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PESTICIDE CONCENTRATIONS IN SNAIL KITE EGGS AND NESTLINGS IN FLORIDA

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Concentrations of organochlorine pesticides were first reported in the Snail Kite (*Rostrhamus sociabilis*) and its principal prey, the apple snail (*Pomacea paludosa*), by Lamont and Reichel (Auk 87:158–159, 1970), using material from Conservation Area 2A (CA2A) and Loxahatchee National Wildlife Refuge (NWR) in the northeastern part of the Florida Everglades, all collected between 1965 and 1967. Treatment of Surinam rice fields in 1971 with sodium pentachlorophenol (NaPCP) to control populations of freshwater snails (*Pomacea glauca* and *P. lineata*) that resulted in a die-off of Snail Kites was described by Vermeer et al. (Environ. Pollut. 7:217–236, 1974). They found high levels of NaPCP in tissues of 17 kites that they analyzed, and they attributed mortality to NaPCP poisoning. I have found no other published accounts of pesticide residues in this species.

From 1970–1977, unhatched Snail Kite eggs and young that were found dead at nests in Florida were analyzed by gas chromatography for residues of organochlorine pollutants. The 1970 and 1974 material (and Lamont and Reichel's 1967 sample) showed measurable amounts of p,p'-DDE, p,p'-DDD, p,p'-DDT, and dieldrin (Tables 1 and 2). Dieldrin and polychlorinated biphenyl (PCB) residues were less than 0.1 ppm in the eggs and were detected in only one sample of muscle tissue at 0.11 ppm. Concentrations in ppm wet weight of p,p'-DDE, p,p'-DDD, p,p'-DDT, dieldrin, and PCB for two samples of muscle and three of brain tissue (all 1977 material) were not detected at the limit of quantification (0.05 ppm). Other organochlorine compounds that may have been present but were below the detection limit in nestlings were: heptachlor epoxide, oxychlordane, *cis*-chlordane, *trans*-nonachlor, *cis*-nonachlor, endrin, toxaphene, hexachlorobenzene, and mirex.

These residue values were incidental and were considered baseline readings in the environment at that time (no significant accumulation). Problems that might be associated with pesticides have not been detected in the kite population in Florida, where the population has been carefully monitored from 1969 to the present. Large tracts of agricultural land adjoin the principal areas used by kites, and runoff from these areas enters kite habitats through an extensive network of interconnecting canals, without treatment to remove chemical wastes (Sykes, Fla. Field Nat. 11:73–88, 1983; J. Field Ornithol. 54:237–246, 1983; Bull. Fla. State Mus. 29(6):211–264, 1984). Because the kite has a restricted diet and the potential for pesticide problems persists, continued monitoring of the kite population, its prey, and its habitat is needed. While the use of DDT and dieldrin have been prohibited in the United States for about a decade, many other pesticides are applied from aircraft and by tractor in south Florida agriculture. To my knowledge, none of these chemical compounds have been tested to determine the effect on apple snails before their approved use.

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TABLE 1. Pesticide concentrations in Snail Kite eggs from Florida.

Sample[a]	Year collected	Lipid weight (%)	Pesticide concentrations (ppm wet weight) p,p'-DDE	p,p'-DDD	p,p'-DDT
1[b]	1966	4.2	0.33	0.14	0.06
2	1970	3.7	0.05	0.20	ND
3	1970	4.0	0.34	ND[c]	ND
4	1970	4.5	0.17	0.08	ND
5	1970	4.7	0.22	0.10	ND
6	1974	5.1	0.03	ND	ND
7	1974	3.0	0.03	ND	ND
8	1974	5.5	0.03	ND	ND
9	1974	2.9	0.03	ND	ND

[a] Each sample consists of one egg. Five different clutches are represented: No. 1 is from one clutch, Nos. 2 and 3 from a second, Nos. 4 and 5 from a third, Nos. 6, 7, and 8 from a fourth, and No. 9 from a fifth. Sample 1 was collected in Conservation Area 2A (Broward County), 2 and 3 in Conservation Area 2B (Broward County), and 4 through 9 at Loxahatchee NWR (Palm Beach County).
[b] Data from Lamont and Reichel (1970).
[c] Not detected at limit of quantification (0.05 ppm).

TABLE 2. Pesticide concentrations in soft tissue of nestling Snail Kites from Florida.

Sample[a]	Year collected	Tissue	Lipid weight (%)	Pesticide concentrations (ppm wet weight) p,p'-DDE	p,p'-DDD	p,p'-DDT	dieldrin	PCB
1[b]	1967	muscle	–	0.20	0.05	T	T	–[e]
2	1970	muscle	0.84	0.09	T[d]	ND	T	T
3	1977	muscle	0.51	ND[c]	ND	ND	ND	0.11

[a] Sample 1 was collected in Conservation Area 2A (Broward County), 2 at Loxahatchee NWR (Palm Beach County), and 3 at Lake Okeechobee (Glades County).
[b] Data from Lamont and Reichel (1970).
[c] Not detected at limit of quantification (0.05 ppm).
[d] T = <0.05 ppm.
[e] No analysis for PCB in 1967.