From the Field: modified drop-net for capturing ungulates

Wlodzimierz Jedrzejewski and Jan F. Kamler

Drop-net traps were first described to capture game birds, including prairie chickens (*Tympanuchus cupido*; Jacobs 1958) and wild turkeys (*Meleagris gallopavo*; Ellis 1961, Glazener et al. 1964). Later, drop-net traps were used to capture white-tailed (*Odocoileus virginianus*) and axis (*Axis axis*) deer (Ramsey 1968). Drop-nets now are widely used to capture ungulates, including deer (Rongstad and McCabe 1984, Conner et al. 1987) and bighorn sheep (*Ovis canadensis*; Kock et al. 1987, Schemnitz 1994). Because of the relatively high expense and complexity of most drop-net traps, several modifications recently have been developed to simplify techniques and reduce costs, at least in smaller drop-net traps (Silvy et al. 1990, Lopez et al. 1998). In this paper we describe a new inexpensive and safe drop-net trap developed to safely capture red deer (*Cervus elaphus*) in and near a national park in northeastern Poland. Our design, using only pulleys and a single winch and trigger release, is simpler and less mechanical than previously described large drop-net traps.

Trap description and construction

We built semi-permanent frames for the drop-nets at 5 sites inside Bialowieza National Park, Poland (52°05′N, 24°E), and at 1 site outside the national park in a managed forest. See Jedrzejewska and Jedrzejewski (1998) for a detailed description of the study area. Trap frames consisted of 10 wooden poles (7 m high, 10 cm in diameter), with the bottom of the poles buried 80 cm into the ground (Figures 1, 2). Each pole was supported by a metal tension line (0.3 cm in diameter) fastened to the top of each pole and staked to the ground (Figure 2). Poles on softer soil were also supported by 3 shorter poles (1 m) attached at angles to their base (Figure 2). We arranged poles in 2 lines (5 poles each) separated by 25 m, with 6.25 m between poles within each line (Figure 1). We drilled holes in the top of each pole and placed a single metal cable (0.6 cm in diameter) through these holes along each line of poles. We staked the cable to the ground at each end of the line (Figure 2). We attached a small pulley (8.5 cm long, with 2,000 kg maximum support, S.I.S., Gliwice, Poland) to the metal cable near the top of each pole (Figure 2).

We used a 22 × 22-m square net (10-cm mesh, 0.3-cm-diameter nylon rope; Korsze-Sieci SA, Korsze, Poland) for each trap. We tied 4 nylon ropes (0.5 cm in diameter, 20–40 m long) at 5.5-m intervals along 2 sides of the net (parallel to the 2 rows of wooden poles, Figure 1). We placed each rope through the nearest pulley (near the top of the poles) and tied all ropes to a single metal ring (12 cm across, 0.6 cm thick). All ropes on the far end of the trap came across the top of the net (Figure 1). We used a winch (1,500 kg of force; Spoldzielnia Pracy-Zelazocynk, Warsaw, Poland) to pull the metal ring back to a trigger mechanism.

To create a trigger mechanism, we buried 2 wooden poles (2 m high, 10 cm in diameter) adjacent to each other and 80 cm deep in the soil (Figure 3). We placed these poles 20–30 m away from the middle of the near side of the trap. For additional support we fastened each pole with a tension cable (0.3 cm in diameter) staked to the ground (Figure 3). We drilled a long metal screw

Figure 1. A drop-net trap for red deer constructed in 2001 inside Bialowieza National Park, Poland. Photo by J. F. Kamler.

(1.6 cm in diameter, 40 cm long) through the 2 poles approximately 1.25 m above the ground (Figure 3). We then fastened an iron rod (1 m long, 1.6 cm in diameter), with 1 end bent like a hook, to the metal screw between the 2 poles (Figure 3). To set the net, we placed the metal ring (pulled back by the winch) onto the hook of the metal rod. We attached a nylon rope (0.5 cm in diameter) to the opposite end of the metal rod. We placed this rope through a pulley (attached to the bottom of a wooden pole of the trigger mechanism; Figure 3) and then extended the rope to the blind (50–150 m away from the trap, depending on terrain and cover).

Observers sitting in a vehicle (at the blind) could see when deer were under the net. To release the net, one of the observers pulled the nylon rope attached to the metal rod, thus raising the hook and releasing the metal ring. To increase the power of the downward pull on some trigger mechanisms, we also tied a second nylon rope to the handle of the iron hook, placed it through a pulley (attached to the top of the wooden pole), and extended it back to the blind, where we tied it (with high tension) to the vehicle. One observer cut this second rope (which was pulling upward on the metal handle) as the second observer pulled the original rope (pulling down on the metal handle). To secure nets when not trapping, we attached a short metal cable (0.6 cm) with a loop on each end (fastened by small U-bolts) to the metal ring and around the posts of the trigger mechanism. Additionally, we attached a nylon rope from the straight end of the metal rod directly to the top of one of the posts (to prevent movement of the metal hook).

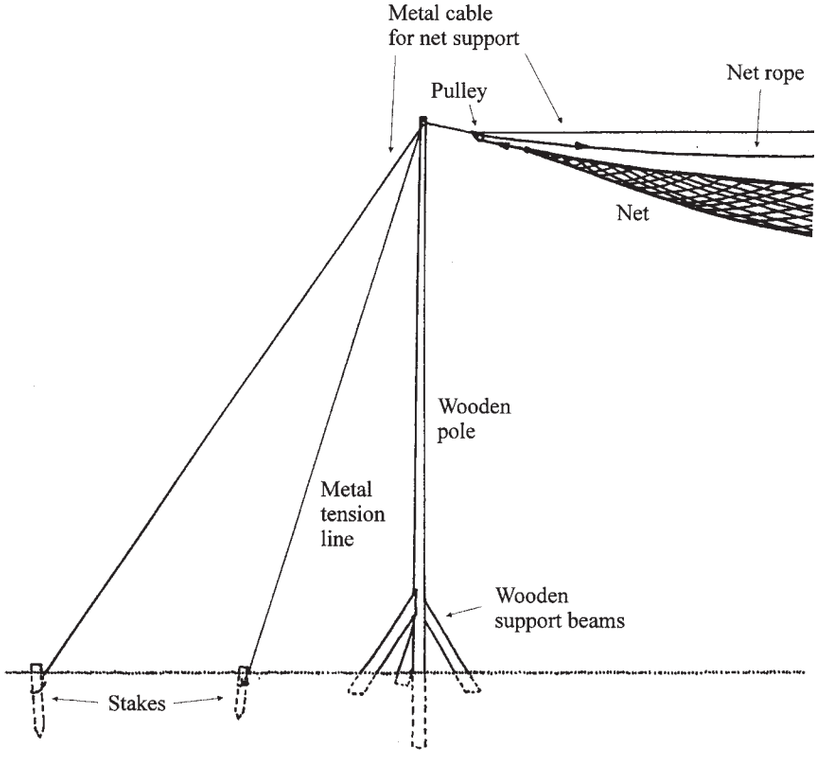

Figure 2. Close view of the corner components of the drop-net trap. Drawing by U. Stenkewitz.

To get deer under the net, we placed hay between the 2 rows of wooden poles, without the net present. Also, we placed corn in a small wooden tray attached to a

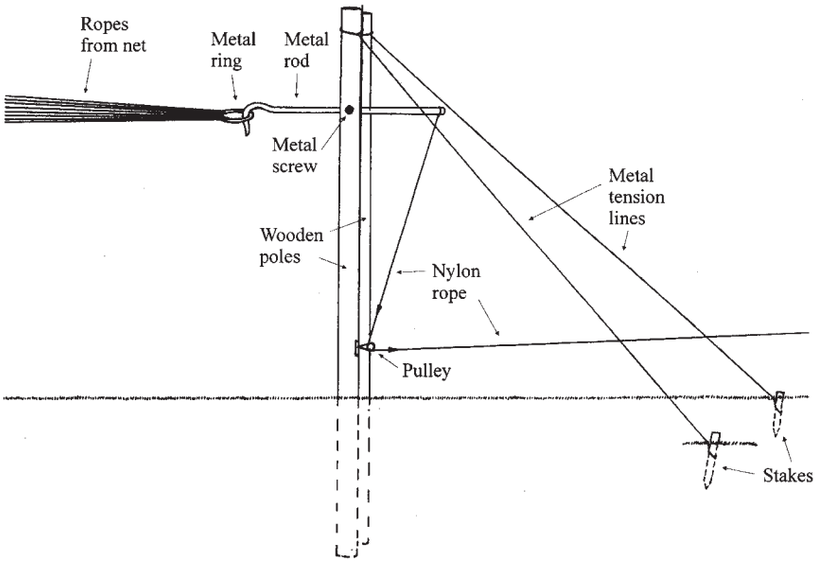

Figure 3. Components of the trigger mechanism for the drop-net trap. Drawing by U. Stenkewitz.

middle wooden pole (Figure 1). After deer began feeding regularly, we set up the net between the polls. After deer began feeding regularly when the net was up, observers would sit in the blind near dusk and release the net when deer were under it.

Results and Discussion

From March 2001 to February 2003, we captured 33 (8 adult males, 21 adult females, 3 juvenile males, 1 juvenile female) red deer during 9 trapping events. Number of deer captured per trapping event ranged from 2–6. Only 1 deer (adult male) escaped after being entangled by the net. This deer was near the edge of the net and had his antlers entangled in the net for several minutes before escaping. We captured 2 adult female deer twice. Many more deer could have been captured because during one attempt, too many deer (15–20) came under the trap, and we did not release the net for safety reasons. There were no obvious injuries among captured deer, as the nylon netting quickly entangled and tightened around the deer, preventing them from kicking and moving excessively. Thus, our trap design demonstrated that drop-nets can be used to safely capture ungulates up to the size of red deer.

Two kinds of malfunctions occurred early in the study, and both were related to the curve on the metal hook. Twice the net dropped prematurely before deer were under it, and we corrected this by increasing the inward curve of the metal hook to reduce sensitivity. Twice the opposite happened—pulling the hook did not release the net. In these cases we decreased the inward curve of the metal hook to increase sensitivity. Thus, several practice drops (to adjust the curve on the metal hook) should be performed prior to trapping deer. Alternatively, trigger mechanisms other than the one we used could be employed.

The major advantage of this trap was its simplicity. By using only pulleys, a winch, and a simple trigger mechanism, we easily used this large drop-net trap to capture red deer. Because of our simple design, mechanical maintenance and repairs common for other traps (e.g., blasting caps, remote-control devices) were unnecessary, and our trap could be used under various weather conditions. Furthermore, our trap design was quite flexible depending on local conditions at each trap site, and modifications were easily made. For example, for 2 traps placed on firm soil, we used 4 wooden poles instead of 5 on each side to support the net. We placed 1 trap in a forest opening, supporting 1 side with cable wires attached 6.5 m high in trees (instead of using wooden poles).

Total cost of materials for each trap (excluding net) was approximately $150 (US), and traps were used for at least 3 years. The net and winch (used for all traps) cost approximately $600 and $125, respectively. Net costs can vary greatly depending on material and size preferred. Thus, similar traps built for capturing smaller ungulates (e.g., white-tailed deer, roe deer [*Capreolus capreolus*], wild boar [*Sus scrofa*]), or large game birds, could use smaller nets, further reducing costs. When considered over years, costs were even lower as annual maintenance was minimal.

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Authors' address: Mammal Research Institute, Polish Academy of Sciences, 17-230 Bialowieza, Poland; e-mail for Kamler: jankamler@hotmail.com.

Wlodzimierz (Wlodek) Jedrzejewski (right) received his M.S. and Ph.D. degrees from Warsaw Agricultural University in Poland. He currently is professor and Vice-Director for Science at the Polish Academy of Sciences, Mammal Research Institute, in Bialowieza. He has conducted studies in animal ecology, forest ecology, and conservation biology. His special interests concern the role of predation in regulating and limiting prey populations, with a particular emphasis on animal populations in Bialowieza Primeval Forest, the last pristine woodland in the lowland temperate zone of Europe. ***Jan F. Kamler*** (left) received his B.S. in biology from the University of Kansas, his M.S. in wildlife biology from Kansas State University, and his Ph.D. in wildlife science from Texas Tech University. He currently is a U.S. Fulbright Scholar conducting post-doctoral research at the Polish Academy of Sciences, Mammal Research Institute, in Bialowieza. His research interests include conservation biology, predator-prey relationships, and the ecology and interactions of carnivores.