***Release sites and experimental conditions***

Tagged CRB were radio tracked after release at two locations on Guam: Triton Farm University of Guam, Dededo (13°31'56.8"N 144°52'24.0"E) and Asan Beach National Park, Hagåtña (13°27'57.5"N 144°42'39.4"E). Triton Farm is an inland experimental farm bordered by a residential area and uncultivated forest areas that include coconut palms along with other trees. Asan Beach National Park is roughly triangular with the ocean bordering one side, coastal wetlands on another, and forested hillside on the third. The park itself is a large, open, grassy field and includes with coconut palms on the edges, many of which displayed CRB damage at the time of the study. Thus, both sites feature relatively accessible terrain that provides a variety of potential breeding sites as well as adult food sources. At each study location, a grassy, open area was chosen for CRB release.

Weather conditions during the experiment were mainly clear with occasional periods of rain and overcast skies. On release dates, August 8 to August 14, average temperature ranged from 27°C to 29°C while relative humidity was 80% to 88%. Beetles were generally tracked under clear skies with the exception of August 9 during which light showers occurred.

***Oryctes rhinoceros capture and specimen selection***

CRB used for radio tracking were wild-caught in bucket traps containing oryctalure and collected within one week of capture. These beetles were placed in tubs containing moist peat moss, fed fresh banana slices and allowed to rest for at least three days.

Only CRB capable of flight were selected for radio tagging and release. After the rest period, captured beetles were flight tested at least one day prior to experimentation. The flight test chamber consisted of a large 121 L lidded garbage container. Within the chamber, about 30 beetles were placed in a smaller open metal bowl half filled with moist peat moss atop an upside down 19 L bucket. Beetles could only exit the smaller open container by flying out of it; therefore, any beetle found on the bottom of the flight chamber container the next morning was considered flight-capable. Flight capable CRB were transported and stored until release in lidded plastic bins approximately 45 cm by 30 cm by 18 cm containing 4 to 6 inches of damp peat moss.  Because not all beetles flew when first taken into the field, some beetles remained in storage for up to six days.

***CRB preparation***

Beetles that demonstrated flight capacity were marked with a unique four-digit code engraved on one elytrum using a laser engraver (Fenix Flyer, Synrad Inc., Mukilteo, WA, United States). The sex, mass, and elytral dimensions of each beetle were then recorded.   Both male and female specimens were used.

Prior to transmitter attachment, the beetle pronotum was abraded with sandpaper to improve adhesion. Transmitters were then affixed to the pronotum with hot melt glue (product xxxx company location xxx model number xxx)(Figure XX picture?) and steady pressure was applied as the adhesive hardened. Each glue-on transmitter (model A2414; Advanced Telemetry Systems; Isanti, Minnesota) had a mass of approximately 300 mg and was secured with approximately 250 mg of adhesive.

***Tracking equipment***

Transmitters had a maximum battery life of 45 days with a warranty guarantee of 22 days. Two frequency bands were chosen ranging from 148.641 to 148.992 and 164.032 to 164.409. Frequencies used with individual CRB were recorded in conjunction with beetle identification numbers.

Beetles were tracked using a radio receiver (model R410, Advanced Telemetry Systems, Isanti, Minnesota) equipped with a three-element folding Yagi antenna (model 13863, Advanced Telemetry Systems, Isanti, Minnesota) attached to a. A total of four units were used so that multiple beetles could be tracked simultaneously: two receivers were programmed with bandwidths from 148.641 to 148.992 and two with bandwidths 164.032 to 164.409.  In addition to radio tracking equipment, handheld GPS units (model XXX, Garmin, XXX) were used to record locations where beetles were found or point of signal loss for each beetle.

***Beetle release and tracking procedure***

Beetles were transported to release sites in plastic storage bins. The lid of the bin was removed at dusk (roughly 19:30) and the container was closed at roughly 21:30. Once the containers were opened, CRB activity was carefully monitored using an infrared camera. Observation under the infrared camera revealed that beetles thermal profile would change just prior to flight, and thermally active beetles observed emerging from the peat moss were briefly viewed under red light to record the identification number and determine the frequency of the radio transmitter. Though nearly all beetles flew independently, several beetles that had not yet flown by the end of experimentation were encouraged to flight by removing them from the peat moss and throwing them into the air to facilitate takeoff.

CRB were pursued on foot following release and were tracked until a landing site was determined or until the transmitter signal was lost. In either case, a waypoint was recorded at the landing site or the last point of signal reception using a GPS unit.

Landing sites were visited on the following morning, and attempts were made to more precisely determine the location of each beetle. Beetle locations were monitored over several days, and beetles and or transmitters were recovered when possible at the end of the experiment. CRB and transmitters were successfully recovered by digging up beetles that buried into soil or compost; however the locations of CRBtracked to coconut crowns could not be as exactly determined due to the density of the frond foliage.

***Analysis***

In assessing the flight patterns of beetles for trends between sex and size, percent emergence weight (%EW) was calculated as an additional consideration. Percent emergence weight describes CRB mass at the time of measurement relative to its estimated mass upon emergence. This value can be estimated based upon a linear equation relating elytral measurements and emergence weight (Vander Meer and Mclean, 1975). This value is significant in data analysis because %EW reflects the present life stage of a beetle and how much stored energy it has available; CRB emerge at their heaviest weight and gradually lose weight over their lifespan.

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