

American Burying Beetle Nebraska Sampling Protocol

February 14, 2007

Trapping for the American burying beetle (*Nicorphorus americanus*) (ABB) will be conducted with a modified version of the U.S. Fish and Wildlife Service's (1991) protocol, as described by Bedick et al. (2004). Trapping for the ABB may be conducted during two periods in the year. The first period is in early summer (approximately June 7th to July 1st) is after beetles have emerged from hibernation and prior to beetles going underground during the larvae rearing cycle. The second trapping period is in late summer (approximately August 7th to September 1st), after the larval cycle when both senescent and teneral beetles are present. For the early summer period, trapping will be conducted when the average temperature at midnight is 60 degrees Fahrenheit or greater. For the late summer period, it is recommended that trapping be conducted when the average temperature at midnight is 60 degrees Fahrenheit or greater. Trapping of ABB may be conducted during this period when the average temperature at midnight is 55 degrees Fahrenheit or greater, however, false negative presence data may be obtained under these conditions. Adult ABBs will be captured by use of baited pitfall traps consisting of a five-gallon (18.92 Liter) plastic bucket (diameter 28.5cm). Bedick (1997) found a five-gallon bucket to be the most appropriate pitfall trap when sampling for the ABB because they provide a larger surface area for each beetle to escape from other carrion beetles. Alternatively, a one-gallon bucket may be used as a pitfall trap in those instances where burial of the five-gallon bucket would be difficult.

All buckets will be washed using bleach and thoroughly rinsed prior to being used as traps. All buckets will be buried in the ground, with approximately 4-5 cm of the bucket above

ground level. Soil will then be built up around the bucket, creating a gradient from ground level upwards to the bucket rim. This will be done to limit the amount of water entering the buckets through runoff and splashing of water during rainfall events. Buckets will be located on the terrain so as to prevent inundation during rainfall events. Approximately 5-8 cm of moist soil will be placed in the bottom of the bucket, in order to give trapped carrion beetles room to burrow into the soil to avoid competitors, high temperatures and low moisture levels above the soil. To prevent rainfall and debris from directly entering the bucket, a square piece of plywood (37 cm by 37 cm) will be placed on top of the trap, supported by two or more sticks/narrow boards ranging from 1.5-2.5 cm in thickness. Additional weight (soil, rocks, etc.) will then be placed on top of the trap cover to reduce bait loss to vertebrate scavengers and to prevent the cover from being moved by wind or small animals.

It is recommended that all traps be baited with previously-frozen, 275-374 g laboratory rats (*Rattus norvegicus* – available from online dealers such as RodentPro.com). If rats are not available, bait items of comparable size and structure may be used. The bait will be aged in airtight containers for 3 to 7 days, depending on the temperature and other weather conditions. In contrast to the previous protocol, the bait will not be placed into containers within the traps. With larger numbers of traps spread across a relatively large area, it is better to allow carrion beetles to feed on the bait, which also helps maintain moisture levels in the soil within the trap and reduces stress. This will be done to prevent loss of beetles to desiccation, which has been determined to be a potential mortality factor for Silphidae on hot mornings by Bedick (1997) and inter-beetle predation. Traps will be spaced no farther than 1 mile (1.6 km) apart to ensure that the entire survey area will be covered by the predicted radius of the trap (0.5-mile (800 m)).

Traps will be set on the first trap day before 1800 hours and checked every subsequent morning by 1100 hours. Trapping will be conducted for a minimum of five consecutive days.

At each trap site, a GPS location and digital photograph will be taken to document the location of the trap and the general habitat characteristics of the trap site. All carrion beetles captured will be identified to species whenever there is available time and resources, and the ABB will be sexed by use of Ratcliffe (1996). Depending on the goals and objectives of the survey effort, all ABB captured will be recorded and marked using a drop of model paint (such as Testors) placed on the pronotum or the posterior portion of one or both elytra. Paint will be applied in a manner that will not cause damage to the elytra. All ABB captured during the second trapping period (August 7th through September 15th) will be evaluated for being either teneral or senescent, if the surveyor(s) have been properly trained. Captured ABB will be released as quickly as possible. For research purposes, the ABB may be released at the point of capture or at locations away from the capture point if such release methods are identified in an approved research design and the release sites have been evaluated as providing suitable habitat for the beetle. For the purpose of removing the ABB from a site prior to disturbance activities, captured beetles will be released, at a minimum distance of two miles away from the capture site. The release sites are to have habitat that has been evaluated as being suitable for the ABB. All captures of ABB will be recorded in the format of the Natural Heritage's Biological Conservation Database housed by the Nebraska Game and Parks Commission and South Dakota Game, Fish, and Parks Department, including recording captures in a Geographic System Database, as applicable, for future reference and analysis.