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DATA ON CAPTURING BLACK BEARS WITH ALPHA-CHLORALOSE[1]

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ABSTRACT

Experimental dosages of alpha-chloralose, an odorless and nearly tasteless oral anesthetic, were administered on baits to 17 wild black bears *(Ursus americanus)* and two captive wild bears. Nine of the 17 were sufficiently narcotized to permit handling without mechanical restraint up to 48 hours later. The other free-living bears escaped in sub-effective narcosis or if anesthetized, were not located in the field. One bear died as a result of chloralose overdosage and another succumbed from an overdose of pentabarbital sodium administered after capture. Preliminary data on the application of the method and some suggestions for further research are presented.

Investigations on bears sometimes involve trapping and handling for collecting data and marking. An initial step in such studies is to find or develop effective trapping techniques.

INTRODUCTION

Two widely used trapping methods are the wheel-mounted culvert trap and the steel-jaw trap. Both were described by Erickson (1957) in Michigan. The culvert trap has been found to be especially effective on garbage-dump or "nuisance" bears. Black (1958) and Stickley (1961) in their work with black bears used both methods but reported better success with steel traps. Craighead (1960) used culvert traps exclusively to trap grizzlies *(Ursus horribilis)* in Yellowstone National Park. A major short-coming of the bulky culvert trap is the tray-shyness it causes. The major problem with steel traps is frequent injury to the animal.

The Aldrich Spring Activated Snare has been used on black bears with some success. D. J. Pierson reported that his best success with snares in Washington was along fish runs or trails.

The recent application of anesthetics and immobilizers has greatly facilitated the capture and handling of large animals. Drugs are usually administered by intramuscular or intra-peritoneal injections with the "Cap-Chur" gun syringe (Crockford, Hayes, Jenkins, and Feurt, 1957) or simply by hand-held hypodermic. Drugs which act on the central nervous system and motor coordination centers have

[1]A Contribution of Federal Aid to Wildlife Restoration Program, Florida Pittman-Robertson W-41-R.

been used to subdue bears after they were captured by other methods. Black (1958) reported success with ethyl ether, sprayed into a culvert trap containing trapped bears. A "prod rod" consisting of an aluminum pole tipped with a syringe was used to immobilize bears caught in steel traps. Black (1958) was not successful in his attempt to anesthetize black bears by administering oral doses of powdered pentabarbital sodium.

Recent success with alpha-chloralose in capturing wild animals encouraged us to test the drug on bears with the thought that an effective oral drug capture method would be especially useful for bears by eliminating the need for bulky, time-consuming trapping devices; reducing the injury rate in the trapped animals; and facilitating the safe handling of the animals after capture.

Some information on alpha-chloralose and its use in capturing wildlife by oral administration is available (Williams, 1966; Williams, Austin and Peoples, 1966; Crider and McDaniel, 1967; Austin and Peoples, 1967). This paper presents some data we have obtained in tests with alpha-chloralose for capturing and handling black bears.

Biologist Jimmie McDaniel provided data from a bear he captured with alpha-chloralose. Wildlife Officers Jim Doxey, Leon Walker and Bob Thurmond were helpful with much of the field work. Appreciation is expressed to Mr. J. T. McCormick for making his game preserve in Duval County available for portions of the study.

METHODS AND MATERIALS

Study Area

The majority of the work was conducted in the Osceola National Forest, Columbia and Baker Counties, Florida on the southern edge of the Okefenokee Swamp. The terrain there is low and flat. The soils are predominantly thin acid sands with organic pans. The most conspicious flora is slash pine *(Pinus elliotti)* gallberry *(Idex glabra),* wiregrass *(Aristida stricta)* and huckleberries *(Vaccinium spp.).* Gum and cypress swamps and bays in shallow standing water are numerous. The well-watered swamps and thickets limit the accessibility of much of the area to man. Inaccessibility seems to be a consistent characteristic of the habitat which is still inhabited by the black bear in Florida.

A limited amount of field work was conducted on a private game preserve in Duval County of northeastern Florida. The habitat there is similar to that on the Osceola Forest, for practical purposes, but the terrain is more varied.

Baiting Tests and Sites

Early in the study, attempts were made to deliberately bait bears to capture sites at all seasons. But as familarity was gained with the study area and its beekeepers and cattlemen, it became evident that sufficient tests could be conducted best during spring and early summer when bear depredation on bee hives and cattle were frequent.

In all tests, a bait which mixed readily with the drug was used. Even on cattle kills, honey was used. Apiary bears were usually baited with a honey, bee larvae, and wax comb mixture placed in an old "super" or two-gallon foot-tub and placed near the apiary. Bears ate some of the bait about 50 percent of the time. It was noticed that on several occasions bears would disturb the bait without eating it. These individuals were baited again with sweet feed and honey or ground beef and bacon drippings. Baiting attempts were discontinued when the second baiting failed. Bears which avoided the baits were usually those which had access to bee hives.

Baiting was also attempted during the months of December through March when bee hives were not present. Hog livers, pork jowls, whole shelled corn, and honey were tested. Sets were made with and without Hawbakers Lure (S. Stanley Hawbaker & Sons, Ft. London, Pennsylvania). A 3-gallon bucket of honey and corn, with a small hole in the bottom to allow honey to drip out and exude its scent was tried. Its contents were eaten by three bears one night, but in general, these baiting tests were inconclusive when apiary depredation was not involved.

Pre-Baiting

One to two gallons of bait mixture in a wooden "super" or foot tub was placed on the ground outside bear depredated apiaries in late afternoon. Pre-baiting was continued for two or three days to determine whether or not drugging would be practical, to enable an estimate of the number of bears present, and to obtain an estimate of the size of the bears. The quantity of bait that individual bears had consumed was deduced by the amount remaining after feedings. This quantity was used thereafter for pre-baiting. Usually, two separate buckets of bait were used when more than one bear was expected. Bait sites were checked each morning and replenished as necessary.

Bait to Drug Mixture

Test dosages of alpha-chloralose were measured on a Model 1440 Hansen Dietetic gram scale. The powdered alpha-chloralose was stirred slowly into the honey, about one-fourth at a time. This mixture was prepared or thoroughly stirred at the bait site because chloralose will settle out over a period of time. The same containers used during pre-baiting were also used with the drugged mixture because bears were unwary of them.

On one occasion, honey combs were used. Chloralose was sprinkled into each wax cell and the cells mashed together to prevent loss of the drug.

Drug Presentation

The bait mixture was presented in the same manner as during pre-baiting, except that window screening was placed over containers to prevent bees from stealing the drugged bait and contaminating the hives. Bait was placed at the hives in late afternoon and checked the next morning. Bait which was not consumed by bears was picked up and held until the evening hours to prevent other animals from disturbing it. Spilled bait was shoveled up to prevent hive contamination.

Baiting was terminated when a bear did not return for three successive days. The bait was picked up, labeled according to date and dosage, and stored in a cool place. If the same mixture was used at a later date, it was stirred again.

Handling After Capture

Bears that consumed the baits were tracked with a slow-trail hound. Early attempts to locate bears without dogs were often futile and it is believed that several were narcotized but were not found. A powder charged 'Cap-Chur" gun loaded with pentabarbital sodium or nicotine solution was carried in the field to anesthetize bears which were not fully anesthetized by the bait.

Bears were examined to determine the degree of narcosis and placed in a ventilated steel trailer and hauled to a shady spot. Every two or three hours they were rolled over. Reflexes were checked by probing, shouting, and tickling the eyelids. Each bear was aged, ear-tagged, and its sex was determined.

RESULTS AND DISCUSSION

Test dosages of chloralose were administered to 17 wild bears and two wild individuals in temporary captivity. Nine were captured in the field and all but two were fully narcotized when found. The others apparently escaped in a sub-effective state or were not located. One juvenile bear died from overdosage and an adult died from multiple injections of pentobarbital sodium.

The data in Table I are difficult to interpret in terms of optimum and lethal dosages because of the variables involved. But some observations can be made. Effective dosages for wild bears was about 1 gram per 3 to 8 pounds of body weight. Smaller dosages were necessary for captive bears. Whereas about 60 grams was effective on a 160 pound bear in the field; a dosage of 22 grams was sufficient for the same bear in captivity two weeks later. Whether this may have been due to an altered physiological state in captivity, residues of drug remaining in the animal, or some other cause, is not known.

Bears which took full dosages of bait and reached a state of profound narcosis were found within a few yards of the bait site. In at least four cases, they were found within 100 yards of the bait. In situations where tracking is feasible, such as in snow

TABLE 1

Results of test dosages of alpha-chloralose on black bears.

Date	Sex	Pounds Weight	Location (County)	Gals. of Bait	Grams of Drug	Amount Bait Taken	Duration of Effects
3-65	M	273	Hamilton	2	44	All	18 hrs.[a]
3-65	M	167	Hamilton	½	11	All	24 hrs.[b]
5-64	F	79	Columbia	1½	17	All	20 hrs.
6-65	-	-	Columbia	1½	32	All	escaped
6-65	-	-	Columbia	1½	57	All	escaped
6-65	-	-	Baker	1½	44	All	escaped
6-65	-	-	Baker	1½	68	All	escaped
5-66	M	85	Liberty	1	32	All	48 hrs.
6-66	M	160	Baker	1½	90	2/3	Less than 32 hrs.
6-66[c]	M	160	Baker	¼	45	½	51 hrs.
2-67[d]	F	180	Duval	(part of 2)[d]	(part of 40)[d]	(part of 2 gal)[d]	24 hrs.
2-67[d]	M	60	Duval				48 hrs.
2-67[d]	M	60	Duval				96 hrs. (died)
4-67	M	125	Liberty	¼	30	All	24 hrs.
5-67	-	-	Columbia	1½	45	½	escaped
6-67	-	-	Columbia	1½	40	½	escaped
5-68[e]	M	87	Columbia	1	35	½	18 hrs.

a Died from injected overdose of pentabarbital sodium.
b Received pentabarbital sodium injections.
c Same bear as immediately above, but caged.
d Three bears trapped at same time with the single 40 gram dose.
e Three bears visited bait site.

or in good trails, a slow-trail hound would not be necessary to locate anesthetized bears.

Narcotic Effects

The degree of anesthesia in wild-captured bears was similar in all cases. Of the nine bears captured, six were lying prone, asleep and breathing deeply when located. The only spontaneous reflex observed was frequent eye twitching. Two other bears had divided one dosage from a single container and were only moderately narcotized. Both were able to raise their heads and front legs when handled roughly. Another was sedated when found and had to be physically restrained with ropes. He would stagger and fall, but, otherwise, showed good muscular control. All three sub-narcotized individuals regurgitated the bait mixture, but the fully anesthetized individuals did not.

It was not possible to accurately determine the duration of anesthesia from onset of narcosis until arousal because we did not know the exact hour the bait had been taken. The duration between the time of capture and recovery ranged between 18 and 48 hours. Captive bears remained out for longer periods on small doses. Observations of one captive bear (Table 2) gave an indication of behavior during narcosis.

During the eight to ten hours before recovery, certain physical changes were observed in most bears. The tongue began to protrude and had a parched appearance, the respiration rate increased, defecation occurred, and the eyes began twitching.

CONCLUSION

An optimum oral field dosage has not been fully tested. We believe that some of the doses we tested approached the maximum safe limits. One definitely exceeded it. The minimum effective and lethal dosages probably approach 1 gram per 5 pounds of body weight and 1 gram per 2.5 pounds of body weight, respectively. Sedative doses are probably in the range between 1 gram per 10 to 20 pounds of body weight.

TABLE 2

Behavior of one captive bear during alpha-chloralose narcosis.

Time Interval After Taking Drug	*Reaction*
30 min.	Head shaky and eyes twitching
30 to 35 min.	Head lowered
35 to 45 min.	Front feet spread apart; snout touched floor
45 to 70 min.	Lost control of rear legs; sat down and fell backwards
105 min.	Prone position, eyes open but could not be easily aroused
105 min. to 50 hrs.	General anesthesia
50 hrs.	Partial control of front legs regained; tongue dry
50 hrs. 45 min.	Drank water while lying down
51 hrs.	Stood up when doused with water

Although the safety margin of alpha-chloralose in bears has not been precisely determined, it appears to be wide enough to warrant continued experimentation to capture bears in the field. The prolonged effect of the drug (Table 1) would seem to be desirable when used at night because of the practical problem of finding narcotized bears before morning. The anesthetic characteristics of many of the barbituates are superior to alpha-chloralose but they tend to be distasteful to many animals. We have not tested them on bears.

It appears that choloralose is stable for extended periods of time, even when mixed with honey. A year-old bait mixture was used to anesthetize three bears simultaneously.

Future work with chloralose on black bears should be aimed at determining optimum oral dosages in a large number of cases. Effective pre-baiting techniques would greatly enhance the oral-drug capture methods.

The potential for misuse of alpha-chloralose and similar drugs is great. It should be used only by people who are well qualified by training or practical experience.

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ALLIGATOR RESEARCH IN FLORIDA: A PROGRESS REPORT[1]

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ABSTRACT

Since the summer of 1965, an alligator research program has been conducted in the Everglades of southern Florida. This report describes the progress of the program. Various capture and marking techniques are described and evaluated. Data on growth rates, movement, homing tendencies, and sex and age interpretation from approximately 1,000 tagged alligators are presented. Life history observations, including population trends, activity surrounding a "gator hole", and the effect of water level fluctuation are reported. Man's influences on the alligator population, both from the standpoints of habitat manipulation and poaching, are discussed.

INTRODUCTION

In order to learn more about the ecology and life processes of the alligator in the Everglades of south Florida, study was designed to determine its basic life history and the factors which limit its productivity. In meeting the objectives of the study, alligators have been captured, measured, marked and released, and later recaptured. Recapture data has indicated movement of young and adults and their growth rates. Observations of the life history of the alligator have provided information on nesting, effects of fluctuating water levels on productivity, and population trends.

This preliminary report discusses the findings of the study and progress of the alligator investigations in the Everglades.

DESCRIPTION OF THE AREA

The Everglades is a vast fresh-water marsh nearly 100 miles long and 30 to 40 miles wide. (Fig. 1). It once occupied in area of about 3,100 square miles, but sections in the northern and eastern portions have been drained for agricultural uses. The remaining habitat is under the jurisdiction of the Central and Southern Florida Flood Control District and the National Park Service. In 1948, 1½ million acres in the southern Everglades was dedicated as the Everglades National Park. The wildlife in Conservation Areas 1, 2, and 3 of the Central and Southern Florida Flood Control District is managed by two agencies, the U. S. Fish and Wildlife Service and the Game and Fresh Water Fish Commission. In 1951, the Loxahatchee National Wildlife Refuge was established in the 140,000 acre Conservation Area 1. In 1952, the Everglades Wildlife Management Area was established in Conservation Areas 2 and 3. The Florida Game and Fresh Water Fish Commission manages the wildlife in this 725,300 acre marsh.

The geologic history of the Everglades is relatively short. Cooke (1939) considered the calcareous marine limestone deposits underlying the lower peninsula to be of recent geologic origin. Carbon-14 dating methods have shown that the oldest and deepest peat soils near the southern edge of Lake Okeechobee are only about 5,000 years old (Stephens, 1956). The peat deposits become thinner toward the southern end of the Everglades. Much of the Everglades National Park lacks the peat mantle, leaving the limestone exposed.

The Everglades is filled with a variety of plant life which impedes the flow of water from Lake Okeechobee to the Gulf of Mexico. Loveless (1959) estimated that

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