Implementation of assisted reproductive technologies in Javan Banteng (Bos javanicus javanicus)

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Presentation by Dan Beetem, Director of Animal Management at The Wilds

Free-ranging Javan Banteng

► Indonesian islands of Java and Bali



- <4,000 free ranging animals remaining in population</p>
 - Declining in all areas

- ► IUCN Red List: Endangered
- ► AZA-endorsed WAZA Global Species Management Program

Previous Reproductive Research in Banteng

- Documentation of natural estrus cycle in *ex-situ* banteng (Asa et al., 1993)
- Conventional AI
 - ▶ successful at The Wilds and Western Plains Zoo (Johnson et al., 2002)
- ► In-vitro fertilization (without embryo transfer)
 - ► Successful (Barnes et al., 1988)
- Embryo flushing and embryo transfer from banteng into domestic cow recipients
 - produced two calves (Wiesner et al., 1984)
 - ► Inter-species transfer is not ideal due to uteroplacental differences between the two species, and lack of behavioral learning
- Nuclear transfer (cloning) of banteng genetics to domestic cow oocytes and recipients (see photo)
 - Lack of pre and postnatal viability likely due to issues from uteroplacental differences (Sansinena et al., 2005)

Ex-Situ Banteng at The Wilds

- ► Small herd of 9 Javan banteng
 - ▶ 6 females, 3 males
- ► Age ranges from 1-18 years old
- Managed on large pasture in summer, and small paddock with indoor access in winter
- ► Historically easy to manually restrain with low stress



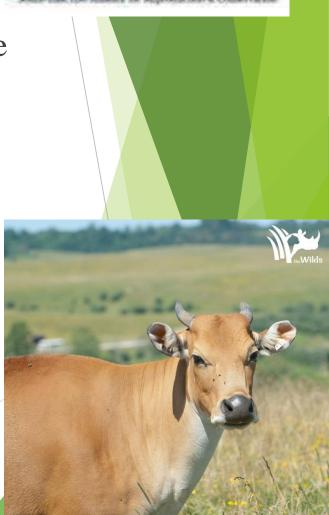


Project Goals





- Establish protocols and assess efficacy of assisted reproductive technologies in Javan banteng
- Coordination with South-East Zoo Alliance for Reproduction and Conservation (SEZARC)
- ▶ Ultimate goal:
 - ► Utilize techniques established here in free-ranging banteng populations
 - ► Allow for selected gamete and embryo acquisition from wild banteng for use in *ex-situ* banteng populations



Assisted Reproductive Technologies

- Large scale project aiming to determine efficacy of:
 - ▶ deep intra-uterine artificial insemination
 - ► Embryo flushing and embryo transfer
 - ➤ Oocyte aspiration, In-vitro fertilization, and embryo transfer
 - ▶ Use of sex-sorted spermatozoa in above techniques



Current Progress

- Assessing efficacy of induced estrus synchronization protocol in banteng by hormonal analysis
 - ▶ Documented successful pregnancy after estrus synchronization and conventional artificial insemination
 - Semen provided by St. Louis Zoo
- Determining appropriate protocols for sex-sorting banteng spermatozoa
- ► Assessing efficacy of conventional artificial insemination





Next Steps:



► In **May**:

- Perform super-stimulation, conventional artificial insemination, and embryo flushing to determine efficacy
- Assessing efficacy of induced super-stimulation protocol in banteng by hormonal analysis

Next Steps:



► In October:

► Perform super-stimulation, conventional artificial insemination, embryo flushing, and embryo transfer after recipient cows' estrus cycles synchronized

Institutional Benefits of Project

- ► Allows for more selective reproductive management
- ▶ Decreases chance of male calves when space is limited
- Eliminates cost and stress of live animal transport for breeding purposes
- ► Allows use of valuable deceased bull sperm
- Allows preservation of currently housed banteng genetics



International Benefits of Project

- Use of techniques in global ex-situ banteng populations
- ► Enhance genetics of insularized and isolated herds of banteng in range countries
- ► Allows acquisition of free-ranging banteng germplasm for use in *ex-situ* populations
 - ► Improving *ex-situ* banteng genetic diversity to represent that of wild populations





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Questions?

