

Homing experiments with the Domestic Dove *Streptopelia risoria*

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Abstract — A group of 4-14 months old domestic doves (*Streptopelia risoria*), which had been raised according to the procedures used in investigations on pigeon homing, was subjected to test releases at various distances (0.1 to 9.0 km) from the home loft. The results show that this tame bird species owns a strong homing drive which, however, is not supported by a true navigational mechanism. Good homing success was in fact reported only in tests carried out at sites where the doves had a direct view of the home loft, or after the birds had been given the opportunity to develop familiarity with the test area.

Introduction

Since Papi and his co-workers have shown that olfactory information plays a basic role in the pigeons' homing process (see Papi 1989, 1991 for references), attempts have been made to verify whether other species of birds rely on a similar homing mechanism (Fiaschi *et al.* 1974, Wallraff and Hund 1982). As doves, due to their close phylogenetic relationship with pigeons, appear to be the most suitable birds for this kind of comparative analysis, we carried out a series of tests to verify the homing ability of the domestic dove *Streptopelia risoria*. This bird species, which had been subjected to a long lasting process of domestication, has been taken into consideration in view of the easiness with which a tame bird can be subjected to experimental manipulation with respect to wild species (see Baillon and Benvenuti 1990, Benvenuti *et al.* 1991). This positive aspect is however counterbalanced by the risk that domestication has weakened or totally disrupted doves' homing abilities possibly present in their wild ancestors.

Methods

Doves used in our tests were offsprings of a stock purchased in a pet shop in Pisa. The fledglings, housed in a loft connected with a large aviary, in Arnino (Pisa), were subjected to the same raising procedures used for pigeon homing studies: the birds were not confined to their loft, where food and

water were continuously available, but often set free to leave it for spontaneous flights.

Test sites were at 0.1, 0.5, 1.1, 1.8 and 9.0 km from the home loft (home direction: SE, E, S, NNE and SSW, respectively). Test releases were carried out in sunny days with no wind or moderate winds. The birds were mostly released singly and followed with binoculars until they landed or, very unfrequently, vanished. Vanishing (or landing) time and bearing were recorded for each bird. Homing performances were verified by checking the birds in their loft each morning for several days after test releases.

Results

Five test releases were carried out between 26th August and 9th September 1991; 28 untrained birds, 4 to 14 months old, were tested in the first release; successive tests were run with the birds that had homed from the previous one. With the exception of the first release, carried out 100 m from the home loft, which was clearly visible at the release site, the doves tended to land soon after the toss. Our attempts to release them in pairs did not produce better results; therefore, our investigation could not be based on initial orientation, but only on homing performances, which are shown in Figure 1. It turns out that our doves exhibited good homing performances in the 1st, 2nd (all 28 birds were able to home) and 4th release [16 out of 17 (94.1%) homed birds]. On the other hand, quite poor performances were recorded in the 3rd and,

especially in the 5th releases in which only 17 out of 28 (60.7%), and 2 out of 16 bird (12.5%), respectively, got back home.

It is worth noting that, though the 4th test was carried out at a greater distance with respect to the 3rd one (1.8 vs 1.1 km), the birds exhibited significantly better homing performance in the former than in the latter (χ^2 , $p < .02$). Older birds did not show better performance than younger ones.

Discussion

From our results it turns out that domestic doves may be raised and treated the same way as homing pigeons, and that they own a well developed homing drive. Contrarily to pigeons, however, doves' homing drive is not adequately supported by a true navigational mechanism. Their homing performance is apparently only guided by the ability to orientate on the basis of familiar landmarks when they have no direct view of the home loft. This hypothesis gives an account for the fact that we recorded a significantly better homing performance in the 4th test than in the 3rd one, though the former had been carried out at a longer distance from home. The 3rd test was in fact the first which was run out of direct view of home, and the rather poor homing success was probably the result of a random search for the loft area. In the 4th test, on the other hand, the search for the home loft was facilitated by the experience (familiarity with the test area) developed in the previous release by those birds which had been able to home. The birds, however, could not benefit of this experience in the 5th test which was carried out at 9 km, out of the presumable range of the area which they were familiar with.

From our results no indication can be deduced about the way in which familiar landmarks have been used by our birds, namely whether they rely on a piloting mechanism, i. e. following a chain of familiar (possibly visual) landmarks, or whether the home direction is determined as a compass direction on a map of familiar landmarks, as it seems to be the case in homing pigeons (see Füller *et al.* 1983).

The impossibility to deduce the existence of a compass mechanism in the domestic dove is due to the fact that we were not able to achieve vanishing bearings from homing tests. The released birds, in fact, tended to land soon after the toss when they had no direct view of their home loft. Thus, this bird species revealed itself to be a poor material for studies on navigational mechanisms, despite its close relationship with the homing pigeons.

As regards other homing experiments run on bird species belonging to the same family as the domestic dove (Columbidae), a short series of tests on two species of wild doves (*Streptopelia senegalensis* and

Turtur abyssinicus) were reported by Benvenuti *et al.* (1991). The homing performances exhibited by these two dove species were quite poor; nonetheless, some of the tossed birds produced vanishing bearings which were used to infer their orientational strategies. Better results were achieved in studies with feral pigeons — which belong to the same species as the homing pigeons (*Columba livia*) — from urban populations (Chelazzi and Pineschi 1974, Edrich and Keeton 1977, Chelazzi *et al.* 1982); though their navigational performance is below the standard of homing pigeons, ferals produced significantly non-uniform distributions of their vanishing bearings which were clustered around the home direction. Similar results were achieved in navigation tests with rock pigeons (*Columba livia livia*) raised in aviaries; the rock pigeon is the species from which ferals and the various breeds of domestic pigeons, including homing pigeons, are derived (Alleva *et al.* 1975, Visalberghi *et al.* 1978).

In conclusion, the domestic dove did not exhibit any navigational performance in our homing tests, except for the ability to use familiar landmarks; it would be pure speculation to discuss whether it has been lost during domestication, or whether it was not owned by the wild ancestor.

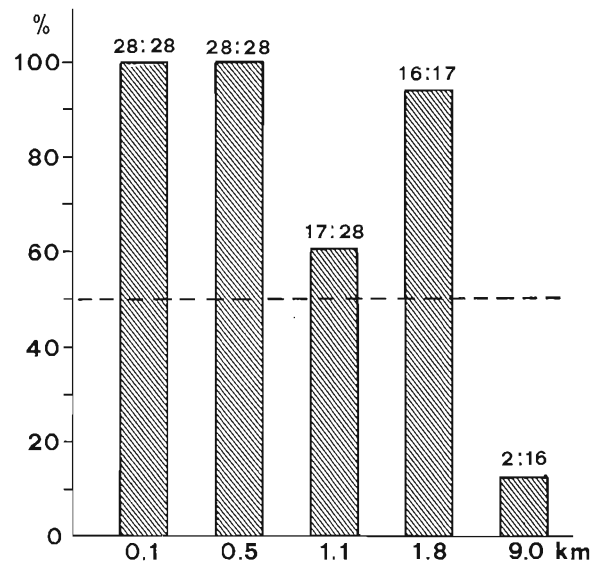


Figure 1. Summary of homing performance data: for each test release, at various distances from home, the height of the columns is proportional to the percentage of the birds which were able to home. The actual sample size (number of birds which homed and which had been released) is given on the top of each column.

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Riassunto — Sono stati eseguiti esperimenti di rilascio con un gruppo di tortore domestiche (*Streptopelia risoria*) di 4-14 mesi di età che erano state allevate secondo i metodi adottati per lo studio dei meccanismi di homing dei colombi viaggiatori. I nostri risultati mostrano che il forte homing drive rilevato in questa specie domestica non è sostenuto da adeguati meccanismi di navigazione. Buone capacità di homing sono state infatti osservate soltanto in seguito a rilasci in luoghi in cui gli uccelli possono vedere la loro voliera, o dopo che essi hanno acquisito familiarità con l'area di rilascio.

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