A capture technique for wintering and migrating steppe eagles in southwestern Saudi Arabia

Stéphane Ostrowski, Emmanuelle Fromont, and Bernd-U. Meyburg

Abstract We describe a technique to capture steppe eagles (*Aquila nipalensis*) in Saudi Arabia and identify some improvements for their safety. Capture of steppe eagles by vehicle pursuit was successful in 92% of attempts ($n=52$). Speed of capture was related to capture sites ($P<0.05$), but not to relative mass of crop contents ($P>0.05$), total body mass ($P>0.05$), or prevailing weather conditions at capture sites ($P>0.05$). Although this technique of capture was very effective for steppe eagles, its efficient use is limited to open habitats.

Key words *Aquila nipalensis,* capture techniques, crop content, raptor, Saudi Arabia, steppe eagle

Commonly used capture methods such as baited snare traps, rocket nets, or exclosure traps (Bloom 1987) are not suitable for steppe eagles (*Aquila nipalensis*). Problems with available traps include potential serious injury to birds (snares), traps designed for solitary birds that are impracticable for many birds at a carcass (exclosure traps), and avoidance of rocket nets by steppe eagles. Likewise, oral drugs are difficult to apply in the appropriate dose, are tolerated poorly, and are potentially dangerous (Ebedes 1973, Day et al. 1980). Remote delivery of drugs by gun has been used to capture griffon vultures (*Gyps fulvus,* Revers and Bögel 1994) but cannot be used for wild steppe eagles, which are difficult to approach and much smaller in size. Although several of the above mentioned techniques are successful on other eagle species (e.g., Harmata 1984, Bloom 1987, Jackman et al. 1994), few authors have addressed the problem of recapturing "trap-shy" individuals with the same technique.

Although the diet of steppe eagles varies considerably throughout their range (Cramp and Simmons 1980), migrating and wintering birds in Saudi Arabia feed on slaughterhouse offal and rubbish dumps in the desert (Hollom et al. 1988). After observing that birds feeding at these dumps have difficulty gaining flight when chased by a vehicle, we attempted to catch birds by chasing them. Our objectives were to describe a technique to catch wintering and migrating steppe eagles in Saudi Arabia and identify factors to maximize the birds' safety.

Study area

We conducted our study at 2 rubbish dumps with animal waste located 35 km from the city of Taif (21°15′N / 40°21′E), in west-central Saudi Arabia, at a mean altitude of 1,400 m above sea level. Both sites were sandy desert crossed by dry watercourses (*wadis*). At site 1, the terrain was undulating with numerous acacia trees (*Acacia tortillis*) along the main *wadi*; at site 2, the terrain was flat and trees were scarce. Neither area had naturally occurring permanent surface water. Consequently, the region was sparsely vegetated with intensively grazed perennial grasses and forbs and tall acacia trees present only in the *wadis*. These rubbish dumps primarily contained carcasses of sheep and goats, were not enclosed, and refuse destruction was not practiced. Scavenging birds had direct access to these sites.

Address for Stéphane Ostrowski: National Wildlife Research Center, P.O. Box 1086, Taif, Saudi Arabia; e-mail: ostrowski@nwrc-sa.org. Address for Emmanuelle Fromont: Université Claude-Bernard, Lyon-1, UMR CNRS 5558, 43 Boulevard du 11 Novembre 1918, 69622 Villeurbanne Cedex, France. Address for Bernd-U. Meyburg: Herbertstrasse 14, D-1000 Berlin 33, Germany.

Adult steppe eagle under pursuit near Taif, Saudi Arabia.

Methods

We captured wintering and migrating steppe eagles in southwestern Saudi Arabia as part of a 4-year study. The capture team was composed of a driver and an onboard observer, who captured birds. We excluded juvenile birds (<1 year old) from the experiment due to potential naivety. We randomly chose adult or subadult birds from groups of scavenging eagles. We conducted captures shortly before or after sunset (+/–15 minutes), when thermals were less active. We chased a flying bird with a 4-wheel-drive vehicle to intercept its flight path and catch the bird when it attempted to land.

We did not hide the vehicle before the chase. We began our approach 200 to 300 m from a randomly chosen roosting or feeding bird. We cut off its flight path 3 to 5 times, at which time the chased eagle would lie on the ground. We then threw a blanket on it and the observer handled the eagle, with gloved hands, by the wings and legs. We then hooded the bird and allowed it to recover prior to handling.

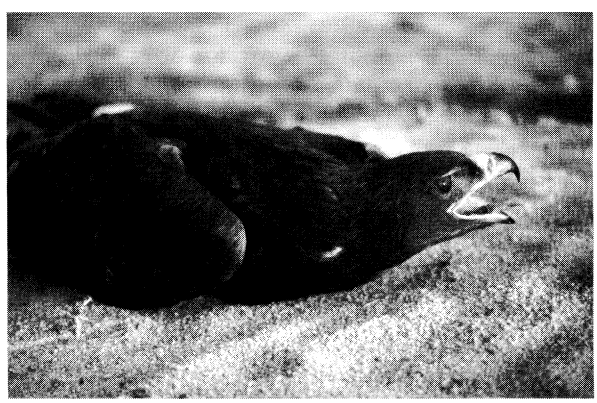
We recorded time between initial takeoff and final capture (capture time) with a stopwatch. We manually removed and weighed (g) crop contents as soon as the bird was caught to evaluate effect of body mass and crop fullness on speed of capture. We recorded body mass (+/–10g) before removal of the crop contents and then again before release. To assess whether speed of capture was dependent on weather conditions, we recorded ground temperature (°C), air temperature (°C), wind speed (m/s), and rainfall (mm) using a meteorological data logger (Grant 1250 series, Cosmark, Royston, United Kingdom). We measured wing length (cm), tail length (cm), beak length (cm), and gap (cm) of each bird and banded each with a National Commission for Wildlife Conservation and Development band (Riyadh, Saudi Arabia). All captured birds received a thorough medical check by a veterinarian and were evaluated for degree of cardiovascular stress. We recorded heart and respiratory rates (number/min) from direct cardiac auscultation and observation of thoracic movements, rectal temperature (°C) with a thermocouple probe (ATT-450, Omega, United States), and arterial pH on an automated blood gas analyzer (ABL 3, Acid-Base Analyzers, Radiometer, Denmark). We limited handling time to 20-30 minutes. Because of darkness after they were processed, birds could not be released the same day. Although stressful to the captured birds, we kept eagles in total isolation in a shaded aviary to document any immediate post-capture mortality. For these 2 reasons, we released birds at the pursuit site 18 to 22 hours after capture. We fitted 11 captured steppe eagles with satellite-monitored backpack transmitters to determine post-release survival.

We compared mean capture time between the 2 sites using the Student *t*-test. We also tested the hypothesis that capture time was not influenced by body mass, relative mass of crop contents, mean air temperature, mean ground temperature, difference between mean air and ground temperatures, and mean wind speed during the capture procedure using linear regression (*F*-tests). For these tests, we used Minitab for Windows (McKenzie et al. 1995). All tests were bilateral, and significant threshold was set as 0.05.

During captures and handling, we followed animal welfare guidelines of the National Commission for Wildlife Conservation and Development, Riyadh.

Results

We successfully captured 48 steppe eagles in 52 attempts (92%). We abandoned chases when birds



Adult steppe eagle lying on the ground at the end of a pursuit. The bird pants and is unable to escape. It is still alert.