

Conservation of the Corsican Nuthatch *Sitta whiteheadi* Sharpe, and Proposals for Habitat Management

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ABSTRACT

A study of the distribution, density and habitat of the Corsican nuthatch, an endemic species to Corsica, suggests that adjustments are needed to the present forest management in order to ensure the conservation of this species. The survival of the Corsican nuthatch is dependent on old Pinus laricio forests where there are dead and rotten trunks, needed for nesting. The Corsican nuthatch was recorded in almost 15 P. laricio forests; the average density was 0.85 pairs 10 ha⁻¹ (0–1.23); this density, extrapolated to a total surface of 24 000 ha of suitable forests, suggests a total population of about 2000 pairs. Apart from fires, snow-slips and predators, which are important factors limiting this endemic species, the present forest management, which includes the removal of dead trees suitable for nesting, threatens the survival of the nuthatch. The third of the forest at the highest altitude should be left unexploited; in the middle zone, only the dead trunks below 3 m should be taken; in the lower third, where suitable trunks are scarce, no dead trunks should be taken.

INTRODUCTION

Studies were conducted on the Corsican nuthatch by Whitehead (1885) and by Jourdain (1911), in the years following its discovery (Sharpe, 1884); no other substantial work was published until Löhrl's (1960) definitive separation of the species from *Sitta canadensis*. Chappuis (1976) studied

the vocalisations, and preliminary data on breeding were given by Hobson (1964) and by Brichetti (1978, 1979). Other records, published in general reports of the Corsican avifauna, are summarised by Thibault (1983).

From 1977 to 1984, and particularly from 1981 to 1984, we undertook research on the distribution, breeding ecology and the population status of the Corsican nuthatch *Sitta whiteheadi*. The species is stenoeic and is strictly tied to *Pinus laricio* forests, where the present management does not ensure adequate conservation (Brichetti & Di Capi, 1985).

Our results suggest that the population of the Corsican nuthatch totals about 2000 pairs; this estimate is based on the extrapolation of the average density ($0.85 \text{ pairs } 10 \text{ ha}^{-1}$), to the total surface of c. 24000 ha of suitable forests. At the end of the 1950s, Löhrl (1960) estimated a population of about 3000 pairs (one territory per 10–15 ha and 43750 ha of forest). We believe that this nuthatch has decreased during the last two decades in some zones where forests have been exploited, and that the reduction has been caused by the loss of suitable breeding habitat.

The Corsican nuthatch is of special conservation concern in Europe (Parslow & Everett, 1981), and fulfils at least 60% of the criteria proposed by Adamus & Clough (1978) as guidelines towards evaluating species for protection in natural areas. These criteria are discussed below.

Site fidelity

We could not test whether the same nests are used year after year, but the same trees are occupied for long periods—for example, in the Valdo Niello forest one tree had a nest for four breeding seasons, until it was cut down.

Sedentariness

Observations during non-reproductive periods (September 1980, October 1983, winter 1983–84) showed that a pair is tied to its breeding territory all the year round, provided that the habitat is not altered. The winter records of Corsican nuthatches below 700–800 m in low valleys and near the west coast of Corsica (Thibault, 1983) probably reflect non-territorial birds or the dispersive movement of fledgelings.

Habitat specialisation

The connection between the Corsican nuthatch and the *Pinus laricio* is absolute, the pine fulfilling all the feeding and breeding requirements of the bird.

Localised distribution, rarity, endemism, and scientific value all result from the peculiar biogeographical properties of the Corsican nuthatch.

STUDY AREA

The Corsican nuthatch lives in at least 15 forests of the *Pinus (nigra) laricio*, spread along all the mountain ridges of inland Corsica, from Tartagine in the north, to Ospedale in the south (Fig. 1). The main forests lie around the Cinto, Rotondo, Renoso and Incudine mountains. These forests characterise the summer dry area of the mountain horizon, with precipitation chiefly concentrated in the autumn and winter. They reach their most characteristic structural physiognomy between 900–1000 and 1300–1400 m, while at lower altitudes they become associated with *Pinus pinaster*. At higher altitudes they reach 1600 m and colonise the top of certain rocky ridges in scattered groups, reaching the uppermost limit of high arboreal vegetation at 1750–1800 m. Among the other trees associated with the *P. laricio* are *Fagus sylvatica* in very damp areas (e.g. Vizzavona forest), *Abies alba* in the most rugged and least accessible areas (e.g. Aitone forest) and *Betula verrucosa*, which forms groupings at the upper limit of forests and occupies open and well-lit clearings (e.g. Valdo Niello forest).

The pluviometric regime generally varies between 1000 and 1300 mm yearly, with extremes of 750–1000 mm in the lower parts of the valleys and 1200–1800 mm in the upper, inner areas. The forests are exploited when the trees are 300 years old (270–360), the trunk is 0.8–1 m wide and the height is 25–40 m (Debazac, 1964; Duplias *et al.*, 1965; Simi, 1981).

METHODS

From 1981 to 1984 we carried out 10 strip censuses on linear transects 3000 m long (in three cases the length was halved) and 200 m wide. Along each strip, we recorded all nests found and every contact with territorial pairs which had the majority of their territory within the transect. The total time needed to cover each strip was 6–8 h; about 200 h were taken for the research and 525 ha were censused. The transects were planned so as to cover both old and pure stands of *P. laricio* and less mature forests subject to management or mixed with other tree species (Fig. 1).

RESULTS

Habitat requirements

Breeding Corsican nuthatches were found from 800 to 1600 m above sea level (average 1260 m). We recognised two main types of habitats, where the nuthatch densities differed.

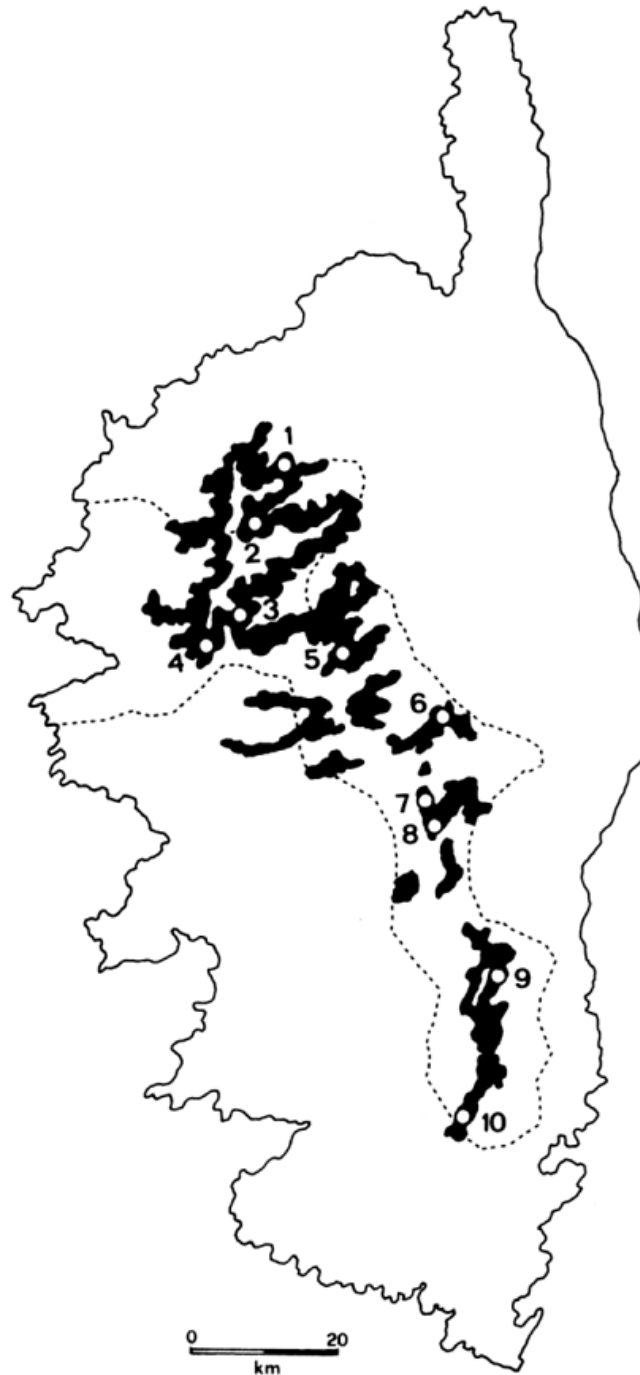


Fig. 1. The range of the Corsican nuthatch *Sitta whiteheadi* overlaps almost completely with the range of *Pinus (nigra) laricio*, shown in black. The Natural Regional Park is included within the stippled line. The numbers indicate the forest localities of sample censuses: 1. Tartagine-Melaya; 2. Carrozzica; 3. Valdo Niello; 4. Aitone; 5. Restonica; 6. Rospa-Sorba; 7. Ghisoni; 8. Marmano-Col de Verde; 9. Bavella; 10. Ospedale.

The optimal habitat coincided with the central and upper elevational parts of the old stands of *P. laricio*, with medium canopy cover, with abundant dead and rotting trunks still standing, and with some clearings. In these forests we recorded an average density of 0.85 pairs 10 ha⁻¹ (maximum density 1.23 pairs 10 ha⁻¹). The highest densities (1.13 pairs 10 ha⁻¹, from 0.92 to 1.50) were recorded in the old, pure stands of the *P. laricio* which are not managed and are situated from 1000–1100 and 1400–1500 m above sea level (max. between 1200–1350 m) (Fig. 2).



Fig. 2. Vegetation profile recorded in a section of *P. laricio* forest (100 × 10 m) representing an example of optimal Corsican nuthatch habitat: Average nest-to-nest distance 290 m (210–390 m); average density 1.13 pairs 10 ha⁻¹ (0.92–1.50).

On the other hand, the lowest densities (0.24 pairs 10 ha⁻¹, from 0 to 0.6) were recorded in the young forests, in those mature stands under heavy management, or in those where the *P. laricio* is mixed with *P. pinaster*, *Fagus sylvatica* or *Abies alba*. These forests are usually below 1000 m above sea level. Low densities were also found above c. 1500 m, where trees are scattered and often stunted, due to the harsh conditions. No birds were found in recently burned forests (e.g. Restonica).

The Corsican nuthatch is believed to belong to the 'Sittelles mésogéennes' group, of pan-mediterranean origin, whose paleobiogeographic reconstruction was discussed by Vielliard (1978) and by Ledant (1978) in relation to the surprising discovery of the Kabylean nuthatch *Sitta ledanti* in 1975 in the Algerian Djebel Babor.

According to Ledant (1978), the habitats of these two nuthatches are comparable in the sense that they are found in the humid climate characteristic of the Mediterranean mountains (annual precipitation over

2000 mm), although their vegetational structure differs. The Kabyle nuthatch lives in the upper Djebel Babor (maximum height 2004 m), and reaches its maximum density in a tight *Quercus-Abies* woodland of 250 ha, lying above 1900 m; the species is scarcer or irregular at lower altitudes, in the open, mixed forests, and in pure stands of *Quercus* or *Cedrus*, totalling about 1000 ha (Vielliard, 1980). According to Gatter & Mattes (1979), the highest density (4 pairs 10 ha^{-1}) is reached in the mixed woodland of the summit area of the massif. The trees forming the main stock are *Cedrus atlantica*, the endemic *Abies numidica*, *Quercus faginea* and *Acer obtusatum*. The lower hill areas are more sparsely colonised (the lowest territory was recorded at 1500 m).

Disturbance factors and threats

Among the factors limiting the local distribution and abundance of the Corsican nuthatch, forest fires caused by man are certainly the most important, because fire destroys the habitat needed by the nuthatch for decades or even centuries. In winters with abundant snow, the vegetation is liable to erosion after snow-slips. These are particularly detrimental because they open wide gaps in the woods and break off many dead trunks which serve as nesting sites for the nuthatch.

Of the potential predators of the nests (small rodents, reptiles or birds), the great spotted woodpecker *Picoides major* seems the most effective, as proposed by earlier authors, and as recorded by ourselves in 1984 in the Bavella forest (a case of predation of chicks from the nest). Breeding by the Corsican nuthatch occurs synchronously (the eggs hatch at the end of April or in the first ten days of May), so that the reproductive success of the entire population is exposed to the detrimental effects of adverse weather.

The present management of the *Pinus laricio* forests act as a further, man-induced limiting factor, because dead and rotten trees are felled and the suitable habitat is thus reduced. All the nests we found were in trees 200–300 years old at the time of death (estimated from the average diameter, at chest height, of 0.7 m in 66% of the trunks, range 0.4–1.2 m). These old trunks had become more suitable to the nuthatches by a long process of decomposition (Fig. 3).

In some sectors of the forests, we observed a decrease of 40–60% in breeding Corsican nuthatches, depending upon the management and exploitation of the forests. In a 20 ha plot on the top of Valdo Niello forest, the density decreased from 1.5 to 0.6 pairs 10 ha^{-1} , and in the lower part of Aitone forest the decrease was from 1.4 to 0.9 pairs. However, these decreases cannot be extrapolated to the entire range of the species,



Fig. 3. Types of *Pinus laricio* trunks used by the Corsican nuthatch for nesting. For type A (58.3% of the cases) and type B (22.2%), the graphs show, on the left, the relation between trunk height (▲) and nest entrance height (●). Trunks of the type C occur rarely, and are used in 8.3% of cases; type D is used in 5.5% of cases. Other types, which total 5.5%, are not shown. Types A and B are drawn in scale with the average height of the trunks and of the nests (A, trunk 14.6 m, range 7–22, nest 9.7, range 4–17; B, trunk 7.5, range 3.5–15, nest 5.6, range 2.7–10).

which includes large surfaces of non-accessible forests which are not exploited.

PROPOSALS FOR FOREST MANAGEMENT

The above information suggests that limited adjustment to forest management (listed below) could effectively enhance the conservation of the Corsican nuthatch, allowing at the same time the continued exploitation of the forests.

The upper third of the old *P. laricio* forests should be left unexploited. These forests hold the highest number of dead trees suitable for nesting (15–20 trees 10 ha^{-1}), although natural limiting factors, like snow-slips, are severe.

The central third of the forest could be managed and exploited for wood, but only dead trunks shorter than 3 m should be felled. Only 5.5%

of the nests are below 3 m; the average height of the nests is 10 m (1.6–26.0 m, $n = 36$). Trunks higher than 3 m should be removed only in particular situations avoided by the nuthatch (slopes exposed to snow-slips, burned areas) where there are few living trees and many dead trunks.

The territory of one pair extends over 7–10 ha; therefore in each 10 ha of forest at least 5–15 suitable dead trees should be left, preferably evenly dispersed. Some living pines with rotting top (type D in Fig. 3) should also be left, because they may be used for nesting, and provide a turnover for the old trunks which are gradually lost. Some of the dead trees of a clump may be removed, particularly those shorter than 3 m and those that are unsteady. When breeding pairs were dense, the average inter-nest distance was 290 m (210–390 m).

In the lower third of the forests, which is often mixed, suitable trees are extremely scarce and none should be removed. In these forests the average inter-nest distance is 470 m (400–500 m), and we found a relation between the low density of breeding pairs ($0.3 \text{ } 10 \text{ ha}^{-1}$) and the scarcity of suitable dead trees (from 0 to $4 \text{ } 10 \text{ ha}^{-1}$).

Many details of the ecology of this interesting endemic species are still to be studied (e.g. reproductive biology, population dynamics, feeding); however, we believe that our preliminary proposals on forest management could ensure the survival of the species, whose range lies almost totally within the boundaries of the Corsican Natural Regional Park.

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