

**PRESENTATIONS
SESSION IV
REPRODUCTION 1**

Attempt to control estrus and ovulation in white rhinoceroses using a synthetic progestagen and slow-release GnRH analogue.

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THE WHITE RHINO BREEDING PROBLEM

**In *the wild* successful
breeding in many areas**

**In *captivity* not
enough pregnancies**

- **Low fertility rate**
- **<50% of ♀♀ breeds**
- **F1 less than F0**
- **Captive population
not self sustaining**



Why we did it



REPRODUCTION IN CAPTIVITY



- ▶ For once we can't blame the male
- ▶ The captive white rhino population is not growing ($\lambda = 1.001$)
- ▶ Only 18-39% of captive-born (FI) females reproduce
- ▶ A problem observed globally in many (semi-)captive settings
- ▶ Causative factors and underlying mechanism yet unclear
- ▶ Observed irregular cycling patterns (variation in cycle duration)
- ▶ High incidence of anovulation, acyclicity and pathologies

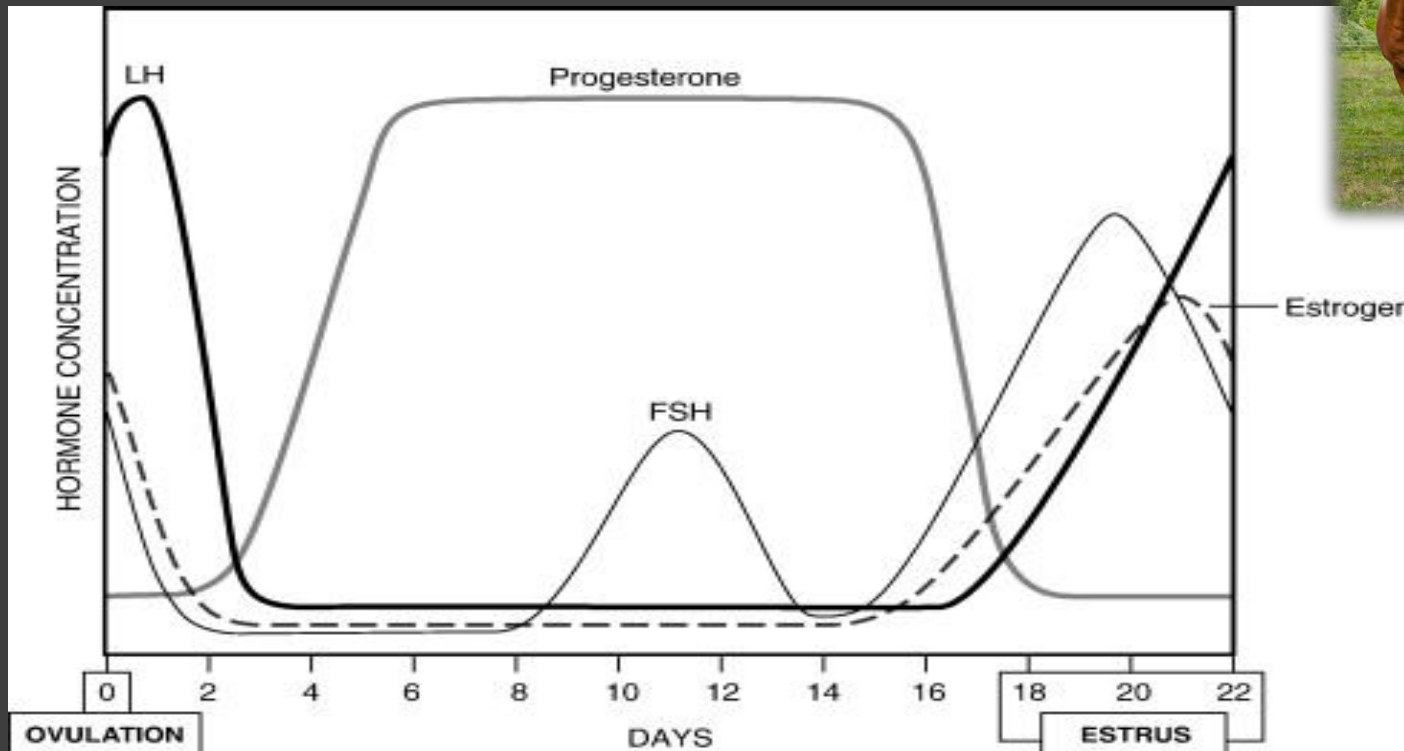
ONE APPROACH is to IMPROVE OVULATION RATE

UNDERSTANDING THE ESTROUS CYCLE



Why we did it

- ▶ Illustration of estrous cycle of a mare (Perissodactylae)



ADVANCED BREEDING TECHNOLOGIES



General need amongst white rhino breeding facilities

- ▶ Improving pregnancy rate
- ▶ More efficient timed management
- ▶ AI & greater effective use bulls



Estrus induction in white rhinoceros

- ▶ Attempts since 1995 - success rate 0-30%
- ▶ Recent report: Chlormadinone acetate with hCG/GnRH analogue
 - ▶ Anovulatory and ovulatory females in Europe
 - ▶ Higher success rate



What we did

OUR GOAL

- ▶ To provide a tool towards enhanced breeding success in the white rhinoceros
- ▶ By developing a functional and practical ovulation induction protocol that can be generally used for **timed breeding management** in zoos and breeding facilities worldwide

AIM OF THIS STUDY

- ▶ To induce estrus and ovulation in a female white rhinoceros by using Regu-mate (a synthetic progestagen) and Sucromate Equine (a 48h-release GnRH analogue)

STUDY ANIMALS



| | | | | |
|----------|------|----|------------------|-------------|
| Female 1 | 1994 | F1 | Jacksonville Zoo | Multiparous |
| Female 2 | 1992 | F1 | Birmingham Zoo | Multiparous |
| Female 3 | 2000 | F2 | Birmingham Zoo | Nulliparous |



Setting Jacksonville Zoo

1 male + 1 female

Setting Birmingham Zoo

2 females + new male introduction

OUR PROTOCOL



What we did

| Day | Treatment | Dose /frequency |
|----------|---|--|
| -90 to 1 | Fecal sample collection* & behavioral observation | 3 times weekly |
| 1-21 | Oral progesterone (Regu-mate) | 0.022 mg/kg once daily (n=2) 0.044 mg/kg once daily (n=1) |
| 30.5 | GnRH analog 48h-release (Sucromate Equine) | 2.5 µg/kg single IM injection |
| 1 to 51 | Fecal sample collection & behavioral observation | daily |
| 21 to 36 | Rectal ultrasound examination | n=1 (Jacksonville Zoo) |

*EMZYME IMMUNOASSAY WITH ANTIBODY RAISED AGAINST 11ALPHA-HEMISUCCINATE CROSS-REACTING WITH
P 4 A N D 5 A L P H A - P R E G N A N

GABBY'S ULTRASOUND JACKSONVILLE ZOO

Mandi Schook – ultrasound specialist



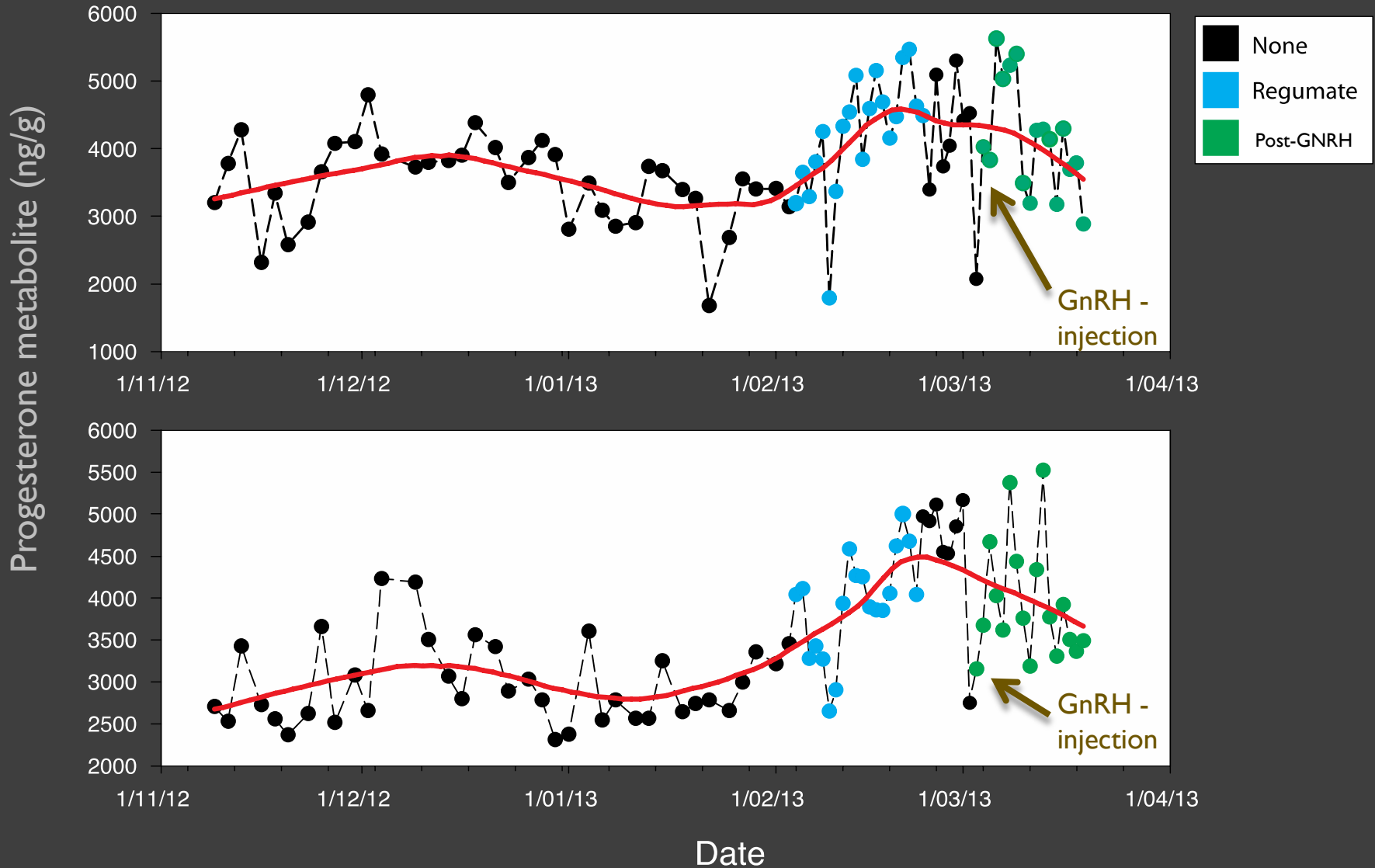
What we did





What we found

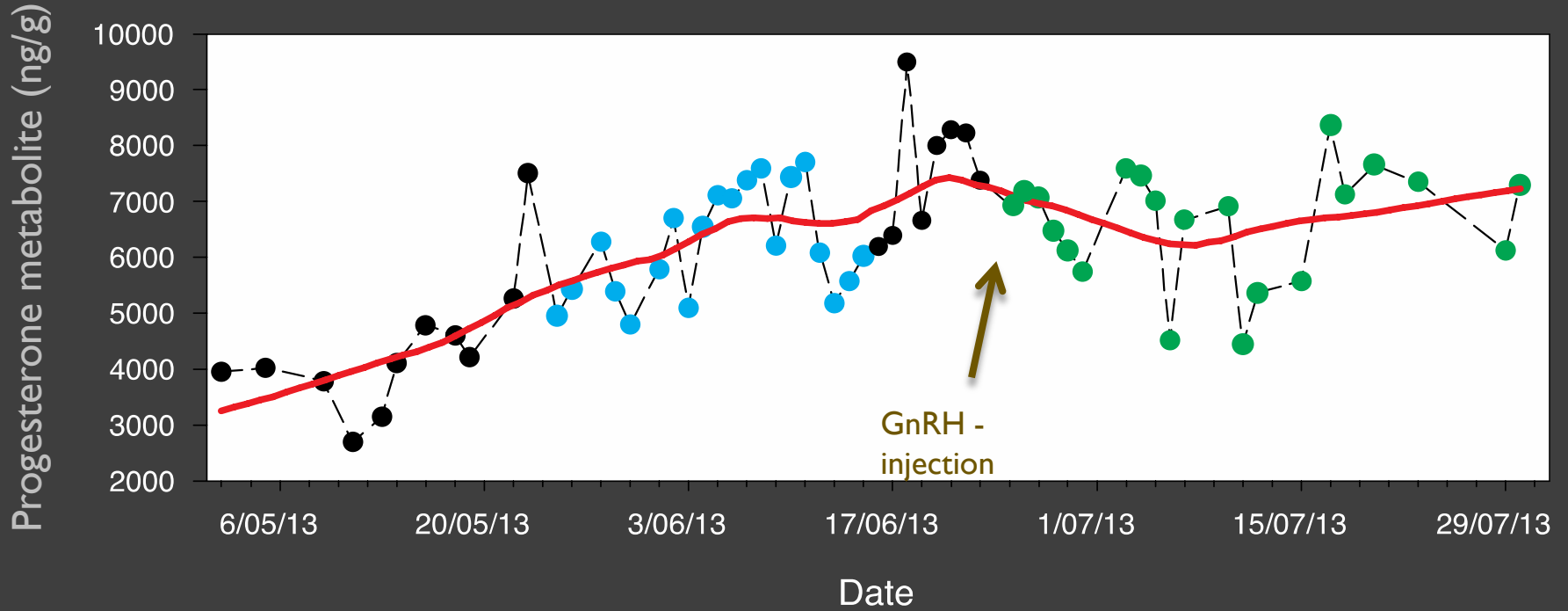
FECAL PROGESTAGENS



FECAL PROGESTAGENS



What we found





CONCLUSION & DISCUSSION

- ❖ No mating / estrus behavior detected
- ❖ Fecal P did show synchronized luteal activity
- ❖ To improve this study we need to:
 1. Replicate samples (2-3 x sample) to avoid test errors
 2. Replicate Regu-mate treatment in one individual (without GnRH)
 - ▶ “nothing” – “regu-mate” – “nothing” – “regu-mate” – “GnRH”
 3. A longer “post-GnRH” fecal sample collection period
 4. Frequent ultrasound
 5. More individuals
 6. Fine-tune doses used and timing

South-East Zoo Alliance
for Reproduction &
Conservation (SEZARC)

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Jacksonville Zoo

Birmingham Zoo

Gabby, Laptop & Ajabu

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University of Western Australia

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Institute for Breeding Rare &
Endangered African Mammals

THANK YOU

