

PESTICIDE RESIDUES IN EGGS OF MONTAGU'S HARRIER, *CIRCUS PYGARGUS* FROM CENTRAL ITALY.

G. ARCA'

Regione Lazio, Ufficio Parchi e Riserve naturali;
Stazione Romana Osservazione e Protezione Uccelli,
Via S. Tommaso d'Aquino 116 Roma.

C.F. MASON

Department of Biology, University of Essex,
Wivenhoe Park, Colchester C04 36Q, U.K.

It is very important to know the degree of contamination by pesticides of the eggs and tissues of raptors, because organochlorine compounds are often responsible for their hatching failure (Ratcliffe, 1970) and the organochlorine level found may be used as an index of environmental pollution by pesticides (Moore, 1966). Very few data are available on pesticide residues in eggs of Italian birds (Focardi *et al.*, 1980; Fasola *et al.* 1981) and we have no published data for Falconiformes.

Six addled eggs of Montagu's Harrier *Circus pygargus* were collected, from 6 different nests, during a field study of the status and breeding biology of this species in two areas in central Italy during 1981-1983. The aim of this paper is to provide information on organochlorine levels in the eggs of a species that lives in agricultural ecosystems where pesticides are widely used.

STUDY AREA

The first study area was situated near the village of Blera, Northern Lazio and provided 5 out of the 6 eggs examined; the second was near the village of Roccastrada, Southern Toscana. Both are small agricultural areas situated respectively 22 and 35 km from the sea and 150 meters above sea level, in which the agriculture is less intense than in neighbouring areas nearer the sea. Within these areas, the hatching success (no. eggs hatched/total eggs) and the breeding success (no. young fledged/total nests) were respectively 0.6 and 1.6 (Arcà & Sammuri, in press).

The first figure is slightly lower than those reported by other authors (quoted in Cramp & Simmons, 1981), while the second is average.

METHODS

Egg-shell indices were determined by Ratcliffe's method (1970) while the methods for extracting and analysing organochlorine residues followed Newton & Bogan (1974).

RESULTS

Eggs 1, 2 and 4 showed no obvious signs of development; egg 3 had a well developed embryo; eggs 5 and 6 were in the early embryo stage. The results of the residue analyses are given in Table I. Lindane, Dieldrin, DDE and DDD were present in all eggs, while Heptaclor was found in two eggs and Aldrin in three.

TABLE I. Egg shell index and organochlorine pesticide content (p.p.m., fresh weight) of eggs of Montagu's Harrier (*Circus pygargus*). ND = not detected.

Site	Year	Shell index	Lindane	Heptachlor	Aldrin	Dieldrin	DDE	DDD
1. Blera, Lazio	1981	1.59	0.06	0.002	ND	0.03	0.52	0.02
2. " "	1982	1.97	0.04	ND	0.01	0.02	0.58	0.002
3. " "	1982	2.32	0.04	ND	0.007	0.06	1.09	0.03
4. " "	1983	1.85	0.10	ND	ND	0.13	1.49	0.05
5. " "	1983	1.68	0.06	0.006	ND	0.14	0.83	0.09
6. Roccastrada, Toscana	1983	2.01	0.13	ND	0.03	0.16	1.51	0.09

DISCUSSION

There are very few data on Montagu's Harrier with which to compare our results. However, although pesticides were reported in all six eggs, the concentrations were lower than in the eggs of most raptors, eg. Sparrowhawk *Accipiter nisus* (Newton & Haas, 1984).

Jones & Colling (1984) presented an analysis of two addled eggs of Montagu's Harrier which were collected, in Wales, in 1962 and 1964. The total organochlorine levels were 1.8 and 7.7 ppm respectively, compared with a range of 0.65-1.92 ppm for the Italian eggs. Jones & Colling thought that organochlorine levels were unlikely to be the cause of hatching failure in the Welsh eggs. Anderson & Hickey (1974) examined egg shell thinning in eggs collected in Denmark and concluded that thinning in Montagu's Harrier was less than in other raptor species studied by them. The thickness indices of the six Italian eggs were within the range of those reported by Anderson & Hickey (1974).

Focardi *et al.* (1980) and Fasola *et al.* (1981) provided the first information on organochlorine levels in bird eggs from Italy. In the first study, DDE ranged from 1.3 to 1.7 ppm over a sample of 37 eggs belonging to two species of *Laridae*. In the second study, DDE ranged from 0.14 to 1.14 ppm over a sample of several species, none of them raptors.

It seems unlikely that the pesticide levels in the eggs of Montagu's Harrier here reported were sufficiently high to have resulted in hatching failure. Other factors were probably involved.

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RIASSUNTO

RESIDUI DI PESTICIDI IN UOVA DI ALBANELLA MINORE *CIRCUS PYGARGUS* DELL'ITALIA CENTRALE.

Si riportano i risultati di analisi sul livello di contaminazione da pesticidi in sei uova di Albanella minore non schiuse, provenienti dal Lazio e dalla Toscana. Dieldrin, DDE, DDD e Lindano sono stati trovati in tutte le uova; Aldrin e Eptacoloro soltanto in alcune. Si ritiene che la concentrazione di cloroorganici riscontrata non sia stata sufficiente a provocare la mancata schiusa.

RESUME'

RESIDUES DE PESTICIDES DANS LES OEUFS DU BUSARD CENDRE' *CIRCUS PYGARGUS* DANS L'ITALIE CENTRALE.

On reporte les resultats des analyses sur le niveau de contamination de pesticides dans six oeufs de Busard cendré, non éclos, qui ont été trouvés dans le Lazio et la Toscana. Dans chaque oeuf on a trouvé Dieldrin, DDE, DDD et Lindano, tandis que l'Aldrin et l'Heptaclor ont été trouvés seulement dans certaines. On croit que la concentration des organochlorides trouvée n'est pas été suffisante à provoquer la non éclosion.

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