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This paper reports on the development of an automatic radio tracking system used to study certain aspects of behavior of wild animals under natural conditions and discusses values of these data in ecology and ethology.

In general, the technique consists of placing a miniature radio transmitter emitting signals at a specified frequency on each animal to be followed. Either portable directional receivers or fixed tracking antenna are then used to monitor the animal's position and movements by triangulation.

The automatic tracking system, described in detail by Cochran et al. (1965) is located at the Cedar Creek Natural History Area in east central Minnesota. Radio signals from the marked animals are received by rotating antennas supported on two towers spaced 0.5 miles apart. After amplification and conversion, the signals are fed to a 52-channel receiving and recording system located in a laboratory between the towers. Time and bearings for up to 52 animals are continually recorded on 16-mm. film. An operator using a microfilm reader takes bearings from the film as desired and determines locations by triangulation. The mechanical accuracy of the system has been determined to be $\pm 0.5^\circ$.

A digital computer program was developed for automatic map construction and distance computations of animal-location data obtained by the automatic system. This program is adapted to the University of Minnesota's CDC 1604 computer in connection with an x-y plotter for map construction (Siniff and Tester, 1965; Tester and Siniff, 1965).

Through July 1966 movements of the following animals have been recorded continually for varying periods of time: 35 red foxes (Vulpes fulva), 15 white-tailed deer (Odocoileus virginianus), 59 raccoons (Procyon lotor), 4 badger (Taxidae taxus), 6 cottontail rabbits (Sylvilagus floridanus), 30 snowshoe hares (Lepus americanus), and 14 owls of various species. Analyses of radio tracking data on these animals are leading to better understanding of such behavioral and ecological aspects as predator-prey interactions, family group dispersal patterns, spacing of individuals in a population, home range and habitat utilization and daily activity rhythms.

In addition, behavior of radio-tagged animals experimentally exposed to sub-lethal doses of ionizing radiation is being studied by comparison with the behavior of the same animals before irradiation and by comparison with non-irradiated controls. Information is also being obtained on the behavior of animals under the stresses of starvation and diseases such as distemper.

LITERATURE CITED

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