A holistic Veterinary approach to captive wildlife welfare

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The role of the modern zoo?
Why is good welfare so important?

• Conservation
  – Populations must be fit for breeding and reintroduction purposes, poor welfare can lead to stress, suppression of immune function and a decrease in reproductive fitness
Why is good welfare so important?

• Education
  – Animals should exhibit natural behaviours to educate the public about their natural habits
Why is good welfare so important?

• Research
  – Healthy animals exhibiting natural behaviours can give us valuable information on how their wild counterparts live and behave
The role of the veterinarian is essential

- Adequate veterinary care:
  "Promoting an animal’s health and welfare... providing guidance and advice based on best practice. The veterinarian should have the authority and responsibility for making judgements regarding animal welfare."

- Governance and communication are vital
What is welfare?

“Good animal welfare implies the absence of pain, fear, and hunger; enables a high level of biological functioning (i.e., normal growth, freedom from disease); and (more controversially) enables animals to experience positive emotional experiences such as comfort and contentment”

Fraser et al. 1997
“...animals experiencing enhanced welfare should be free of behaviors that are abnormal or indicative of fear and frustration. They should actively explore and interact with their environment and demonstrate a diversity of behavior similar to that typically observed in the wild.”

Positive Reinforcement and environmental enrichment: enhancing animal well-being

Journal of the American Veterinary Medical Association
Behavioral Health
- Ability to cope with environment
- Expression of Natural Behaviors

Physical Well-Being

Mental Well-Being
Five Freedoms

• 1. Freedom from Hunger and Thirst - by ready access to fresh water and a diet to maintain full health and vigour.
• 2. Freedom from Discomfort - by providing an appropriate environment including shelter and a comfortable resting area.
• 3. Freedom from Pain, Injury or Disease - by prevention or rapid diagnosis and treatment.
• 4. Freedom to Express Normal Behaviour - by providing sufficient space, proper facilities and company of the animal's own kind.
• 5. Freedom from Fear and Distress - by ensuring conditions and treatment which avoid mental suffering.
Physical Health

• Preventive Vs Proactive
• Nutrition
• Biosecurity
• How much do wildlife species demonstrate physical pain?
  – Osteoarthritis
  – Dental disease
  – Ocular disease
Behavioural health and drives

- Animals experience strong neurobiological drives to fulfil certain self-rewarding behavioural activities even if all physical needs are met.
How do we know what animals need?

Most of the time...

...We don’t

Opportunities to make their own choices

"He's much happier now - he wasn't at all impressed with that leather recliner!"
Defining behaviour

*Natural behaviour* has been defined as a behaviour that is “typically observed in the wild; it is adaptive in the evolutionary sense...(i.e.) has evolved by natural selection which allows an individual to survive more easily in its particular environment and so gives it a better chance of leaving offspring than an animal not so adapted” (Poole, 1988b, p. 3).

*Unnatural behaviour* is defined as a behaviour that is “not seen in the wild. Not all unnatural behaviours are regarded as abnormal, however, as they may promote success within the captive environment” (Poole, 1988b, p. 3-4).
Defining Behaviour

**Normal behaviour** will “promote the success and survival of the individual and its genetic contribution to the population” and is “clearly appropriate to the particular situation”. It may also “be either natural or unnatural” (Poole, 1988b, p. 4).

**Abnormal behaviour** is defined as a behaviour that is “rarely seen in wild populations and does not promote the success and the survival of the individual or its close relatives (i.e. it does not increase fitness). It appears not to be goal oriented, so that its function is not apparent.” It “may include elements of normal activities, but they are performed in an inappropriate fashion” (Poole, 1988b, p. 4).
Abnormal Behaviours – a mental health issue?

- **Displacement Behaviors** – arising out of conflict when an animal is driven to perform two behaviours at the same time e.g. when an aggressive keeper offers food the animal may be conflicted between the fear of the keeper and the desire to get the food – often displayed as licking, grooming, locomotion or vocalisation.

- **Redirected Behaviors** - Activity directed away from the principle target and toward another less appropriate target E.g. redirected aggression – often seen in primates.
What is stereotypy?

http://www.aps.uoguelph.ca/~gmasan/StereotypicAnimalBehaviour/library.shtml
What is stereotypy?

- Repetitive, invariant behavior patterns with no obvious goal or function
- Derived from normal motor patterns
- Develop slowly; early on may be more flexible
- With time, patterns become more rigid
- Eventually, they are performed even when original stimuli is not present
What causes stereoty?

• Sub-optimal environments
• Lack of social contact or stimulation as a young animal
  – Fewer neurons, decreased dendritic branching and reduced synaptic connectivity
• Genetic predisposition
• Lack of opportunity to express natural behavioural drives
What causes stereotypy?

• Unavoidable stress or fear
• Lack of sensory stimulation and or behavioral opportunities that lead to:
  – Frustration
  – Conflict, etc.
• Always associated with a sub-optimal environment
• One common factor  FRUSTRATION
Origins of stereotypy

- **Frustration** - When an individual is highly motivated to perform a behavior but is restricted from doing so.

- **Conflict** – When an individual is motivated to perform two opposing behaviors at the same time.
• Whatever the original reason for repeating the behavior, repetition strengthens the performance by sensitizing the neuronal pathways involved!
Mental Health - Stress

Stimuli or stressors causing an alteration to an organisms’ physiological homeostasis and/or psychological well-being

Eustress

Distress
Eustress

• “Good Stress”
• Fight or Flight Response
• Able to adapt, cope and regain physiological +/- psychological homeostasis

Distress

• “Bad Stress”
• Cumulative/Chronic Stress
• Unable to adapt, cope, and fail to regain physiological +/- psychological homeostasis
Importance of Minimizing Stress in Captivity

“Recent advances in stress research have now lead to the realization that certain preclinical and clinical symptoms may be resulting from physiological and psychological distress in the captive environment. Freedom from distress thus represents another essential component for the establishment of overall well-being.”

Journal of the American Veterinary Medical Association
Behavioural Management Strategies

• Behavioural management allows the development of proactive standards for the care and psychological well-being of captive animals

• Behavioural management incorporates appropriate veterinary care, environmental enrichment, training, animal behaviour issues, and exhibit architecture and husbandry.
## Summary of any herd management issues: (Dec 07) with updates and actions from meeting 23rd April 08

**15th August 08 in blue**

Updates are given in blue

<table>
<thead>
<tr>
<th>Issue</th>
<th>Proposed Benefit of Actions</th>
<th>Action from Dec 07 meeting</th>
<th>Priority</th>
<th>Time scale (Dec 07 meeting)</th>
<th>Actions from meeting on 23rd April 08</th>
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</thead>
</table>
| Husbandry practices vary with the team | • Easier to evaluate our husbandry and the effect any husbandry changes  
• Maintains standards, increases consistency, which is good for the animals | • Standardize husbandry practices across team  
• Becoming more consistent but discussed need for written procedures so that consistency can be monitored and maintained. | High | CM to take immediate action in next team meeting | Working procedures to be discussed at team meeting, agreed and written up. First draft done house by house. Feeding, cleaning, basic husbandry. CM did plan. Each person does a house, will have a meeting go through and agree. Tsavo 1 only house not started. (agreed forms can then also be used as basis for SWP for the section)  
By Who: CM & Rhino Team (SB to do Tsavo 1 by end of next week)  
By When: End of August 08 |
| Development of a husbandry manual | • Development of a husbandry manual  
Backbone of husbandry manual produced by BSc Conservation Medicine students (and due for review by student starting next week). This could serve as a starting point for the team - though there are areas that they will have to write from scratch – eg working procedures (daily routine, feeding, moving, introducing, hormone assessment, loading, births, etc.) | | Low | CM to take action: long term goal | Team to assist vet student with updating the basics during her placement.  
Team to identify gaps and plan how these will be dealt with (eg who will take on writing the first draft of the bits that need adding, group discussions etc).  
By Whom: CM & Rhino team with assistance from student.  
By When: Progress report end of May 08 (ie first draft and plan of what else needs doing)  
Electronic copy of report to be forwarded to the team so can start a file with all info on rhinos in one file.  
SS to forward on word document To talk to Eveline re categories for file. |
| Limited time spent in contact with animals | • This will increase the ability to handle and treat the animals | • Formal time set aside for keepers to spend with animals; discussed 1 rhino/keeper | High | CM to initiate immediately with team | Team to spend 10mn/day with each rhino (direct interaction, desensitisation to touch etc). |
Enclosure design

‘many studies have demonstrated that animals’ prefer their enclosures to include complexity, variety, challenge and options, rather than just space’

BIAZA
Environmental Enrichment

1. Food
   - Scatter feeding, smears
2. Auditory
   - Music, vocalisations
3. Tactile
   - Substrates, toys
4. Cognitive
   - Puzzle feeders, coconuts
5. Olfactory
   - Essential oils, dung
6. Visual
   - Banners, flags, mirrors
<table>
<thead>
<tr>
<th>Wednesday</th>
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<td></td>
<td>Herbs/spices, fresh fruit, yoghurt drizzles, oats mix, toy 3</td>
<td>Bamboo laying, hanging nappies, rice piles</td>
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<td></td>
<td>香草/香料，新鲜水果，喷滴酸奶奶，麦片混合物，玩具3</td>
<td>趣味粗竹糕，稀稠7，成堆的</td>
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<td></td>
<td>Smear 1, nuts&amp;seeds, log treats, PVC feeder tube, small iceblocks</td>
<td>Kongs with vegetable oil, scat装有牛肉蔬菜串，</td>
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<td>稀稠1，坚果/瓜子，趣味圆木，PVC喂食筒，小号冰糕</td>
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<tr>
<th>WEEK 2</th>
<th>Wednesday</th>
<th>Thursday</th>
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<td></td>
<td>Fresh vegetables, rice mix,</td>
<td>Fresh fruit,</td>
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</table>
The following items are to be used with the current enrichment calendar. The toys listed below will stay in the enclosure for the whole day.

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SMEAR ITEM</th>
<th>NOVEL OBJECT / TOY</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO 1</td>
<td>Black sesame butter</td>
<td>Fire hose cubes &amp; Tyres</td>
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<tr>
<td></td>
<td>黑芝麻酱</td>
<td>消防带方形玩具&amp;轮胎</td>
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<tr>
<td>NO 2</td>
<td>Kiwi sauce</td>
<td>Hanging bamboo toy</td>
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<tr>
<td></td>
<td>猕猴桃酱</td>
<td>悬挂组合竹筒玩具</td>
</tr>
<tr>
<td>NO 3</td>
<td>Pineapple sauce</td>
<td>White plastic canisters</td>
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<tr>
<td></td>
<td>菠萝酱</td>
<td>白色塑料桶</td>
</tr>
<tr>
<td>NO 4</td>
<td>Fish paste</td>
<td>Feeder tubes (blue, black, yellow)</td>
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<tr>
<td></td>
<td>虾酱</td>
<td>喂食简（蓝色，黑色，黄色）</td>
</tr>
<tr>
<td>NO 5</td>
<td>Plum paste</td>
<td>Fire hose hangers</td>
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<td></td>
<td>酸梅酱</td>
<td>消防带条形玩具</td>
</tr>
<tr>
<td>NO 6</td>
<td>Hazelnut chocolate spread</td>
<td>Hanging log toys</td>
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<tr>
<td></td>
<td>巧克力榛子酱</td>
<td>悬挂圆木玩具</td>
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<tr>
<td>NO 7</td>
<td>Cream cheese</td>
<td>Floating pillows &amp; Drums</td>
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<tr>
<td></td>
<td>奶酪</td>
<td>浮枕&amp;蓝色桶</td>
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</tbody>
</table>

Note: If a particular item is low in stock or damaged, notify the BTS immediately. If the item is unavailable, BTS/BM will advise a substitute item until it is returned in stock.

注意：如果某种物品的存量很少或者被损坏，立即通知饲养主管。如果无法获得该物品，饲养主管会建议使用另一种替代物品直到恢复该物品的库存。
Operant Conditioning

- Can be useful as a management tool
- Must be enjoyable and progressive
- May be helpful as an educational tool
Human animal interaction

Staff

Visitors
Routine Health screening

- Daily keeper checks
- Regular team meetings
- Routine visual and/or physical screening
Veterinary Interventions

Pharmacology

• Anti-psychotics
  – Haloperidol, thioridazine, risperidone, sulpiride.

• Anxiolytics
  – Diazepam, alprazolam

Summary

• As veterinarians we a responsibility to ensure the physical, mental and behavioural health of our animals
• This requires a holistic, integrated approach amongst the different zoo staff
• Behavioural problems may be multifactorial and complex to address
• Prevention is better than cure!
Thank you