

BEHAVIORAL RESEARCH

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WHY CONDUCT RESEARCH?

From a husbandry perspective, the main function of research is to gather the information we need to make good management decisions. In order to maintain animals in naturalistic settings, we need to know what their habitat is like in the wild. In order to assess the success of environmental enrichment strategies we need to know about the animal's natural behavior. In order to maintain a healthy population we need to know the animal's dietary needs. The list goes on and on. The better the research, the more reliable the information, and thus the better we can care for our animals. In many cases the information gathered through informal observation - the kind of information that becomes entrenched in traditional management strategies - is accurate, and allows for good management, but in many cases it is not. It is often useful to step back and consider what assumptions we are making when we do things a certain way, and then test to see if those assumptions are reasonable.

INSTITUTIONAL SPECIES SURVIVAL PLAN (SSP©) RESEARCH

Current research: results of a phone survey of SSP© institutions

At present it appears that there is a fairly low level of behavioral research involving orangutans at SSP© institutions. A 1994 telephone survey conducted by the Pittsburgh Zoo showed that, out of 46 responding institutions, 7 had conducted behavioral research in the past, 9 were currently conducting such research, and 7 had future projects planned. The vast majority of these research projects, past, present and future, were studies of various environmental enrichment regimens.

Suggestions for research projects

A poll of orangutan SSP© institutions, the SSP© species coordinator, members of the Primate-Talk internet network, selected field researchers, and information taken from early drafts of the Great Ape Taxon Advisory Group strategic collection plan resulted in the following suggestions for high-priority orangutan research projects (divided into categories):

1. Studies concerned with weight gain (important because of the propensity of orangutans to develop obesity and Type II diabetes). Suggested were studies on:
 - Food intake

- Food preference
 - Eating patterns
 - Weight gain in contracepted animals
 - Physical activity and body weight as a function of age
2. Studies addressing the problems of housing and exhibiting large groups of orangutans:
- agonistic interactions
 - reconciliation mechanisms
 - mate choice
3. Education-oriented projects:
- Development of a plan to maximize the educational potential of the captive population
 - Scientific evidence of educational materials and methods used in zoo's orangutan interpretive materials/programs
 - Scientific evaluation of public attitudes towards and perceptions of orangutans
4. Quality of life studies
- Operationally defining variables that measure "quality of life" for captive orangutans (includes encouraging empirical research to assess and define these variables)
 - Evaluation of the standards/quality of orangutan facilities and husbandry

Conducting research: the scientific method

The steps to conducting a scientific study are straightforward:

1. Observe your animal
2. Form a question (For example: why are so many captive orangutans obese?)
3. Further observations and literature search to refine your question
4. Construct, if possible, mutually exclusive hypotheses (putative answers to your question). "Mutually exclusive" means that you try to frame your questions that one and only one, hypothesis is correct. This is not always possible, especially since many natural phenomena have a plethora of interacting causes, but it makes for the strongest studies. For example, possible hypothesis relating to obesity in orangutans include:
 - a. We provide them with the wrong diet
 - b. We provide the correct diet, but they select only unhealthy portions
 - c. They are genetically predisposed to obesity
 - d. etc.

Note that these hypotheses may or may not be mutually exclusive

(we may feed them the wrong diet *and* they might be genetically predisposed to obesity)

5. Make testable predictions based on your hypotheses (for example, if orangutans are genetically predisposed to obesity you would predict that obesity was heritable, and that obese orangutans would tend to have obese offspring, and lean orangutans lean offspring, if housed under similar conditions).
6. Identify the behaviors that are pertinent to your study and select a sampling method.

How to select pertinent behaviors and how to sample are topics too broad to go into here, but two good references are: Measuring Behavior (Martin and Bateson 1986) and Research Methods for Studying Animal Behavior in a Zoo Setting, a videotape and handbook produced jointly by the Washington Park Zoo and the Minnesota Zoological Gardens and available from either organization.

7. Consult with a statistician before you collect data. There is nothing sadder than someone spending hundreds of hours collecting data and then finding that because of a minor procedural error that the data are insufficient to answer their question.
8. Collect data.
9. Analyze data. This is often much more time consuming than collecting the data in the first place.
10. Interpret results and draw conclusions. Remember when you interpret your results that science can only disprove hypotheses, it can never prove them. A very simple example: you could easily eliminate ideas such as "orangutans tend to be obese because their fur is red" (since red foxes don't tend to be obese), but you cannot say that "because obesity in orangutans heritable (if it is) that obesity is definitely caused by genetic factors", since even heritable effects might have a non-genetic cause (such as family members all growing up in an environment that predisposes its occupants to obesity).
11. Disseminate results. If you don't tell others about what you have found your study will have no lasting effect.
12. Form new research question.

Research proposals

Completing a research proposal, even for work done in-house, is generally a requirement of an institution's research policy. Even when not required, it is a valuable exercise, for it forces you to examine your research question and strategy. The following outline, taken from the draft version of the American Zoo and Aquarium Association (AZA) research guide, gives the basic elements that should be included in a

research proposal. A research proposal should let a reviewer determine:

1. The scientific validity and implications of the project
2. The likelihood that the project will be successful
3. The costs of the project.

Proposals should contain following information:

1. Description of Project
 - A. Title (concise but informative)
 - B. Summary
 - C. Goals and implications
 - D. Background (include references to relevant studies)
 - E. Methods and materials
 - i. project protocol
 - ii. sampling methods
 - iii. experimental manipulations
 - iv. how results will be analyzed
 - v. how results will be disseminated
 - vi. what equipment, drugs, etc. will be used and how
 - F. Reference list
2. Qualifications of investigator(s)
 - A. Name
 - B. Institutional affiliation
 - C. Address
 - D. Phone
 - E. E-mail address
 - F. Attached Curriculum Vitae
 - i. include relevant experience
 - ii. special skills appropriate to project
 - iii. list of publications
3. Budget (time and materials)
 - A. Zoo resources needed
 - i. animals
 - ii. currently held
 - iii. necessary acquisitions
 - iv. staff used
 - v. number
 - vi. hrs/wk
 - vii. primary contact at zoo
 - viii. other
 - ix. office space
 - B. Equipment
 - i. supplies
 - C. Resources supplied by investigator
 - i. equipment
 - ii. supplies

- iii. person-power
- D. Schedule of completion

Suggested format:

1. Cover page
 - A. Title
 - B. Summary
 - C. Investigator information
 - i. name
 - ii. affiliation
 - iii. address
 - iv. phone
 - v. e-mail address
 - D. Primary zoo contact person, if any
2. Body of proposal
 - A. Goals and implications
 - B. Background
 - C. Methods and materials
 - D. References
3. Appendixes
 - A. Budget
 - B. Schedule of completion
 - C. CV(s)
 - D. other pertinent material

Resources available to aid you in your research

There are many resources available to help you design and implement a meaningful research project. Besides the previously mentioned videotape, the Experimental Design and Statistics Subcommittee of the AZA Behavior and Husbandry Group can be consulted. This group offers help with experimental design questions, advice on statistics and proposal pre-review. For further information on these services contact:

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