

SHORT COMMUNICATIONS

NESTING OF *Falco tinnunculus* IN NATURAL SITES IN CANARY PINES ON EL HIERRO ISLAND*

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In Europe the reproductive behaviour of the Kestrel (*Falco tinnunculus*) is similar to that of other Falconidae: no nest building occurs although some individuals scrape the surface where their eggs will be laid (Cave 1968). According to Cramp and Simmons (1980), nesting occurs most frequently in trees, using old nests left by Corvidae (Dementiev et al. 1951), Columbidae (Labitte 1932), Picidae (Geroudet 1978), as well as by larger birds of prey, and even in those of arboreal mammals (i.e., *Sciurus vulgaris*) (Kuusela 1983).

The behavioural flexibility of the Kestrel is also shown in its utilization of a wide variety of nesting sites such as ledges on cliffs or building (Geroudet 1978), nest boxes (Cave 1968) and occasionally the ground (Balfour 1955). Use of such varied nest sites is probably one of the factors contributing to the species' success as the commonest of the diurnal birds of prey in most of the Palearctic and African regions (Cade 1982), including the Canary Islands.

The reproduction of the Kestrel in the Canary Islands has been discussed, though not in depth (Koenig 1890; Bannerman 1914; Carrillo and Trujillo in press). Moreover, studies on the nesting sites are scarce, and lack quantitative information (Bannerman 1963; Perez Padrón 1983), apart from the record of 17 nests on Tenerife (Martín 1987).

In the Canary Islands the Kestrel usually breeds in holes and on ledges on cliffs. Nesting in trees is occasional (Cabrera 1893; Polatzek 1908), though in the Eastern Islands nesting in palm trees seems to be a more frequent phenomenon (Meade-Waldo 1889; Bannerman 1963). Other sites where we have also found Kestrel clutches are in walls pertaining to houses and along roadsides, in holes of disused quarries, in old nests of domestic pigeons (*Columba* sp.) in rural buildings or earth slopes, and in nests of ravens (*Corvus corax*) on rocks, or in Canary Pines (*Pinus canariensis*).

Also, in El Hierro Island the Kestrel breeds normally (approximately 70-80% of cases) in ledges and holes on rocky walls. We have found, however, that on this island

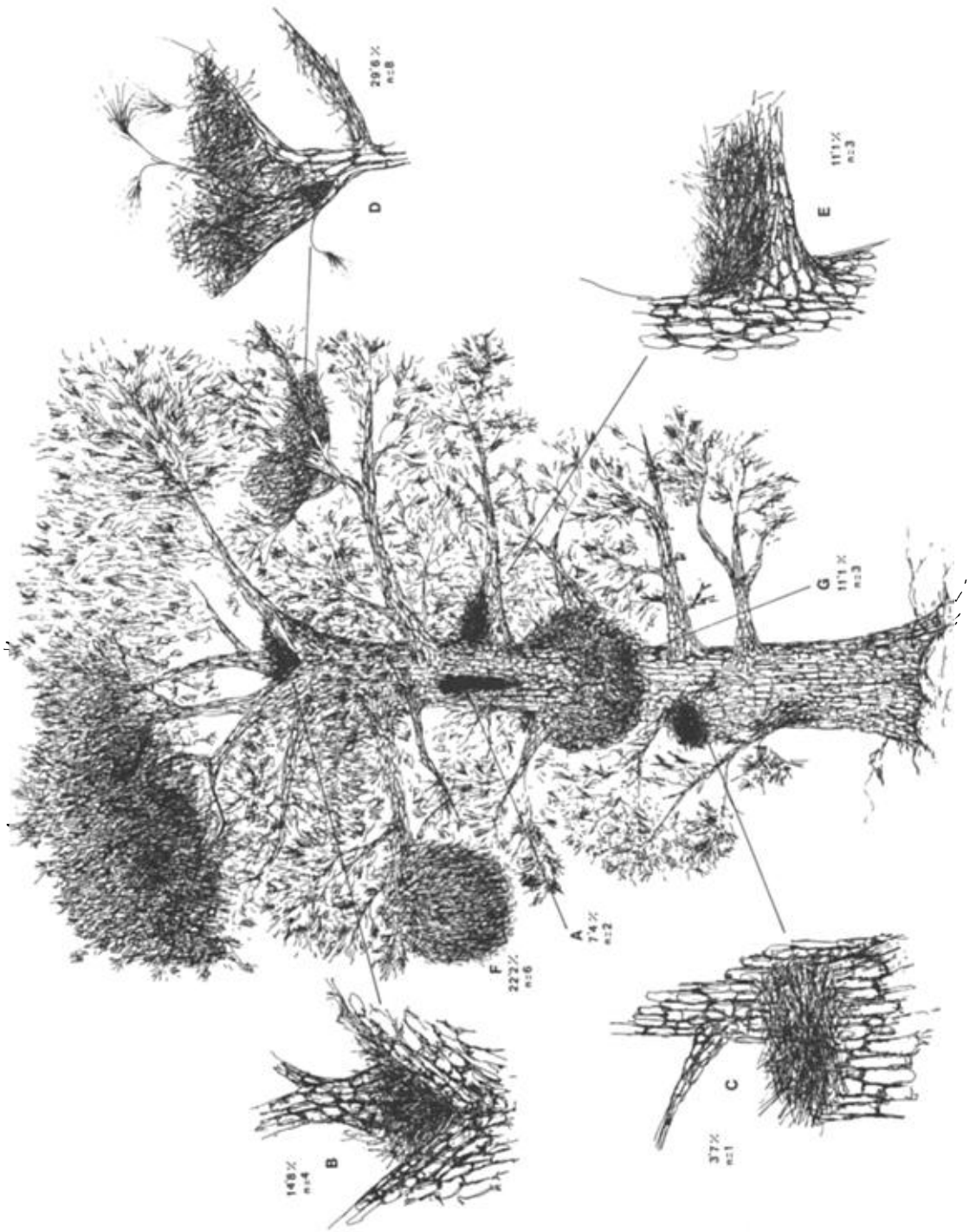
the Kestrel breeds in the forests of Canary Pines by laying its eggs on or in the masses of pine needles that accumulate naturally in various parts of mature pine trees. Pine forests on El Hierro Island are characterized by a fairly high density of trees and an almost total lack of undergrowth. Although the forests have been extensively modified by human activities, they contain a substantial number of mature trees, and these are used for nesting by kestrels. Nesting occurred both near the outer borders of the forest and in the interior, apparently without preference.

Our observations on El Hierro were carried out during the spring of 1987. The 27 nests that we studied in pine trees were classified according to 7 nest site types (Fig. 1), and distance to the tree trunk and height above ground were also measured. The most frequently utilized sites were the masses of dead pine needles near the ends of lateral branches (Fig. 1, type D). Such accumulations, once initiated, are well situated to catch falling needles from the upper parts of the tree, and thus often reach a large size. The malformations on the tips of the branches (type F), including both living and dead needles, form a more regular type of structure, but in our sample they were used a little less commonly than type D sites. These malformations are sometimes formed at the tops of the trees, and in one there was a small tunnel through which the Kestrel entered to breed. These large and compact foliage concentrations in the tree tops are somewhat comparable to the bulky nests of the Hamerkop (*Scoptes umbretta*) in South Africa, which also has interior tunnels that are occasionally used by nesting kestrels (Steyn 1985). Both type D and type F sites are favourable for nesting, probably because the fragility of the branches is a deterrent to human interference which kestrels often suffer on the islands.

The remaining types of nest sites (types A, B, C, D, G) were associated with the trunk and less frequently used by the Kestrel. Accumulations of needles in such sites were usually smaller than those on the branches and may be more vulnerable to human interferences.

From a total of 27 nests surveyed the average height from the forest floor surface was 10.3 m (S.D. = 3.15; range = 3-17 m). This height was slightly greater to what Soler et al. (1983) exposed on kestrels nesting on old nests of the Carrion Crow (*Corvus corone*) on trees in Granada

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(south of the Iberian Peninsula). The average distance from the nests to the tree trunks was 2.9 m (N = 13; S.D. = 2.19; range = 0.5–8 m), a distance similar to that described by Soler et al. (1983).

According to Newton (1979) the density of birds of prey is generally restricted by the availability of breeding sites or food. The high relief of El Hierro, the abundant food supply during the breeding season (Nogales, in prep.) and the versatile feeding habits of the Kestrel on El Hierro Island (Carrillo et al., in press) are all factors that combine to ensure the success of this species on the island. This success probably ensures the saturation of all trophically optimal areas that also contain breeding sites in rocky places (these are in the area of El Pinar). Thus, the use of pine trees for nesting probably increases the overall breeding density of the species on El Hierro. Similar effects have been produced artificially by providing nest boxes (Cave 1968) and artificial nests of Corvidae (Village 1983). It is noteworthy, however, that the use of natural nesting sites in pine trees has not been recorded up to now in any of the other islands in the Canary archipelago.

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Figure 1. Diagram showing the different types of nest sites used by *Falco tinnunculus* in *Pinus canariensis* on El Hierro, with number of cases and percentages frequency of each type. Types of nest sites shown in the figure are A, nest on trunk hole; B, nest on the trunk ending fork; C, nest on the platform of a main trunk; D, nest on needle accumulation of lateral branches; E, nest on stretched base axillary branch; F, nest on malformation of terminal branch; G, nest on trunk malformation.

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RED FOX PREDATION ON FLEDGLING EGYPTIAN VULTURES

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Reports of predation on nestlings of Old World vultures are rare (see Brown, L. and D. Amadon, Eagles, hawks and falcons of the world. Feltham, Middlesex, 1968; Mundy, P., The comparative biology of Southern African Vultures. Vulture Study Group, Johannesburg, 1982). The Egyptian Vulture (*Neophron percnopterus*) nests frequently in narrow cliff cavities where the possibility of mammalian predation is low (Ceballos, O. and J. Donázar, *Munibe*, in press). Only one reference (Rodríguez-Jiménez and Balcells, *P. Cent. Pir. Biol. Exp.* 2:159-187, 1968) reports the capture of a nestling in an accessible nest by a mammalian predator of unknown species. Killing of fledglings by predators are not known. In this note we report an Egyptian Vulture-Red Fox (*Vulpes vulpes*) incident and two cases of fledgling predation by Red Foxes. The research was done in Bardenas Reales-Navarra (northern Spain).

On 11 August 1987, while observing an Egyptian Vulture nest with 2 fledged chicks, we saw a fox approaching the nest along the cliff edge close to where the younger fledgling (81 d old) was perched. Immediately, the female vulture placed herself between the fox and the chick and displayed much nervous excitement. A few seconds after, the fox moved away. Meanwhile, the nestling, very frightened, flew hurriedly to a nearby ravine.

On 28 August 1987, the remains of an 83 d old fledgling were found under the nest-cliff. On the ground there was a great pool of blood and plucked feathers with cut quills. Fox tracks were very common, and a den was located 150 m away from the nest.

On 30 August 1987, a fledgling provided with a radio transmitter flew from the nest at sunset and did not return, roosting on the ground under the nest-cliff. Next morning the young had disappeared. It was 82 d old and its flights

were still very short, no more than 50 m around the nest. Searching with receivers we found the radio transmitter together with the nestling remains at the burrow entrance of a fox den, which was 650 m away from the nest. The remains, only wings and body, had signs of carnivore feeding.

It is difficult to evaluate the real importance of fox predation in our study area. Of 7 fledglings provided with radio transmitters, 1 was killed (last reported case). The chance for predation would be enhanced by foxes wandering around vulture nests searching for food remains. Predation seems more probable during the days following the initial flight, which occurs when the chick is around 75 d old. In this period, fledglings are not able to return to the nest at night (unpubl. obs.) and are thus being exposed to possible mammalian predation.

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