

CHEMICAL RESIDUES IN BIRDS AND EGGS FOUND ON BUTE

By Ian Hopkins

Chemicals play a large part in agriculture nowadays, particularly as herbicides, insecticides and fungicides. The most important as far as birds are concerned are the organo-chlorine compounds, such as D.D.T., Aldrin, Dieldrin, Endrin and Heptachlor.

Apart from being toxic, they are very stable, which means they do not break down for many years. They can also dissolve in fat, which means birds can accumulate them in their bodies, and birds at the top of the food chain can accumulate quite high, sometimes fatal amounts.

These chemicals are also found in birds' eggs, and if sufficiently high levels are present, the eggs might not hatch, or may have such thin eggshells, that the adult birds break them accidentally.

The Nature Conservancy Council have been analysing corpses of birds of prey and addled eggs (taken under licence) for pesticides in order to monitor the situation. Below is a list of birds and eggs found on Bute I have sent off for analysis in recent years. One cannot draw any real conclusions from the results, as there are many anomalies, for example some eggs with high levels come from clutches from which young are successfully reared. However, I thought it would be interesting for the results to be published for future comparisons.

I quote explanatory notes from the Nature Conservancy Council:

"D.D.E. is the main metabolite (breakdown product) of D.D.T. It is still toxic. The insecticides Aldrin and Heptachlor are rapidly metabolised to Dieldrin and Heptachlor Epoxide respectively in animal tissue. These two latter compounds are also toxic. Dieldrin is also an insecticide in its own right, and very toxic to vertebrates. P.C.B. is the abbreviation for the Polychlorinated Biphenyls, which are substances having a number of industrial uses, but which are not used

in agriculture. P.C.B.'s are commonly found in the marine environment".

The owls are analysed by the Department of Agriculture and Fisheries for Scotland.

INTERPRETATION OF ORGANO-CHLORINE RESIDUES P.P.M. WET WEIGHT BASIS

D.D.E. 0-5; Dieldrin 0-0.5—These are low "background" residues.

D.D.E. 5-20; Dieldrin 0.5-2.0—Levels in this range can be regarded as the usual "background" residues now found in predatory birds and their eggs. (See Note 2).

D.D.E. 20-60; Dieldrin 2-6—These are relatively high residues but are unlikely to have been an important factor in causing death or failure of this specimen. The residues are high enough to have caused some sublethal effects. (See Note 3).

D.D.E. 60-150; Dieldrin 6-10—These are high residues, probably on the borderline of lethal residues for some species.

D.D.E. 150 plus; Dieldrin 10 plus—These levels are exceptionally high and were almost certainly a contributory cause of death/failure in this specimen.

Note 1—The effects of the various insecticides and their metabolites may be additive.

Note 2—Eggs containing residues within these levels may be exhibiting thinner shells than pre-war specimens.

Note 3—Liver residues in this range may move up into the lethal range if the individual containing them experiences stresses such as bad weather, starvation, long flights or disease which reduce the depot fat and releases its stored organo-chlorine load to more sensitive regions.

Species	Date and where found	Tissue analysed	Parts per million wet weight		P.C.B.	Comments
			D.D.E.	Dieldrin		
Peregrine	Bute 1971	Egg	6.0	3.0	3.0	Young reared from this clutch.
Peregrine	Bute 1977	Egg	12.2	2.1	14.5	Clutch deserted. New female in 1978. Quite high levels but typical of S.W. Scotland Peregrine eggs.
Peregrine	Bute 1979	Egg	14.6	3.9	0.45	Clutch of 3 reduced to 1 which didn't hatch.
Hen Harrier	Bute 1976	Egg	1.3	0.04	1.4	Young reared.
Hen Harrier	Bute 1978	Egg	1.6	0.8	0.03	Young reared although similar levels to 1976 egg, P.P.M. in fat for this egg were highest ever recorded for this species
Barn Owl	Kilchattan 18.1.78	Liver	0.7	Nil	2.0	Found dead. Post mortem suggests by injury in good condition. Levels not unusual.
Barn Owl	Kilmichael 13.6.79	Liver	2.9	Nil	195.0	Found dead, in poor condition. Possibly through stress. High levels of P.C.B.'s frequent in Barn Owls, but 195 extreme.
Tawny Owl	Hermitage 13.6.79	Liver	0.32	0.07	0.4	Found dead by road. Probably killed by car. In good condition. Not unusual levels.
Tawny Owl	Bute 27.11.79	Liver	0.1	Nil	< 1.0	Found dead, in good condition. Bruising on side of neck.