

## **Mirex Residues in Eggs and Livers of Two Long-Lived Reptiles (*Chrysemys scripta* and *Terrapene carolina*) in Mississippi, 1970-1977**

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Accumulation of residues of the organochlorine insecticide mirex in various nontarget organisms has been documented by several studies (e.g., WHEELER et al. 1977). Previous work included only data obtained over restricted periods of time. A question remains as to the long-term accumulation of mirex residues in long-lived organisms.

Here we report on accumulation of mirex in eggs and livers of two long-lived vertebrates (aquatic slider turtle, *Chrysemys scripta*, and terrestrial box turtle, *Terrapene carolina*) in Lowndes County, Mississippi (cf. JACKSON et al. 1973). In eight years, this location received four applications of mirex at a concentration of 5 % in an aerially sprayed bait intended to control locally abundant target populations of imported fire ants (*Solenopsis* spp.).

### **MATERIALS AND METHODS**

Collection of Specimens. Adults of the slider, *C. scripta*, and the box turtle, *T. carolina*, were collected during the springs of 1970, 1972, 1974, 1975, and 1977. Sliders were all from Pratt Thomas Lake, 11 mi SW Columbus, Lowndes County, Mississippi. Box turtles were collected along roads within 5 mi of Pratt Thomas Lake. Livers and eggs (if present) were removed immediately and frozen until analyzed.

Analysis of eggs and livers. Samples were dried to constant weight at 100 C and analyzed for mirex by a procedure developed by the State Pesticide Laboratory at Mississippi State University, as follows. Tissue samples of 0.5 g were extracted with acetonitrile. The extract was diluted with water and further extracted with petroleum ether. The resulting extract was cleaned through a Florisil column and concentrated by evaporating to about 1 mL. Five microliters of concentrated extract were injected into a gas chromatograph equipped with an electron capture detector to measure

the mirex present. Samples of each concentrated extract were analyzed using two different columns. The columns (1.8 m) were operated at 200 C using an argon-methane mixture as a carrier gas. The stationary phases were 2 % OV-17 and 15 % QF-1 + 10 % DC-200, all separately coated on 80/100 mesh Chromosorb W. The concentration of mirex was calculated by comparing the instrument response for each sample to its response when a standard sample containing 0.2 ug/mL mirex was injected. The value we report here is the mean obtained using each of the two columns. In cases where the two measurements did not closely agree, the samples were rerun.

Bait application. Bait containing 5 % mirex was sprayed in southwest Lowndes County, Mississippi by agents of the U. S. Department of Agriculture as follows: October 1968 and May 1969, 2.5 lb/acre; October 1969 and September 1974, 1.25 lb/acre. No other widespread applications of mirex bait were made at this location from 1968-1977.

## RESULTS

Significant levels of mirex were detected in both livers and eggs of both species of turtle (Table 1).

TABLE 1

Mirex Concentrations (ppm dry weight) in Livers and Eggs of Two Species of Turtles from Lowndes County, Mississippi.

Year	<u>Chrysemys scripta</u>			<u>Terrapene carolina</u>		
	Number of turtles	liver	eggs	Number of turtles	liver	eggs
1970	2	0.98	1.8	6	2.7	1.4
1972	3	2.1	2.2	3	4.1	1.6
1974	4	0.39	0.15	1	3.0	2.5
1975	9	0.12	0.16	5	0.68	1.4
1977	6	0.01	0.04	0	--	--

Mirex residues were consistently higher in livers of box turtles than in sliders, and to a lesser extent in eggs as well. Peak residues in livers of both species occurred in 1972, 2.5 years after the last application of mirex bait. Residues declined after 1972, despite an application in 1974 which had no apparent effect on residues in sliders in 1977.

## DISCUSSION

Lives of adult turtles may span decades (STICKEL 1978), therefore we assume that our samples represent individuals alive as adults in the sampling area at the times mirex bait was applied. Our data strongly indicate that mirex does not accumulate for long periods in the tissues of these animals.

Mirex bait applied in 1974 did not show up in samples from 1975 and 1977. Presumably, lack of increased concentrations in aquatic turtles occurred because bait was not applied over water as it had been in 1968 and 1969.

Differences between species are probably related to trophic position: adult sliders are almost exclusively primary consumers (CLARK & GIBBONS 1969), while box turtles occupy higher trophic levels as omnivores (CONANT 1975). Our data represent an additional example of increased concentration of a pesticide in organisms at higher trophic levels.

## ACKNOWLEDGMENTS

We are grateful to Crawford G. Jackson, Jr. for providing some of the data, and to Elisabeth Wells Parker for commenting on the manuscript.

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