

# RESULTS OF A FIELD TEST TO CONTROL STRIPED SKUNKS WITH DIETHYLSTILBESTROL

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**ABSTRACT.** — Data concerning movements of striped skunks (*Mephitis mephitis*) in the wild indicated that the movements of nine diethylstilbestrol (DES)-treated skunks were not restricted after treatment. In a field trial, more than 82 percent of 9,000 DES-tallow baits distributed annually, in 1965 and in 1966, on a 46,000-acre area in Carroll County, Illinois, were taken within 10 days after placement. Samples of skunks collected from the treated area and a control area indicated no marked changes in numbers of skunks from 1965 to 1966. Differences in number of placental scars per female and in size of gonads of both sexes between skunks from the treated area and those from the control area were not significant ( $P>0.05$ ). The results of the field test did not show that the DES treatment resulted in a significant reduction in skunk productivity.

This paper presents the results of preliminary field tests to suppress productivity in striped skunks in Carroll County, Illinois using the synthetic estrogen diethylstilbestrol (DES). Although further studies are needed to adequately demonstrate the value of this technique, these preliminary results are presented because it was not possible to continue this study. DES was selected because of its reported antifertility effects in other mammals (Greenwald 1957, Hill and Pierson 1958, Balser 1964, and Linhart and Enders 1964), and because it is readily available and inexpensive.

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## METHODS

### *Reproduction of Adult Females*

Four adult females captured in March, 1966, in Carroll County, were fed cat food containing DES. Two each received 25 mg/day for 3 days and two each received 25 mg/day for 2 days. A fifth adult female fed untreated cat food served as a control. After the final treatment each female was fitted with a radio transmitter (Verts 1963) and released at her respective capture site. These five skunks were located daily, during daylight hours, by using radio-telemetry, and were recaptured 3 to 4 weeks after the release dates and sacrificed to determine the effect of DES on developing embryos.

### *Effect of DES on Adrenal Weights*

Two juvenile females that received 100 mg of DES each and two that received 400 mg of DES each were treated in captivity, and one juvenile female given no DES served as a control; all were fitted with radios and released on the Shannon Study Area in Carroll County. Each skunk was released at its point of capture. Each skunk was recaptured at 3 weeks posttreatment and sacrificed the day of recapture to collect and weigh its adrenals.

### *Activity Patterns of Radio-tagged Skunks*

The effect of DES on the daily movement patterns of wild skunks was

studied during the summer of 1966. For this experiment, the five juvenile females used to test the effect of DES on adrenal weights, five juvenile males (four treated and one control), and two adult males (one treated and one control) were fed DES in cat food during a 3- to 4-day period in captivity. Treated skunks received a total dose of either 75 mg., 100 mg. or 400 mg. of DES. After treatment, each of the 12 skunks was fitted with a radio transmitter and released where captured, near Shannon, Illinois. Skunks were located by radio-telemetry and their positions plotted on maps once during daylight hours and one to three times during the night at least 5 days per week. An attempt was made to radio-track each skunk for 15 days following its release.

#### *Field Tests With Wild Population*

The field test to determine the effect of DES on a wild skunk population was conducted on a contiguous 46,000-acre area in southeastern Carroll County during 1965 and 1966. Tallow baits containing DES were prepared according to the procedures given by Ballantyne and O'Donoghue (1954) and Balser (1964). About 9,000 baits were distributed each year at about 650 stations. Baits were placed at stations once during March and once during April in both 1965 and 1966 (Table 1). Bait stations were established at  $\frac{1}{4}$ - to  $\frac{1}{2}$ -mile intervals around each Section (640 acres). The baits were placed near culverts or fencerows along roadways. Seven,  $\frac{1}{2}$ -ounce baits, each containing 85 mg DES, were placed at each station. All stations were examined for bait consumption and evidence of feeding within 10 days after the baits were distributed.

Skunks were collected on the DES-treated area, and on a control area located 5 miles south of the treated area, during May through August of 1965 and 1966. No.  $1\frac{1}{2}$  steel traps set in or near road culverts were used to capture skunks. Equal trapping effort was used for each area. Each adult female was classified into one of the following groups after gross examination of the mammae; (1) no sign of lactation, (2) signs of recent lactation, or (3) questionable lactation; the latter included skunks with long, pigmented teats but without milk. The ovaries and uteri of females and the testes of males, captured during 1965 and 1966, were removed, cleaned, and weighed the days the skunks were captured. The weights

of the paired adrenals were obtained from the sample of skunks collected during 1966.

The March-April period was selected for placing baits in the field because the number of skunks is at a seasonal low, natural foods of skunks are in short supply, plant cover along roadsides in northern Illinois is sparse, and the movements of skunks in early spring are more extensive than in winter. The height of the breeding season of skunks in northern Illinois occurs during early March (Verts 1967:109). Thus a majority of the females were expected to be pregnant when the DES-baits were placed in the field.

Some disadvantages of placing baits in the field during early spring in northern Illinois include the possibility of low temperatures during March, which may result in more restricted movements of skunks than in summer, occasional snowfalls which may cover baits and result in reduced consumption, and poor road conditions.

## RESULTS

### *Reproduction of Adult Females*

Four of the five adult radio-tagged females were recaptured alive 3 to 4 weeks after their release. One treated female resorbed her entire litter and two were resorbing at least one embryo each. The single control showed six viable fetuses. All four females appeared in excellent condition when recaptured. The fourth treated female died 29 days after the treatment. This female was barren, and was positive for rabies as determined from mouse inoculation and FA tests.

### *Adrenal Weights*

Each of the five juvenile radio-tagged females (four treated and one control) was recaptured 3 weeks after treatment. The weight of the paired adrenals of the untreated female was 406.5 mg, whereas those of the four treated females ranged from 435.3 to 719.9 mg and averaged 590.1 mg.

### *Activity Patterns of Radio-Tagged Skunks*

The 12 radio-tagged skunks used to test the effect of DES on the activity patterns of skunks were radio-tracked for at least 1 week each. There was no evidence that DES influenced their daily activity patterns. All radio fixes obtained during nocturnal hours for each treated and control animal were classified as *nighttime moving*. This means that the skunks were active at night and had moved from their respective daytime retreats. The tracking data showed considerable individual variation in the size of the activity areas used by the 12 radio-tagged skunks, but variation probably reflected the lack of sufficient tracking data rather than a real difference in size of activity areas among skunks. The data indicated that the movements of DES-treated skunks were not restricted after treatment and may have been more extensive than the movements of untreated skunks.

### *Field Test with Wild Population*

More than 88 percent of the DES-baits distributed in 1965 and 1966 for the field test were taken within 10 days after placement (Table 1). Evidence of bait consumption by identified species was negligible during both years, and direct evidence of consumption of baits by skunks was not obtained. However, feeding trials conducted with three captive skunks showed that skunks readily ate the tallow DES-baits. Six tallow baits were placed near the den entrances of each of two radio-tagged skunks on one day during the late winter, 1964. The majority of the bait material was consumed at each den, and

was believed to have been taken by the tagged skunks.

Thirty-three striped skunks were captured on the DES-treated area, and 20 were captured on the control area during the May-August period in 1965. In the following year, 24 and 26 skunks were captured on the treated and control areas, respectively. Based on the number of skunks captured per 1,000 trap-nights, there was not a marked change in the number on either the treated or the control area from 1965 to 1966 (Table 2).

Examination of adult females in the May-June sample indicated that a greater proportion of the females from the control area were lactating as compared with females from the treated area (Table 3), but the differences in the number of placental scars per female between skunks from the treated area and those from the control area were not significant ( $P>0.05$ ). Likewise the differences in the size of the gonads of both males and females between samples of skunks from the two areas (1965 and 1966) and the differences in the weight of the adrenals for skunks from the treated and control areas (1966 only) were not significant ( $P>0.05$ ).

DES had no apparent effect on the general behavior patterns of radio-tagged skunks. However, movement data were not obtained for DES-treated females during lactation. Verts (1967:60) reported that a lactating female skunk did not travel more than 360 yards from her den during the period May 25-June 2, but by June 12, when her offspring were older, she was often radio-located ½ mile from her den. This

TABLE 1.—Distribution, number, and percent of tallow DES-baits taken on a contiguous 46,000-acre (12 miles x 6 miles) in southeastern Carroll County, Illinois.

Year	Dates Baits were Distributed	Number of Baits	Number of Bait Stations*	Percent Baits Taken†
1965.....	March 11-16 April 9-24	8,904	636	88.7
1966.....	March 8-12 April 1- 9	9,324	666	93.0

\* Seven baits were placed at each station (600 mg DES/station) during each of two distributions during each year.

† Stations were revisited within 10 days after each distribution.

TABLE 2.—Number of skunks captured on the DES-treated area and on a control area during May-August in 1965 and in 1966.

Year	Treated				Control			
	Adult	Juvenile	Total	Skunks per 1,000 Trap-nights	Adult	Juvenile	Total	Skunks per 1,000 Trap-nights
1965. . . .	30	3	33	25	18	2	20	15
1966. . . .	20	4	24	26	23	3	26	28

TABLE 3.—Reproductive characteristics of adult female skunks from a DES-treated and a control area during May-August, 1965 and 1966. Numbers in parentheses refer to the adult females captured during the May-June period.

Year and Area	Number of Adult Females Captured	Females Showing Definite Sign of Nursing		Number of Females with Viable Fetuses	Females with Placental Scars		Mean Number of Placental Scars/Female	Mean Size of Ovaries (LxW)
		No.	Percent		No.	Percent		
1965								
Treated.....	17 (15)	10 (10)	58.8 (66.7)	1	14	82.4	6.6	45.6 mm
Control.....	8 (8)	6 (6)	75.0 (75.0)	0	8	100.0	8.3	47.5 mm
1966								
Treated.....	9 (5)	3 (2)	33.0 (40.0)	0	9	100.0	6.7	54.1 mm
Control.....	8 (3)	4 (2)	50.0 (66.7)	1	6	75.0	6.8	63.0 mm

suggests that the daily movement pattern of lactating females may differ significantly from that of females not tending young.

The data acquired from the field trials did not reveal a significant reduction in skunk productivity by the treatment used. More field tests, conducted under a variety of conditions and perhaps using more effective chemosterilants, are needed to determine whether the use of chemosterilants is a feasible approach to suppressing productivity in wild striped skunks.

Part of the explanation may lie in the fact that we had no way to determine which skunks consumed baits or how much DES a skunk had ingested. A laboratory study made concurrently with this field study gave inconclusive results because of small sample sizes, but captive females receiving single oral doses of DES ranging from 26.3 mg/kg to 367.7 mg/kg produced 0.5 living offspring per/living female for 8 treated females while six control females produced 1.7 living offspring per female.

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