

DESIGN AND DESCRIPTION OF THE RADIOTELEMETRY INVESTIGATION OF THE ANIMALS

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ABSTRACT. The paper observed in brief the basic methods and techniques for radio-tracking of wild animals. Their advantages and disadvantages are discussed. The main components of the three distinct types for radio-tracking: conventional, very-high-frequency radio tracking (VHF), satellite radio tracking and Global Positioning System radio tracking (GPS).

It is put forward a proposal for radio telemetry investigations of big games in Bulgaria, results from which is expected to create a real picture of their main population-biological characteristics as the average home range size, 2) habitat selection and use ,3) seasonal behavior and movement patterns.

KEY WORDS. radio telemetry, radio tracking, big game;

INTRODUCTION

Radio tracking is a technique for collecting information for animal using radio signal transmitting or receiving from a device affix to the animal. “Telemetry” is a transmission of information through the atmosphere usually by radio waves. Thus radio tracking includes telemetry and the both techniques much overlap. Radio tracking is a technique that revolutionized investigation of wild animals. The potential of this technique for obtaining information for wild animal in its natural environment is almost unlimited. On the other hand this technique requires catching of animal and fixes a collar or other device on it. Then it is necessity somebody to trace out for the signal from the device periodically. That means including a people in field research for a long time. Radio tracking gives two new advances in investigation of wild animals in comparison with conventional methods: 1- possibility to identify individual animal and 2-possibility to localize it when is necessary. This advantages

leads to wide application of radio tracking since the fits full working system was build (Coachran and Lord, 1963).

Main techniques for radio tracking-advantages and disadvantages

Three main systems for radio tracking are in use in the present: 1-very high frequency (VHF) radio tracking, 2-satellite radio tracking and 3- radio tracking based on global positioning system (GPS).

The advantages of VHF systems for radio tracking in brief are: relatively low price, reasonable accuracy for a lot of investigations and possibility to carry out them in a relatively long time period. Disadvantages are: hard field work and dependence from the weather if it is based on aircraft. Never the less VHF radio tracking is most using method for collecting information for wind animals.

Satellite radio tracking require bigger capital investments and is more inaccurate. Satellite radio tracking has undoubted advantages if the purpose of the investigation is to trace migration routes or tracking in a wide area, because there is no need of field work on it.

In a difference of the above two methods GPS radio tracking is based on a radio receiver installed in the investigated animal collar. It receives signals from a special satellite system and using built in microprocessor calculates and store position of the investigated animal. Depending on collar weight, some GPS collars store the data and drop off the animal when expired to allow data retrieval; others transmit the data to another set of satellites that relay it to the researchers; and still others send the data on a programmed schedule to biologists who must be in the field to receive them. GPS radio tracking also have a high initial price and can be implemented on bigger animals. In dependants of chosen telemetric system the potential influence on the normal behavior of the animal have to consider when trapping and collaring the animal .The unfavorable effects of trapping and radio stamping on the animal can be long-lasting or short-lasting and vary from tolerable to hard and fatal (Birgham, 1989). It is to the researcher's advantage to minimize these effects since the goal of radio-tracking is to obtain data most closely reflecting the animals' natural behaviors.

Most of the changes in normal behavior take place 1-2 weeks. White and Garrott (1990) made five recommendations for researchers when implementing a radio telemetry study; 1) use the lightest-weight transmitter package possible, 2) select an inconspicuous package especially when dealing with animals that rely on cryptic coloration, 3) test the transmitter packages on captive animals first in a variety of environmental settings, 4) wait one week before collecting data to use in analysis, and 5) avoid catching an animal during any critical life history period (especially reproductive). In conclusion if the investigated animal keeps his weight, estimate and keep his area and produce offspring, investigators consider the side effects are with minor influence.

If the budget for investigations is low implementing the VHF telemetry system is only possibility. And what is more VHF devices can be implement on almost all animals for which the satellite and GPS telemetry devices are more heavy and can not be used for relatively small animals. Other advantage of VHF radio telemetry devices

is the relatively longer time period of use in comparison of satellite and GPS radio telemetry devices.

To fit the receivers to the animals traditionally collars are used. Standard collars cannot be used with animals such as boars (Jullien et al., 1990), which have temporarily enlarged necks during the rutting season. They used an expandable collar to allow for seasonal neck circumference changes in the boar.

Configuration of the base system for radio telemetry tracking

Main components of the base system for radio tracking are: 1- Transmitting subsystem consists of radio transmitter, power supply and transmitting antenna and 2- receiving subsystems detecting and identifying signals from transmitters consists of: receiver, a receiving antenna, cables and recorder. Other accessories include devices for mounting receiving antennas to vehicles and aircraft, scanners to enhance searching for numerous signals, specialized recorders to aid in data collection, downloading and data-interpreting devices, and various types of software.

The researchers can define positions of the investigated animal by two basic methods: 1- homing consists of following a signal toward its greatest strength. The process continues until the researcher sees the animal or otherwise estimates its location when sufficiently near (Mech, 1983). Homing can introduce bias to the data as the animal may be disturbed and behave differently as a result (White and Garrott, 1990). 2-triangulating involves obtaining two signal bearings from different locations (preferably at angles of about 90° to one another) which then cross at the animal. In practice, it is better to take three or four bearings because antenna directionality is imprecise. When more than two bearings are plotted, the bearings form an error polygon on a map (Heezen and Tester, 1967; White and Garrott, 1990). This polygon theoretically contains the animal's location.

Significant error can be introduced if the bearings are not taken in a relatively short period, since the more time that passes, the greater the probability that the animal has moved. This problem can be avoided by researchers simultaneously taking bearings each from a different location. Triangulation locates an animal with minimal disturbance since the researcher can be far from the animal while obtaining a bearing. Triangulating involves obtaining two signal bearings from different locations (preferably at angles of about 90 degree to one another) which then cross at the animal. In practice, it is better to take three or four bearings because antenna directionality is imprecise. When more than two bearings are plotted, the bearings form an error polygon on a map (Heezen and Tester, 1967; White and Garrott, 1990).

Project for radio tracking of big games in Bulgaria.

Radio telemetry investigations of big games in Bulgaria are still not performing on level to make a real concept for their main population-biological characteristics. Despite the economic importance of the wild boar and red deer to Bulgaria as a big game trophy animal, there have been no studies on its habitat use and selection, or effects of harvest strategies and poaching on the population. We do not know what impact this disruption is having on population attributes. Understanding the effects of hunting and other human activities on the big game

population is critical to the proper and sustained management of it. Therefore it is necessary to develop a project based on radio tracking of this species for collecting an information for habitat selection, seasonal home ranges, and the sociobiology of big game have not been investigated scientifically in Bulgaria but it is heavily necessary . This study, therefore, will contribute significantly to the understanding of, and management strategies for техните populations. This study also will provide data on the area (hectares) and habitat types necessary for successful establishment of the 14 game breeding facilities mandated by the Hunting Law.

The main purpose of this project attended with radio tracking of big games have to be orientated to the investigation of their most important population-biological parameters as: 1) the average home range size, 2) habitat selection and use, 3) seasonal behavior and movement patterns, home range size and habitat selection will be affected by environmental factors (e.g., temperature, precipitation), habitat characteristics and human disturbance; it will be obtained knowledge of movement patterns and feeding activity и will be investigate if they are affected by time of day (most activity during twilight and night) and season.

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