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Research Questions on the Behavior and Ecology of the Giant Armadillo (*Priodontes maximus*)

Dennis A. Meritt Jr.

Between 1972 and 1982, five giant armadillos (*Priodontes maximus*) resided for varying periods in an off-exhibit area at the Lincoln Park Zoo in Chicago, Illinois. They included three males which came from Guyana and two females from Bolivia, all received as wild-caught young adults. Together they were the subjects of observations by animal care staff and volunteer docents, who made almost daily observations on the overall activity, food consumption, and general behavior of the giant armadillos. Zoo personnel also recorded weights and body measurements at regular intervals, as well as basic physiologic values such as body temperature and respiratory rates. The presence of *Priodontes* in the collection stimulated a number of communications, visits and inquiries from individuals and organizations interested in its natural history and behavior. Together with field excursions to giant armadillo habitat in the Chaco of Paraguay and northern Argentina (Meritt, 1973), these captive armadillos prompted the development of a detailed life history outline—one that summarized research questions related to this species, noted information not readily available or missing from the literature, and listed life history traits which are still unknown (Meritt, unpubl. ms.).

A recent field excursion to the Chaco of Paraguay, and an increase in research projects in Argentina and Paraguay, has prompted me to update and expand this outline, which is meant to serve as a guide for those studying this, the largest of the living armadillos (Ceresoli and Fernandez-Duque, 2004; Porini, 1999, 2001). Many of the study topics posed here will only be answered through the detailed study of animals in the wild, but others may be addressed through the diligent observation of animals already held in various Argentine zoos, or those under investigation in private

wildlife reserves. It is my hope that anyone intending to work with *Priodontes*, or those already doing so, will consider the questions raised in this outline. I encourage anyone who is able to provide answers to any of these questions to publish their results; and likewise I welcome any additions to this list, based on the life history and behavior of the giant armadillo.

A thorough search of the literature demonstrates just how little is known about this species. Burmeister (1867a, 1867b) provided early anatomical information on the giant armadillo, including notes on its skeleton. Benirschke and Würster (1969) provided the first chromosome count for this species, while Carter (1983) and Carter and Encarnação (1983) conducted a census of its burrows in the Serra da Canastra, Brazil. Parera (2002) provided a brief review of the status, distribution, habitat and diet of the species in Argentina, but little else is known directly, although some inferences may be made from the related forms of *Cabassous* and what is known about their natural history and behavior.

One may hypothesize that *Priodontes* is generally solitary, except during periods of sexual receptivity. While the number of young per litter is unknown, in at least two *Cabassous* species there is usually only a single offspring (pers. obs.). The gestation period is unknown, but thought to be similar to *Cabassous*; the period of maternal care is not known, and the role, if any, of the male in the rearing and protection of the young is also unknown. At the Lincoln Park Zoo, captive female *Cabassous* with developing offspring were not in the company of a male (pers. obs.) so it is not possible to make any inferences about the male's role, or even his possible threat to the offspring. Strikingly, no juvenile *Priodontes* have been discovered in the field, nor found their way into captive management. Various species of *Cabassous* have been confused for immature *Priodontes* at one time or another (pers. obs.) and have even been offered for sale by animal dealers. Whether the evidence is physical or photographic, however, none of these supposed giant armadillos have been proven to be *Priodontes*. Even in habitat known to support them, where giant armadillo activity has been demonstrated and field studies have been carried out, no young have ever been witnessed.

Our understanding of the habitat preferences of giant armadillos is also imprecise. While the present distribution of *Priodontes* has been adequately mapped, both individuals and populations are patchy in their distribution, and may be limited to islands of preferred habitat. In the Chaco of Paraguay, for example, where *Priodontes* is known and occasionally captured,

they are most often encountered in riparian habitat or in similar areas with loose, sandy-loam soil. It appears that *Priodontes* in the Paraguayan Chaco prefers soil with a loose composition and near adequate water supplies, as well as necessary food such as insects, fruit and carrion (pers. obs.). Captive individuals have consumed a variety of meat and meat-based diet formulas (Meritt, 1977). Recent dietary studies have made a significant contribution to identifying the type of insect material sought by *Priodontes*, and provided additional insights to its habitat requirements in a very different ecosystem, the Cerrado of Brazil (Anacleto and Marinho-Filho, 2001).

Although *Priodontes* is widespread in its geographic distribution, and found in a variety of tropical ecosystems throughout South America, it is nowhere as common as the range maps would imply. Often only individual animals, rather than populations, are found in what might seem to be prime habitat. For native people across the continent, *Priodontes* is the armadillo of choice for food whenever available; given its adult mass (as much as 40 kg), one individual makes for a significant source of protein for a subsistence hunter and his family. Thus it is hunted wherever it may be found, and in some habitats it may represent the single largest source of meat (Leeuwenberg, 1997; Meritt, in prep.).

A Checklist of Research Questions for “Tatu Carreta,” “Tatu-Canastra,” the Giant Armadillo (*Priodontes maximus*)

Activity Schedule

- When are animals active?
- What time of day/night?
- When is the male active?
- When is the female active?
- Are animals more active when it is hot?
- Are animals more active when it is cold?
- What is the ideal ambient temperature for activity?
- How long are animals active?
- Is there a difference in activity between seasons? (Winter, spring, summer, wet season, dry season)
- What is the distance traveled each day?
- Does it vary with the seasons?

Mating Behavior

- How often do the animals show reproductive behavior?
- When and what time of year? Weekly? Monthly? Seasonally?
- How long is the period of sexual receptivity/activity?

- Describe reproductive behaviors—Sniff? Touch? Follow? Chase? Push? Claw? Mount? Vocalize? Urinate? Erection? Vulvar secretion? Vulvar swelling? Change in vulvar color?

Feeding Habits

- What foods do they eat? Plants? What parts of plants? Animals? What kinds of animals? Insects? Eggs?
- Do they prefer special foods? Ants? Termites? Bird’s eggs? Roots? Fruits? Carrion?
- How often? Daily? Twice in a 24-hr period? More? Less?
- Are there seasonal foods that they look for in nature? If so, what are they?
- What keys or attracts the animal to its food? Location? Smell? Texture/Consistency?

Burrowing

- Do they choose special places for their burrows?
 1. Temporary resting places?
 2. Permanent home?
 3. In sand/loose soil?
 4. In banks?
 5. At the base of trees?
 6. Where?
 7. Near water?
 8. For permanent use?
 9. For nesting only?
 10. How many entrances?
- How can one tell if a burrow is active?
- What are burrow measurements? Entrance hole size? Tunnel diameter? Tunnel depth? Tunnel length?

Nesting and Nursing

- Is the nest burrow any different?
- Is there a true nest? Nest material?
- How many young are born/litter? Sexes? Same sex? Mixed sex?
- How often? Once each year? More?
- What time of year?
- During what season(s)?
- What do the young look like?
- How much do they weigh? Measurements?
- Are their eyes open?
- Ears open?
- Covered with hair?
- Claws hard or soft?
- Shell (carapace) hard or soft?
- Teeth present?
- Can they crawl? Walk? Stand? Vocalize?
- Are the young with the male and female, or the mother alone?
- What is the role of the male?

- Nursing position of mother? Female on back? Female on side? Which side?
- How often do they nurse?
- Do they have nipple preferences?
- How often do they nurse each 24 hours?
- For how long each session?
- Do they nurse during the day or at night?
- More by day? (0600–1800 hrs) or by night? (1800–0600)
- How many days, weeks, months spent nursing?
- When do they begin solid food? What age?
- What kind of food is it?
- When are they first left alone? What age?
- Where are they left?
- When are they first out of their burrow?
- With a parent or alone?
- How long and how far?
- When do they become independent?
- Do they seek their own territory?
- Are they forced to seek their own territory?
- Is it away from their mother or their parents?
- How far? Remote (= some distance) or in adjacent territory?
- Is this done in a toilet or latrine area that is used more than once?
- Where is this area located?
- Does the animal attempt to bury its waste? Or cover it?
- When active, how often does the animal stand up on its hind legs?
- When this happens, what else is the armadillo doing?
 1. Sniffing?
 2. Looking in a particular direction?
 3. Hold its foreclaws to its chest?
 4. Moving its head?
 5. Opening or closing its mouth?
 6. Walking forward?
 7. Clawing at an object or in the air?
 8. Closing its eyes?
- Can you track armadillos by following:
 1. Their trail?
 2. Places where they searched for food?
 3. Toilet areas?
 4. Temporary burrows?
 5. Claw marks?
 6. Scent or odor?

Sleeping Patterns

- In each 24-hour period, how long does the animal:
 1. Sleep?
 2. Rest? (Awake but inactive)
 3. Be active?
- When sleeping, what body position is it in?
 1. Fetal?
 2. On its back?
 3. On its stomach?
 4. On its side?
 5. Which side?
- When sleeping, does the animal
 1. Vocalize? (Wheeze or snore?)
 2. Shake or tremble?
 3. In the case of males, have erections?
 4. Paw or claw in the air?
 5. Curl and uncurl the body?

Foraging and Elimination

- When foraging, does the animal
 1. Sniff the air?
 2. Stand on hind legs?
 3. Dig in soil?
 4. Grab at food with claws?
 5. Attempt to bury and save food?
- How often does the animal:
 1. Urinate? What is the volume?
 2. Defecate? What is the amount and consistency?
- Is this elimination done separately or together?

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A Reference List of Common Names for the Edentates

Mariella Superina
John M. Aguiar

Edentates are found in every country of the Western Hemisphere except Canada and the smaller Caribbean islands. This panoramic distribution has brought them into contact with a profusion of languages, and some widespread species have been known by many dozens or hundreds of indigenous names. The ascent of European languages to continental dominance has given rise to many more — some of them adaptations of prior native terms, and others entirely new.

Two of these latecomer tongues, Spanish and Portuguese, overlay virtually the entire range of the edentate order, and together they encompass more local and regional variants than any other extant language. Spanish common names in particular are myriad, diverse and frequently confusing; the suite of terms in one country may be entirely distinct from another — and the same name may be used for different species in several different areas. This is not to say that pandemonium reigns: experienced researchers know the terrain, and field biologists are familiar with the local names where they work. But for those searching through reports or making comparisons from afar — or those who are simply new to the field — aligning the common and Latin names may take a great deal of paging through far-flung references.

We have done some paging ourselves, and here we share the results of our efforts: a compilation of the established common names in the major languages of Neotropical science, together with as broad a selection of current local names as we could assemble. We also present a sampling of the hundreds of indigenous names which still survive throughout Central and South America, in recognition of the many peoples and cultures who first gave names to the edentates.

This is an expansive list, but it is by no means exhaustive in any of these languages; a truly comprehensive document would want a lifetime of ethnographic surveys throughout the hemisphere. Instead we have tried to compile, in a workable matrix, the names which have already been included in a variety of field guides, monographs, articles and other publications. Not all versions of each name have been listed here; many indigenous languages are only spoken, not written, and countless variants may stem from dif-