougaham *et al.* 2020), Sendouh and Coudia in November 2019 (Bougaham *et al.* 2020), Tababort in April 2020 (Bougaham *et al.* 2021), and Bouhanch in September 2021 (Mayache *et al.* 2021).

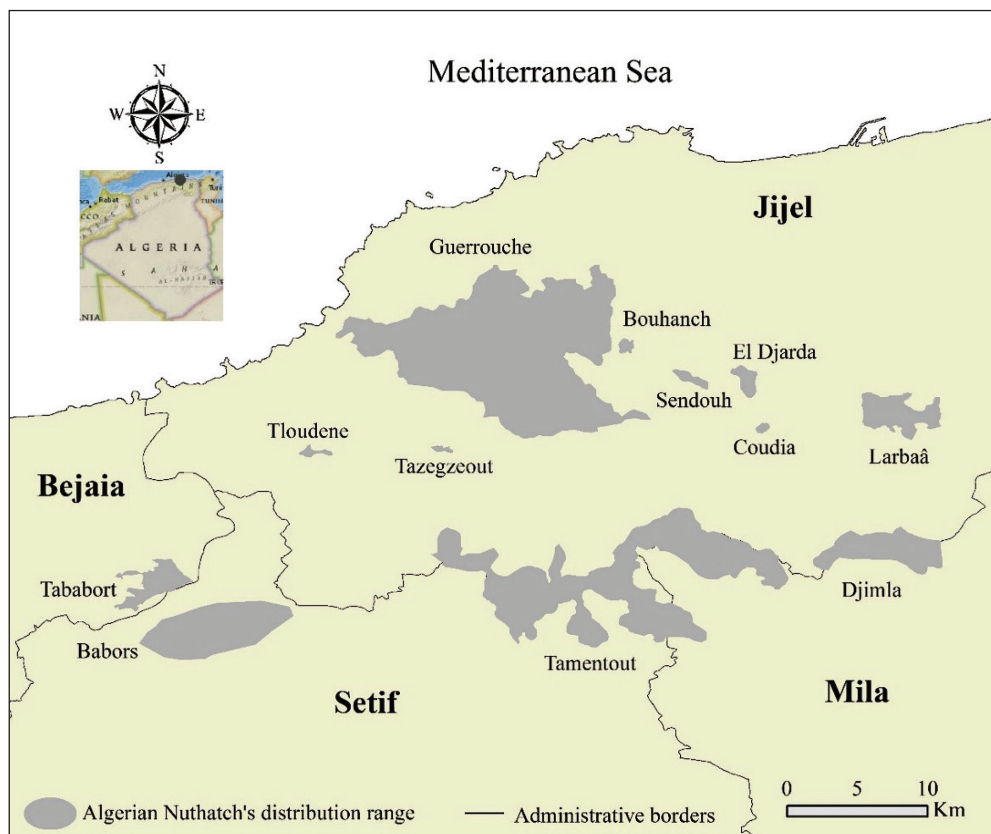


Figure 1. Map of the Algerian Nuthatch's distribution range. The grey colour highlights the breeding forests of the species discovered up to 2021 (© Souad Hamitouche)

1. ábra Az Atlasz-csuszka elterjedési térképe. Szürkével a 2021-ben felfedezett költőterületeit jelöltük (© Souad Hamitouche)

All the habitats that are home to the Algerian Nuthatch are located in the Kabylia of Babors (north-eastern Algeria). The distribution range of the Algerian Nuthatch is spread over a set of 12 forests separated by inhabitable plots (Harrap 2002). We have illustrated the species' distribution area with a map (Figure 1) using ArcGIS v10.5.1 software (Harder 2015, ESRI 2016).

### Description of the Algerian Nuthatch

The Algerian Nuthatch is described as a medium-sized passerine measuring between 11.5 and 12.5 cm (Heinzel *et al.* 1996, Svensson *et al.* 1999, Harrap 2002). The male weighs 18 g and has a wing length of 81 millimetres, and is characterized by a grey-blue dorsal plumage and a beige to light red belly plumage. It also has a whitish throat and a black cap that is distinguished from the colour of the rest of its body. Its dark eye is crossed by a black line with a white eyebrow. The male has a long grey beak of 16 mm, slightly curved upwards,

and its tail ends in a small white band (Burnier 1976, Vielliard 1976, Vielliard 1978, Fossé & Vaillant 1982, Chalabi 1989, Heinzel *et al.* 1996, Svensson *et al.* 1999, Harrap 2002, Monticelli & Legrand 2009, Bougaham *et al.* 2017).

The female Algerian Nuthatch weighs 16.5 g and has a wing length of 79 millimetres (mm), and is identical to the male but has a less pronounced pigmentation. Her cap is much smaller than the male's and is greyish which is similar to the rest of her body colour. She also has a finer beak than the male (Vielliard 1976, Vielliard 1978, Vielliard 1980, Fossé & Vaillant 1982, Chalabi 1989, Heinzel *et al.* 1996, Svensson *et al.* 1999, Harrap 2002, Monticelli & Legrand 2009, Bougaham *et al.* 2017).

The juveniles of Algerian Nuthatch have a yellowish beak which is shorter than that of their parents. They also have a greyish cap, their plumage colour is pale, and their headband is not very visible (Vielliard 1976, Ledant & Jacobs 1977, Jacobs *et al.* 1978, Vielliard 1978, Vielliard 1980, Fossé & Vaillant 1982, Harrap 2002). Algerian Nuthatches undergo moulting throughout the year. Therefore, between July and October, adults are subject to a post-breeding moult, and juveniles to a "post-juvenile" moult, which enables them to acquire characteristics similar to those of their parents (Jacobs *et al.* 1978, Vielliard 1980). Sexual dimorphism in the Algerian Nuthatch divided the opinions of researchers. Hence, there does not seem to be any sexual dimorphism affecting the individuals of the species for Vielliard (Vielliard 1976, Vielliard 1978, Vielliard 1980). Nevertheless, by referring to the definition of sexual dimorphism, and taking into account the differences which exist between individuals (male, female and juveniles), we are inclined to support opinion that sexual dimorphism does indeed affect the Algerian Nuthatch (Jacobs *et al.* 1978, Fossé & Vaillant 1982, Bougaham *et al.* 2017).

### **Phylogeny of the Algerian Nuthatch**

Nuthatches are all sedentary and belong to a single genus called "*Sitta*" that has appeared in the Miocene (Vielliard 1978, Svensson *et al.* 2009). Among *Sitta* species, the Algerian Nuthatch *Sitta ledanti* is the only endemic bird species of Algeria (BirdLife International 2020). It belongs to the clade which contains the Yunnan Nuthatch *Sitta yunnanensis* as the common ancestor. Other species in this clade are the: Corsican *Sitta whiteheadi*, Krüper's *Sitta krueperi*, Chinese *Sitta villosa*, and North American *Sitta canadensis* nuthatches (Géroutet 1976, Pasquet *et al.* 2014).

Previous studies stated that the Algerian Nuthatch was phenotypically (or morphologically) similar to the Corsican and Krüper's nuthatches Heim de Balsac 1976, Vielliard 1978). However, according to current mitochondrial and genetic (DNA) analysis, the Algerian Nuthatch has been found to be more closely related to the Krüper's Nuthatch than to all the other nuthatches of its lineage (Pasquet 1998, Blondel 2018).

### **Habitat of the Algerian Nuthatch**

The Algerian Nuthatch prefers mixed plant stands, even though it is also found in pure plant formations (Ledant & Jacobs 1977, Vielliard 1978, Ledant *et al.* 1985, Chalabi 1989,

Bellatrèche & Boubaker 1995, Bougaham *et al.* 2018, Hamitouche *et al.* 2020). The tree species frequented by the Algerian Nuthatch are: (i) oaks: afares *Quercus afares*, zeen *Quercus canariensis*, cork *Quercus suber* and green *Quercus ilex*, (ii) Atlas cedar *Cedrus atlantica*, (iii) Numidian fir *Abies numidica*, (iv) maples *Acer obtusatum*, *Acer campestre*, etc. They are accompanied by a dense undergrowth in most of the forests sheltering the species (Ledant 1977, Ledant & Jacobs 1977, Vielliard 1978, Vielliard 1980, Ledant *et al.* 1985, Chalabi 1989, Bellatrèche 1990, Bougaham *et al.* 2017, Moulai *et al.* 2017, Bougaham *et al.* 2018, Moulai & Mayache 2018, Hamitouche *et al.* 2020).

The Algerian Nuthatch avoids the margins of forests of its distribution range, it then sets out in search of territories in the center of them. This preference ought to be detrimental to the survival of the species in case of important deforestation and/or devastating fires (Vielliard 1980, Bougaham *et al.* 2018, Hamitouche *et al.* 2020).

### Vocalisation of the Algerian Nuthatch

The vocalisation of the Algerian Nuthatch is composed of 7 to 12 notations, repeated several times a minute. It is sometimes whispered, sometimes nasal, sometimes fast, and sometimes slow (Burnier 1976, Vielliard 1976, Heinzel *et al.* 1996, Harrap 2002). The species is characterized by two types of sounds. A territorial song (or species recognition song), which is of low intensity, and is emitted by male and female to communicate with each other, to look for food, etc. A whispered and aggressive call reminiscent of Eurasian Jay *Garrulus glandarius* which is emitted exclusively by the male to mark his presence and/or to defend his territory (Burnier 1976, Vielliard 1978, Heinzel *et al.* 1996, Svensson *et al.* 1999, Harrap 2002, Monticelli & Legrand 2009). The same reaction is observed using a recorder during field investigations (Ledant 1978).

Juveniles also emit a variety of sounds, no doubt trying to imitate their parents (Vielliard 1978). During searching food, the Algerian Nuthatch hardly manifests itself anymore, when so, it shouts more than it sings (Bellatrèche & Boubaker 1995).

### Diet and foraging of the Algerian Nuthatch

The diet of the Algerian Nuthatch varies according to seasons. In the winter, the species is typically granivorous, then seeds and acorns of conifers, firs, and cedars are eaten. In spring (breeding) and summer seasons, the proliferation of insects allows the species to diversify its feeding. Thus, spiders, caterpillars, beetles, ants, hymenoptera and adult lepidoptera, which are abundant around its nests, are all in its diet, and *Forticola auricularia* is its most common prey, during its breeding period (Burnier 1976, Ledant & Jacobs 1977, Vielliard 1978, Ledant 1981, Bellatrèche & Boubaker 1995, Mayache *et al.* 2020, Zemouri *et al.* 2021). The Algerian Nuthatch does not seem to have any preference for the plant species of its environment when it is feeding.

The Algerian Nuthatch deploys various methods in its search for food. It digs, picks, gleans, and hollows out tree supports. The bird seems to opt for middle-aged trees with small and thin branches and explores more the foliage of trees than their trunks (Bellatrèche

& Boubaker 1995). The seeds it consumes are taken from the ground, they are eaten directly or are stored in the cavities of the trees (especially oaks). This strategy allows the species to conceal food for the summer supply and/or the feeding of its chicks (Ledant & Jacobs 1977, Vielliard 1978, Ledant 1981, Le Fur 1981).

Both parents are responsible for the feeding of the nestlings in the nest, but it is the male who mainly provides the energy needs of its family (Vielliard 1978, Bellatrèche & Boubaker 1995, Bougaham *et al.* 2017, Moulai *et al.* 2017). However, within the same brood, there is fraternal mutual aid where one nestling feeds another who is less developed (Ledant & Jacobs 1977). The feeding period for the nestlings lasts between 22 and 25 days. The parents continue to feed their young even after their fledging despite their independence (Ledant & Jacobs 1977, Vielliard 1978).

### **Breeding of the Algerian Nuthatch**

The breeding season of the Algerian Nuthatch starts between March and May and can last until July, according to the weather. Mean clutch size is around 6, and only female incubates the eggs, which lasts from 14 to 17 days (Ledant & Jacobs 1977, Vielliard 1978, Bellatrèche & Chalabi 1990, Bougaham *et al.* 2017, Moulai *et al.* 2017). Fledglings leave the nest between June and July (Ledant & Jacobs 1977, Vielliard 1978, Fossé & Vaillant 1982, Moulai *et al.* 2017). Both males and females are taking out nestling feces. They still defend their territory even after a few days of their offspring's flight (Ledant & Jacobs 1977, Bougaham *et al.* 2017).

The Algerian Nuthatch digs its lodge and/or uses those abandoned by woodpeckers, mainly on dead trees still standing on their trunks (Ledant & Jacobs 1977, Bougaham *et al.* 2017, Moulai *et al.* 2017). The Algerian Nuthatch uses the Numidia fir, the Atlas cedar, the different oaks species, and the eucalyptus trees of its environment for nesting (Ledant & Jacobs 1977, Vielliard 1978, Bougaham *et al.* 2017, Moulai *et al.* 2017). Its nest is built of litter consisting of softwood shavings, dead leaf debris, moss, forest bird feathers, and wild boar bristles. Its depth varies from 15 to 20 cm and it is built approximately 5 to 15 metres above the ground (Ledant & Jacobs 1977, Vielliard 1978, Fossé & Vaillant 1982, Bougaham *et al.* 2017, Moulai *et al.* 2017).

### **Relation between Algerian Nuthatch and other forest birds**

In the inter-breeding period, the Algerian Nuthatch makes flocks with the Coal Tit *Periparus ater*, the Great Tit *Parus major*, the Common Chiffchaff *Phylloscopus collybita*, and the Firecrest *Regulus ignicapilla* (Ledant & Jacobs 1977, Jacobs *et al.* 1978).

The European Pied Flycatcher *Ficedula hypoleuca* is among the species that competes for food with the Algerian Nuthatch (Ledant & Jacobs 1977). The Great Spotted Woodpecker *Dendrocopos major*, the Garden Dormouse *Eliomys quercinus*, and the Weasel *Mustela nivalis numidica* attack and destroy Algerian Nuthatch's broods and nests (Vielliard 1978, Bougaham *et al.* 2017).

### Conservation status and numbers of the Algerian Nuthatch

The International Union for the Conservation of Nature (IUCN) has classified the Algerian Nuthatch as an endangered species in its Red List, and it can be found thanks to the code: “Endangered B1ab(iii,v);C2a(i) ver 3.1” (BirdLife International 2020).

In Algeria, the protection of the Algerian Nuthatch falls within the framework of the conservation of non-domestic wild species of the decree n° 83-509, established by the Algerian constitution since 1983 (JORA 1983). This law was updated in 2012 when more species were included (JORA 2012).

The solely complete inventories of the Algerian Nuthatch have been made in ten forests (*Table 1*). Its numbers have been estimated between 250 and 999 individuals (BirdLife International 2020). However, the continuity of the prospections for counting the numbers of the Algerian Nuthatch could make a difference; the numbers of individuals could exceed the set interval, and its conservation status may be changed, giving hope that the species will not be longer threatened by extinction. This will be possible by lasting to study all aspects of this bird and by calling on all the authorities concerned to conserve its living environment.

*Table 1.* Number of individuals of the Algerian Nuthatch in eleven forest territories  
1. táblázat Az Atlasz-csuszka egyedszámai tizenegy erdőterületen

Forests	Individuals	Pairs	Solitaries	References
Babor	275	133	9	(Zemouri & Bougaham in press)
Guerrouche	91	–	–	(Bellatrèche & Chalabi 1990)
Tamentout	187	80	27	(Hamitouche <i>et al.</i> 2020)
Djimla	60	27	6	(Bougaham <i>et al.</i> 2018)
Larbaâ	40	13	14	In press
El Djarda	10	3	4	Our own findings
Sendouh	9	4	1	Our own findings
Tloudène	7	3	1	Our own findings
Tazegzeout	3	1	1	Our own findings
Coudia	3	1	1	Our own findings
Tababort	6	3	0	Our own findings
Total	691	268	64	–

### Threats

Man will remain an eternal danger for the forest. Among the many pressures on the forest, fires can damage the forest fauna, flora, and habitats. Illegal logging is another threat to the Algerian Nuthatch, especially when it is carried out to the detriment of dead trees. This disturbs the ecology of forest birds that use dead trees for their nesting as is the case of the Algerian Nuthatch (Vielliard 1978, Ledant 1981, Ledant *et al.* 1985, Bougaham *et al.* 2017, Bougaham *et al.* 2018, Hamitouche *et al.* 2020, Bougaham *et al.* 2021). Besides, residents

over-exploit forest resources for their use and/or for sale on the market. They create tracks for the passage of transport vehicles within the forest itself, they gather edible wild fruits and known medicinal plants and exploit wood of forest trees, particularly cork oak *Quercus suber* (Ledant 1977, 1981, Ledant & Jacobs 1977, Ledant *et al.* 1985, Camps 1991, Madoui 2002, Ramade 2008, Bougaham *et al.* 2017, Moulai *et al.* 2017). In addition, they practice the breeding and the grazing of cattle, sheep, and goats, which causes soil erosion and flora diversity diminution. Therefore, the consequences of these human activities are harmful, threatening the forests of the Kabylia of Babors with degradation, reduction of their surface area, and even the disappearance of the species they shelter (Ledant 1977, 1981, Ledant *et al.* 1985, Camps 1991). The threats that we have summarised are a danger for all the fauna and flora of the Kabylia of Babors, in particular for the Algerian Nuthatch.

## Conclusion

The Algerian Nuthatch is an endemic bird with small population size. Knowledge on the ecology and behaviour of this species is extremely limited. Here, we provide essential information about the species, to facilitate its presentation to the general public and scientists in particular. Finally, the ultimate aim of this article is to draw the attention of the authorities concerned, about the lack of studies undertaken on the Algerian Nuthatch and to the urgent need to establish means for the conservation of this endemic species still poorly known.

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