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FIELD TESTING THE WILDLINK CAPTURE COLLAR ON WOLVES

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The Wildlink Capture Collar[3] (Wildlink Data Acquisition and Recapture System, 2924 98th Avenue N., Brooklyn Park, MN 55444) is a telemetry collar that also includes anesthetic darts that can be fired upon remote command. Thus it is useful in any application requiring recapture of individual animals. One application for which the capture collar has been proposed is a wolf reintroduction program; if a reintroduced wolf leaves the reestablishment area, it could be recaptured and returned (U.S. Fish and Wildl. Serv. 1987).

The capture collar was successfully tested on white-tailed deer (*Odocoileus virginianus*) in the Superior National Forest of northeastern Minnesota (Mech et al. 1990). However, because of the wolf's more active lifestyle, tougher skin, social nature, and ability to damage objects with its teeth (Thiel and Fritts 1983), we were not certain that the capture collar would function properly on wolves. We describe the results of field tests of the capture collar on wild wolves.

METHODS

The study was conducted in the east-central part of the Superior National Forest in St. Louis and Lake counties, Minnesota, from 31 May 1989–7 March 1991. Temperatures during the study varied from −32 to +35 C and during the tests from −28 to +23 C.

Wolves were live-trapped with modified steel foot traps (Mech 1974, Kuehn et al. 1986), anesthetized, and fitted with the same type of Wildlink capture collars used on white-tailed deer (Mech et al. 1990). Each collar weighed 520 g, about the same weight as standard radio collars. The 2 plastic darts were covered with copper or aluminum sleeves to minimize possible damage from chewing by packmates.

Collars were fastened around each wolf's neck with enough slack that a person's flattened, outstretched 4 fingers could be squeezed between the collar and the wolf's neck. The darts were positioned on the collar to ride above the muscles lying dorsally on each side of the spinal column. Each dart was filled with a 1.5-ml mixture of 250–500 mg of tiletamine, 250–500 mg of zolazepam, and 37–75 mg of xylazine hydrochloride (Kreeger et al. 1990) and 0.75 ml of propylene glycol as an antifreeze. Batteries can be replaced in the field, but during these tests, used collars were removed and replaced by collars whose batteries were replaced in the lab. After the animals were examined and otherwise handled, usually ≥120 minutes after induction, they were injected intravenously with 15 mg of yohimbine hydrochloride to antagonize the xylazine (Kreeger et al. 1987).

Seventeen collars were used on 14 wolves weighing 25–48 kg. Most test firings (n = 43) were conducted approximately 1 month after previous handlings. Although communication with the collars for location and activity study (Kunkel et al. 1991) was regularly achieved ≤3.0 km from the ground and ≤26.5 km from the air (Mech et al. 1990), most recapture attempts were conducted from distances ≤0.5 km so biologists could reach the drugged animal quickly.

RESULTS

Six wolves in 1989 and 8 in 1990 were equipped with recapture collars. Wolves carried the collars for 3–220 days (mean = 82.4 days, median = 85.5 days). Of 43 attempts at recapturing wolves, 37 (86%) were successful. Based on monitoring the activity of the wolves after the darts were fired (Kunkel et al. 1991), in 3 cases confirmed by simultaneous aerial observation, the induction time was 3–11 minutes. The animals remained drugged 51–162 minutes and were boosted when necessary with

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[3] Mention of commercial suppliers does not constitute endorsement by the U.S. Government.

100–200 mg of ketamine hydrochloride to maintain immobilization.

One recaptured wolf drowned when it fell in a puddle 6 cm deep. Failures were attributable to the combination of a malfunctioning dart and inadequate drugs in 1 case and premature battery expiration in 5 cases, eventually resulting in loss of radio contact with 6 (43%) of the 14 dart-collared wolves. We were unable to retrieve the 5 collars with battery failure. The battery failures occurred 25, 29, 75, 96, and 107 days after putting the collars on the wolves. However, when batteries were routinely replaced ≤ every 2 months in each collar, success rose to 100% (17 of 17 tests).

Some wolves were alone when recaptured, others accompanied a pack, and 1 was with another wolf, presumably his mate. Observations from the ground and air, and tracks in snow, indicated that recaptured wolves moved 30–40 m after the dart was detonated. In some cases, other pack members left when the dart injected, but in 1 instance, the wolf's partner was observed nuzzling the stumbling wolf. In another case, a member of a pack of 8 wolves traveling on a frozen lake left its packmates and headed into the woods before induction. Twice packmates howled from a distance while the recaptured animal was weighed, measured, and blood-sampled. In no case did packmates attack the drugged wolf before biologists reached it. One wolf twice had 1 dart broken from its collar when it was retrieved; and another once. The wolves' packmates probably had snapped the darts off. After 1 wolf left her pack, both darts remained intact.

In all of the recaptures, only 1 dart was required, although once, both darts fired because of a faulty collar belt. In the test that failed because of a malfunctioning dart and drug dose, the collar was remotely dropped from the animal and retrieved. On another occasion after these tests were completed, a pack wolf's collar dropped off spontaneously (as programmed) when a bite into the collar led to internal water damage.

After considerable experimentation, the optimum drug dose seemed to be 250 mg of tiletamine, 250 mg of zolazepam, 37 mg of xylazine, and 0.75 ml of propylene glycol. This mixture withstood temperatures to −25 C, yet the drugs did not precipitate or crystallize. Stronger concentrations tended to crystallize and become inactive.

DISCUSSION AND CONCLUSION

The version of the capture collar we tested on wolves worked successfully if batteries were changed ≤ every 2 months. Wolves were anesthetized quickly, and seemed to suffer no ill effects from other packmates or other factors, except 1 that drowned. They seemed to tolerate the collars well, although 2 wolves had single darts broken from the collar. On the other hand, another individual with a mate wore the collar for 6 months and was captured 8 times.

After the above study was completed, we similarly tested a version of the capture collar with upgraded electronics and software from 15 July–17 December 1991 on 4 new wolves and 2 formerly tested individuals. Eighteen recapture tests were made after intervals of 5–60 days; 17 (94%) succeeded, and 1 collar was lost. The batteries in 3 collars lasted 4 months, and 3 others were still operating after 3 months. In addition, the signal from 1 collar disappeared after 60 days, but we could not determine if that was caused by a collar failure, dispersal from the area, or illegal killing of the wolf.

SUMMARY

Seventeen Wildlink capture collars were tested 61 times on 18 gray wolves (*Canis lupus*) during 1989–1991 in the Superior National Forest of northeastern Minnesota. Overall success rate was 89%, and most failures were attributable to premature battery expiration. When batteries were changed ≤ every 2 months, 17 of 17 tests succeeded. With an up-

graded version of the collar in which batteries lasted longer, 17 of 18 tests suceeded. Over the 2-year study, 6 of the 17 collars were lost. For serially recapturing individuals, the Wildlink collar proved useful and reliable if care was taken to replace batteries at proper intervals.

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