may implies that many individuals have learn this feeding technique. Absence of toads foraging records in other places suggests that the technique is learned by imitation or "conspecfic observation" (KLOPFER, 1959) among individuals within the population.

This population preference for an unusual food shows the existence of a particular factor that affects the owls hunting selection. CHARNOV & ORIANS (1973) establish four levels of hunting selection: a) habitat selection b) hunting habitat selection c) hunting method selection and d) kind of prey selection. A fifth level may exist, where the selection may be product of individual or populational preference (developed by learning) for certain kind of food. The differences with the fourth level stated by CHARNOV & ORIANS is that, while the prey selection is characteristic of each species and is pointed to an optimum foraging performance, the populational or individual preferences, although respecting the optimal foraging laws, is an unpredictable show of biological diversity.

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3304 : NESTING OF THE RED-LEGGED PARTRIDGE (*Alectoris rufa*) UPON OLIVE TREE TRUNKS IN THE SOUTH OF SPAIN

The Red-legged Partridge (*Alectoris rufa* L.) is a typical ground nesting bird common to open landscapes in both wild and farmed areas. It tends to occupy younger olive groves (MUÑOZ-COBO, 1992) and field margins, but it is also present in older groves.

Olive grove cover more than two million hectares in Spain, and about 75% of them being in Andalucía (southern Spain). This represents 14.81% of the region's total surface area. The increasing intensive farming in olive groves has resulted in greater production and a decrease in labor costs (VALERA *et al.*, 1993). This intensification creates a continuous move-

FIG. 1.– One of the nests found upon the olive trunks.
L'un des nids trouvés sur un tronc d'olivier.

ment of machinery and people in the plantations in order to carry out agricultural work.

Nest site selection and the breeding success of the Red-legged Partridge depend on the existence of ground vegetation and its height around the nest (RANDS, 1988), as well as on the percent vertical cover and the distance to the nearest opening of the shrub (RICCI *et al.*, 1990). In the olive groves plant coverage is very scarce due to the agricultural work carried out. In spring, after the rainfall period, it is specially important for the farmers to remove growing vegetation which is in competition with the olive trees for the water and the nutrients during the summer drought (SAAVEDRA, 1994). Thus, during this season, work is specially focused on eradicating the vegetation in the olive grove lanes and under the olive canopies, both mechanically (tillage) and chemically (herbicidal applications). These labors coincide with the Red-legged Partridge breeding season.

In olive groves the vegetation around the sites selected by the Red-legged Partridge for nesting changes drastically during the hatching period. Out of 40 nests analyzed in olive groves during 1995, 61.53% had a plant coverage height of more than 50 cm at the beginning of the laying. During hatching, 85.8% of them were uncovered or plant coverage height was reduced to less than 50 cm (VARGAS & CARDO, 1996). This, directly and indirectly, caused nest and egg losses of about 50%. Such low habitat quality in the olive groves probably induces the Red-legged Partridge to select anomalous nest sites.

TABLE I.– Features of red-legged partridge nests found upon olive trunks. The abandoned nest was a direct consequence of man disturbance. *Caractéristiques des nids de Perdrix rouge trouvés sur des troncs d'oliviers. L'abandon du nid a été provoqué par des dérangements humains.*

Year	Clutch size	Eggs hatched	Age of tree (years)	Height over ground (cm)	Depth of the hole (cm)	Dimensions of the hole (cm)	Fate of nest
1996	14	14	> 100	85	20	27 x 17	Successful
1997	1	0	50 to 80	95	34	38 x 24	Abandoned
1997	15	14	> 100	115	25	21 x 13	Successful
1997	13	0	> 100	85	20	27 x 17	Thieved
1998	9	8	> 100	95	14	25 x 28	Successful

In this note, we present seven cases of Red-legged Partridges nesting upon trees about one meter above the ground, which is a breeding behaviour hitherto unreported in this species.

During 1995, 1996, 1997 and 1998, 40, 48, 63 and 54 Red-legged Partridge nests, respectively, were monitored at hatching in a private game preserve of about 954 ha of homogeneous olive groves, located in Antequera region (Málaga province, southern Spain). Olive density in the study area was 76 trees/ha, most of them being very productive old trees (more than 100 years old).

We found one nest upon a olive trunk in 1995 (2.5% of the total nests found), one in 1996 (2% of the total), four in 1997 (6.35%) and one more in 1998 (1.8%). The features of five of these nests are described in table 1. The nest found in 1996 was used again in 1997.

The five nests in table 1 were located in holes in olive trunks at a mean height of 95 cm (C.V. = 7.75%) and lacked any plant coverage. The eggs were lying at the bottom of the hole in which there were some dry leaves that had fallen from the tree.

The nests we found were located on olives belonging to the older groves. These trees show greater structural complexity than the younger ones, since they have a lot of holes and crevices. As with other partridges (e.g. Grey Partridge, whose preferred breeding habitat is grassy banks and fallow land but will use cereal fields if necessary, BIRKAN & JACOB, 1988), if its favourite habitat is not available, Red-legged Partridge can breed in other habitats some of them as surprising as tree at a height of 1 m. The nesting of the Red-legged Partridge in these holes may be related to a nest site microselection caused by the shortage of adequate sites.

Interviews with gamekeepers of the area confirm that this behaviour has been known for at least 10 years, and that some nests are usually found upon olive trunks every breeding season. The gamekeepers also state that this behaviour occurs only with old Red-legged Partridge females, not with young ones. If it is true, this suggests that Red-legged Partridge might display such strategy in the absence of optimal plant coverage for nesting, because it could constitute an effective antipredator mechanism. It is worth considering that about 40% of nests are predated every year.

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