



Results from two decades of reproductive steroid monitoring in white rhinoceroses kept in European zoos

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Goeritz F, Hildebrandt TB, Robert Hermes



Structure of this presentation

- Preconditions – the EEP population
 - Possibilities for monitoring
- Monitoring results
- Management suggestions

Between 1993 – 2010

the White rhino EEP

Population increased

from 175 to 250

animals



European
White Rhino **Studbook**
CERATOTHERIUM SIMUM



2009

Current until 31-12-2009

Compiled by:

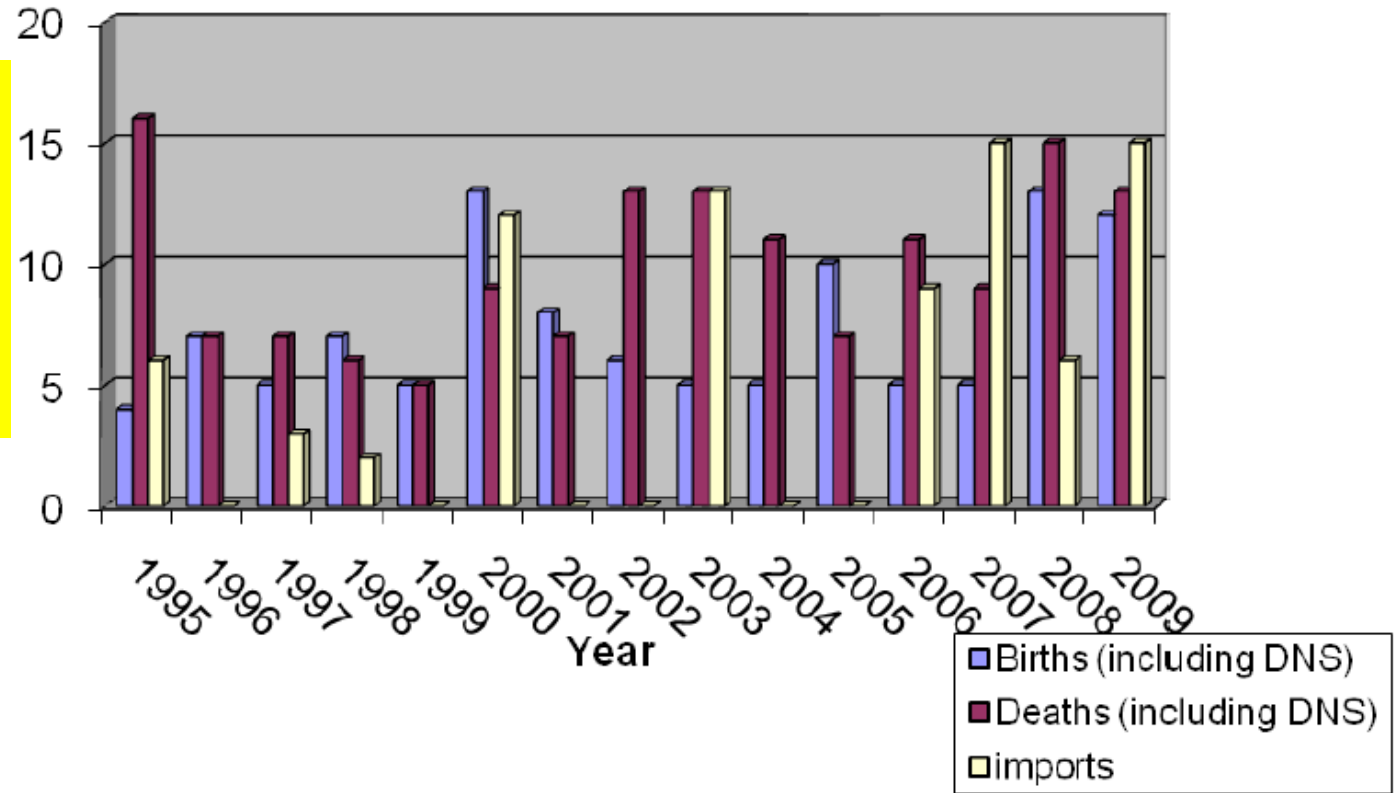
Lars Versteeg

Safaripark Beekse Bergen

The White rhino EEP Population is not self-sustainable

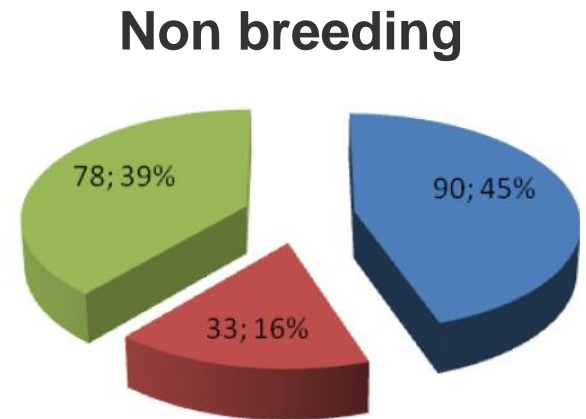
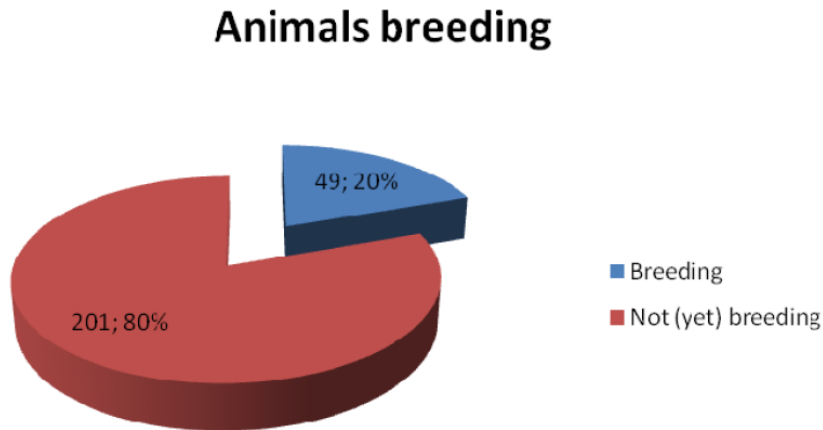
Number of births, deaths and imports 1995-2010

~ 110 birth
~ 145
deaths
~ 80 imports



The major problem is the lack of breeding

From the 250 white rhino in the EEP
20% (49 animals; = 17 males and 32 females)
is currently breeding and .



Age classes

< 10y (n=90); 45 %

10 – 20y (n=33); 16%

> 20y (n=78) 39%

Consequences of not breeding successfully → Development of reproductive pathologies in males and females



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Theriogenology 63 (2005) 219–238

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Reproductive soundness of captive southern and northern white rhinoceroses (*Ceratotherium simum simum*, *C.s. cottoni*): **evaluation of male genital tract morphology** and semen quality before and after cryopreservation

Robert Hermes^{a,*}, Thomas Bernd Hildebrandt^a, Steffen Blottner^a, Christian Walzer^b, Sandra Silinski^b, Marilyn L. Patton^c, Gudrun Wibbelt^a, Franz Schwarzenberger^d, Frank Göritz^a

The effect of long non-reproductive periods on the genital health in captive **female white rhinoceroses** (*Ceratotherium simum simum*, *C.s. cottoni*)

Robert Hermes^{a,*}, Thomas Bernd Hildebrandt^a, Christian Walzer^b, Frank Göritz^a, Marilyn L. Patton^c, Sandra Silinski^d, Matt J. Anderson^c, Catherine E. Reid^a, Gudrun Wibbelt^a, Kristina Tomasova^c, Franz Schwarzenberger^f

Experience from 2 decades of faecal steroid analysis

■ Faecal samples

- From 51 institutions
- ~ 120 female white rhinos
- ~ 24,000 samples



Animal Reproduction Science 53 (1998) 173–190

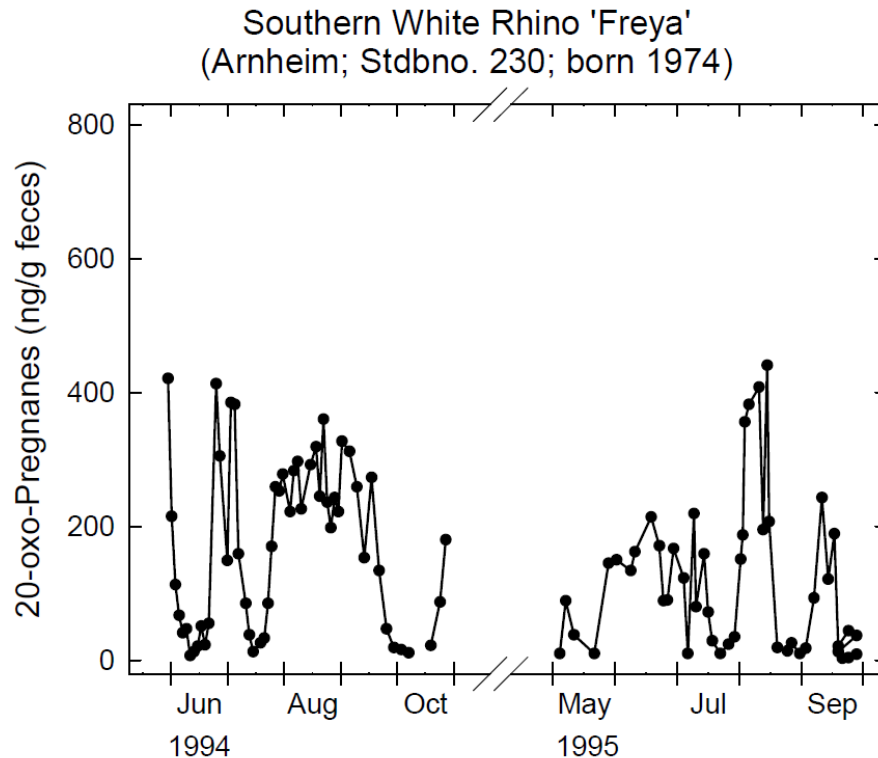
ANIMAL
REPRODUCTION
SCIENCE

Faecal progesterone metabolite analysis for
non-invasive monitoring of reproductive function in
the white rhinoceros (*Ceratotherium simum*)

F. Schwarzenberger ^{a,*}, C. Walzer ^b, K. Tomasova ^c, J. Vahala ^c,
J. Meister ^d, K.L. Goodrowe ^e, J. Zima ^f, G. Strauß ^g, M. Lynch ^h

Ovarian activity and Oestrous cycle length

*Schwarzenberger et al.
Anim. Reprod. Sci. 1998*

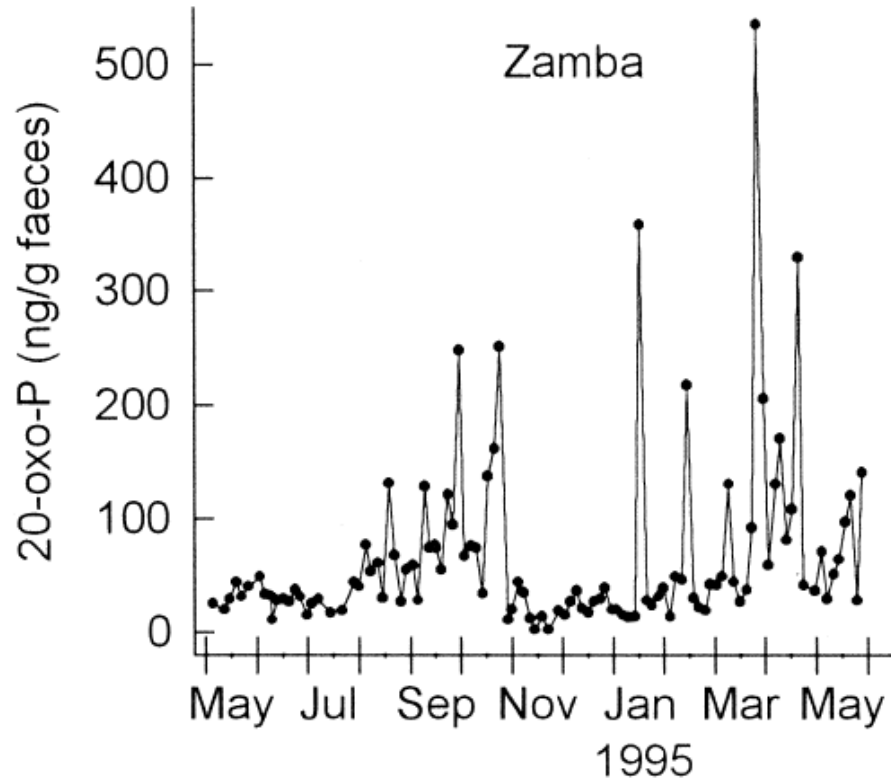


Categories of ovarian activity:

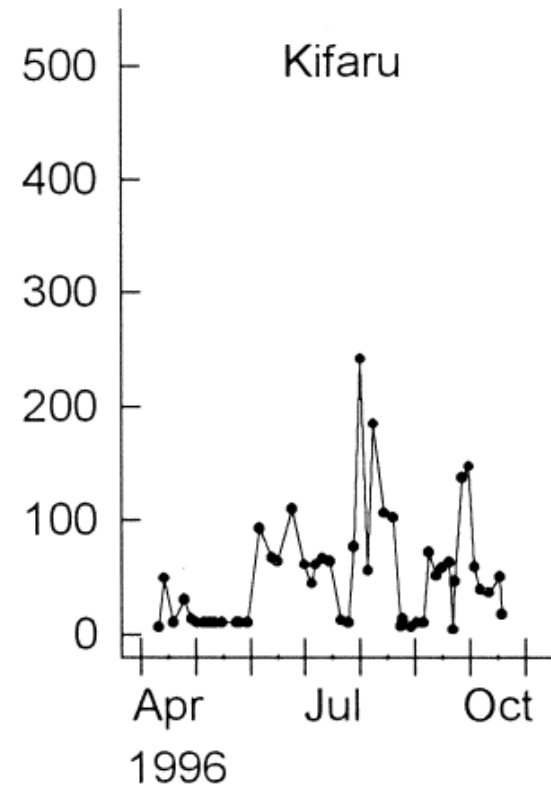
- Oestrous cycles (**35 or 70 days**)
- **Persisting luteal activity**, but no cyclicality
- Missing luteal activity - **flatliners**

Persisting luteal activity

Stdbk.# 209; wild born 1970



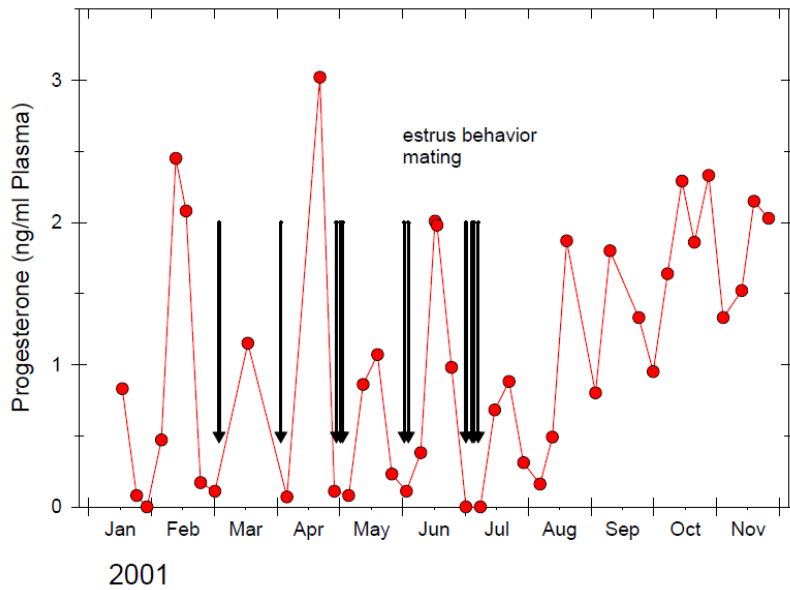
Stdbk.# 773; captive born 1982



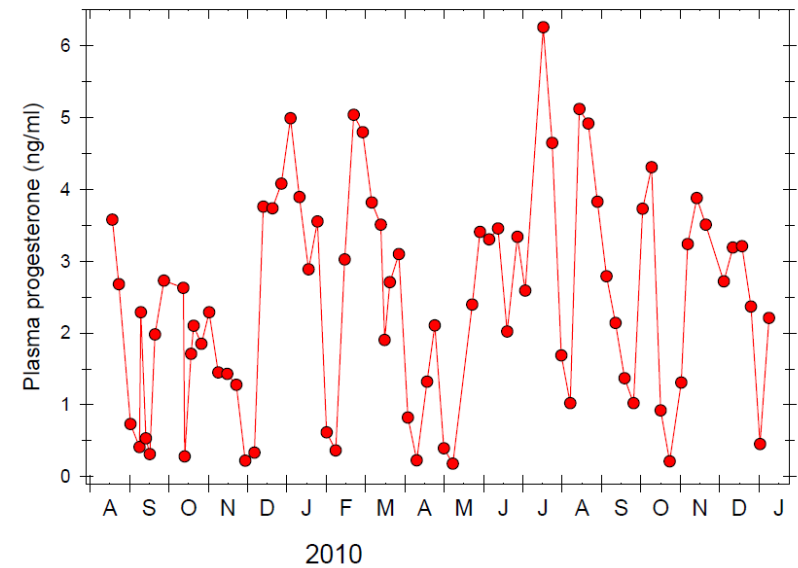
Schwarzenberger et al.; Anim. Reprod. Sci. 1998

Oestrous cycle monitoring – blood samples

White Rhino Sabie (Perth Zoo, Australia)
Stdbk.# 1283; wildborn 1995



White Rhino 'Lulu' (Budapest)
Stdbk.# 902; wildborn 1980



Structure of this presentation

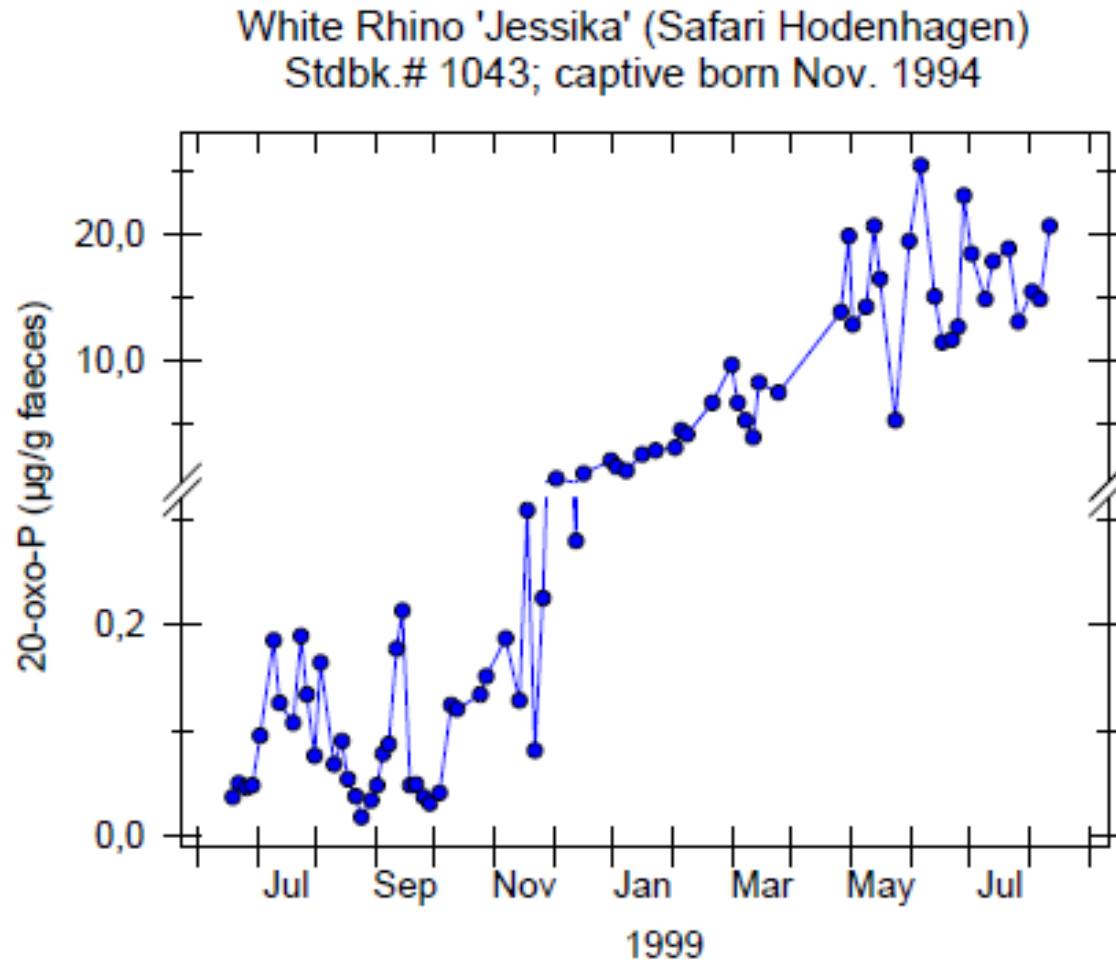
- Preconditions – the EEP population

Possibilities for monitoring

- **Monitoring results**

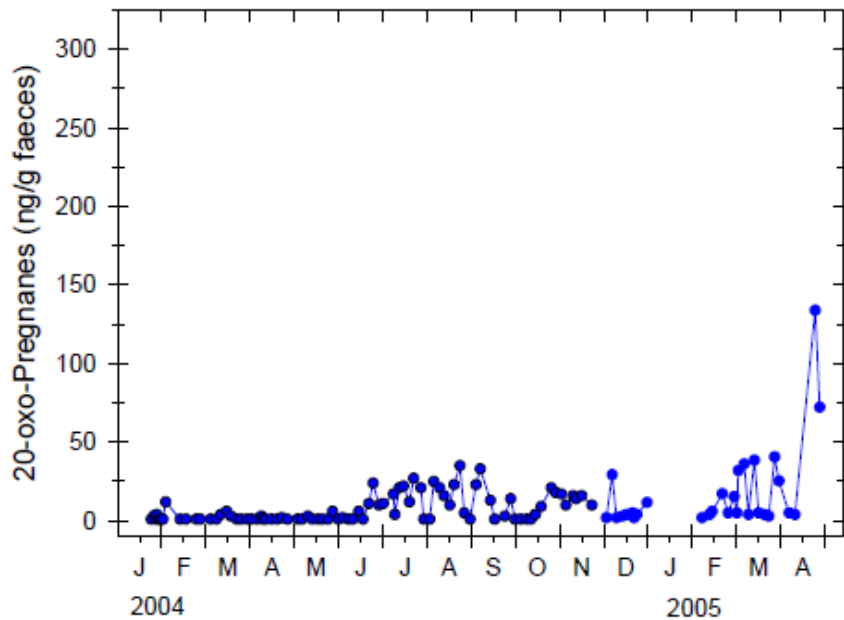
- Management suggestions

What is the 'normal' length of the oestrous cycle: 35 or 70 days?

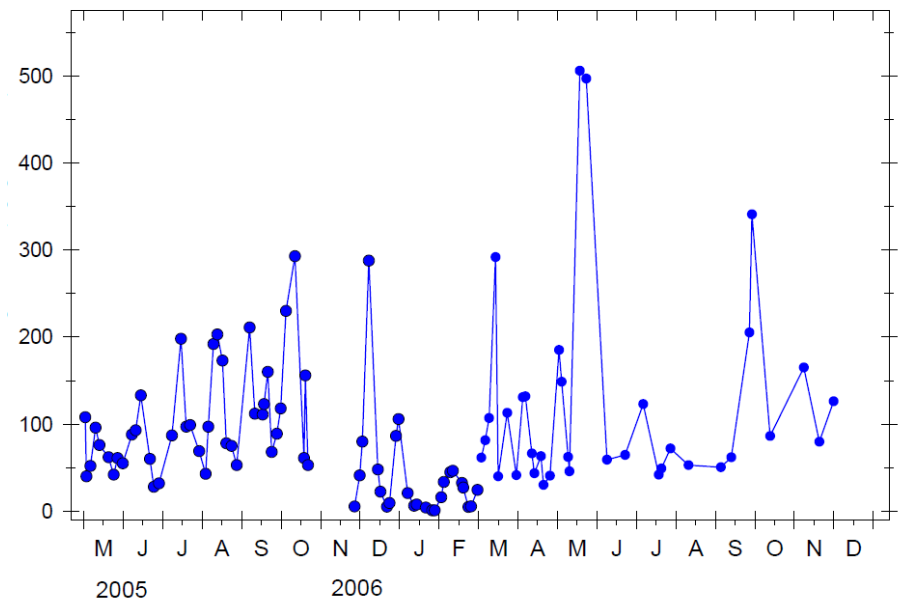


How do ovarian cycles in young rhino cows develop

White Rhino 'Emily' (Colchester)
Stdbk.# 1457; wildborn 2000



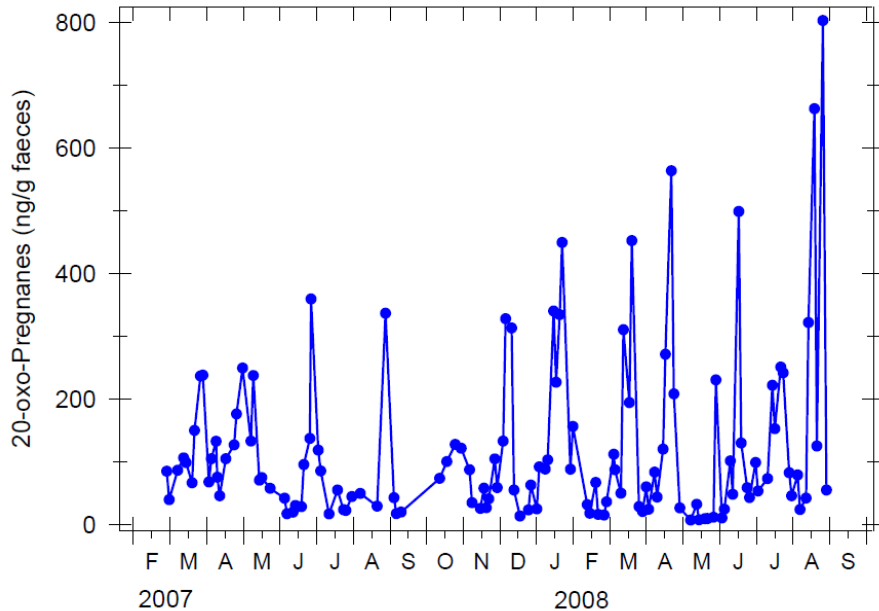
White Rhino 'Emily' (Colchester)
Stdbk.# 1457; wildborn 2000



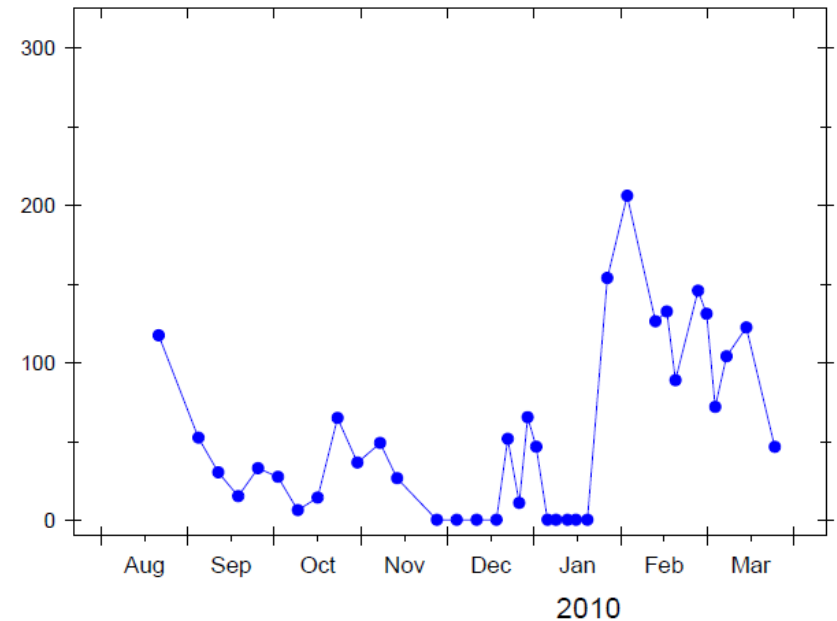
Age: 4 – 6 years

How do ovarian cycles in young rhino cows develop

White Rhino 'Emily' (Colchester)
Stdbk.# 1457; wildborn 2000



White Rhino 'Emily' (Colchester)
Stdbk.# 1457; wildborn 2000



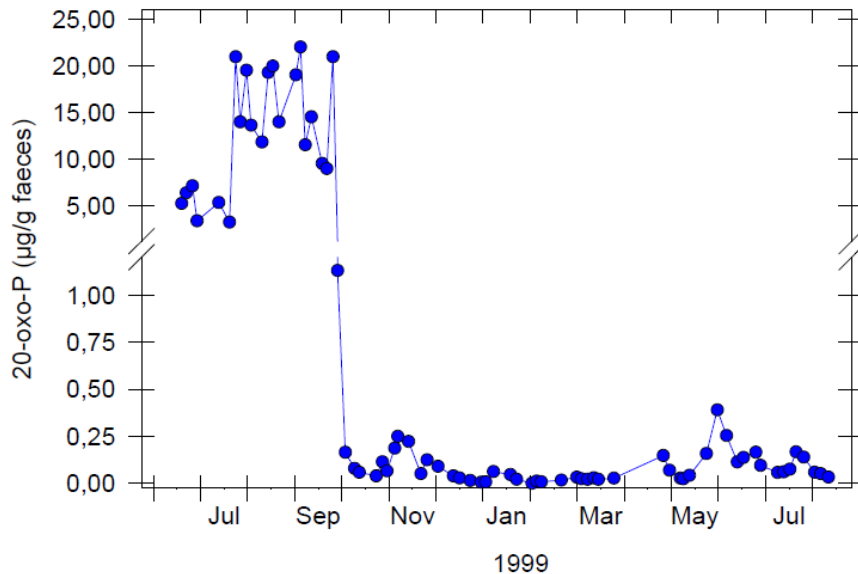
Age: 7 – 10 years

How will ovarian activity in adult rhino cows develop?

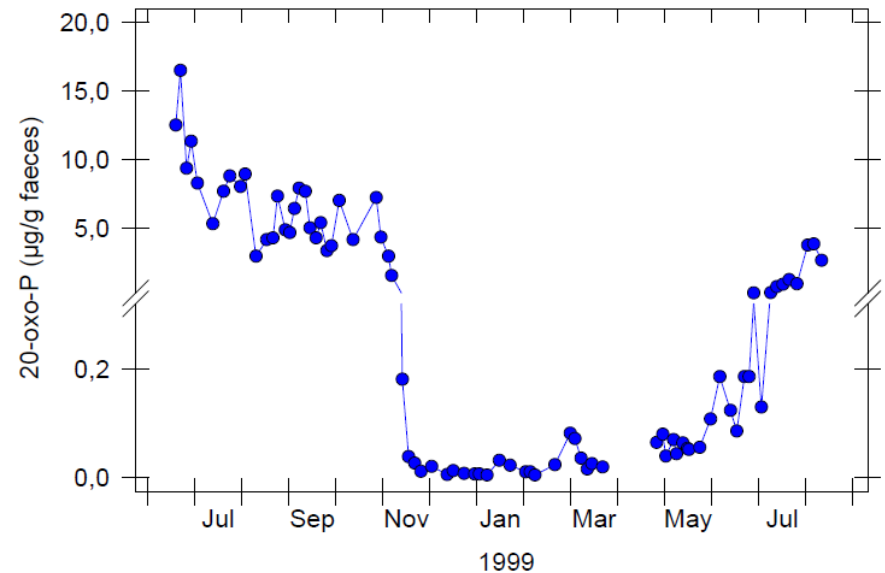


Breeding rhino cows will be fertile throughout their lifespan – Endocrinology in pregnant 30 year old cows

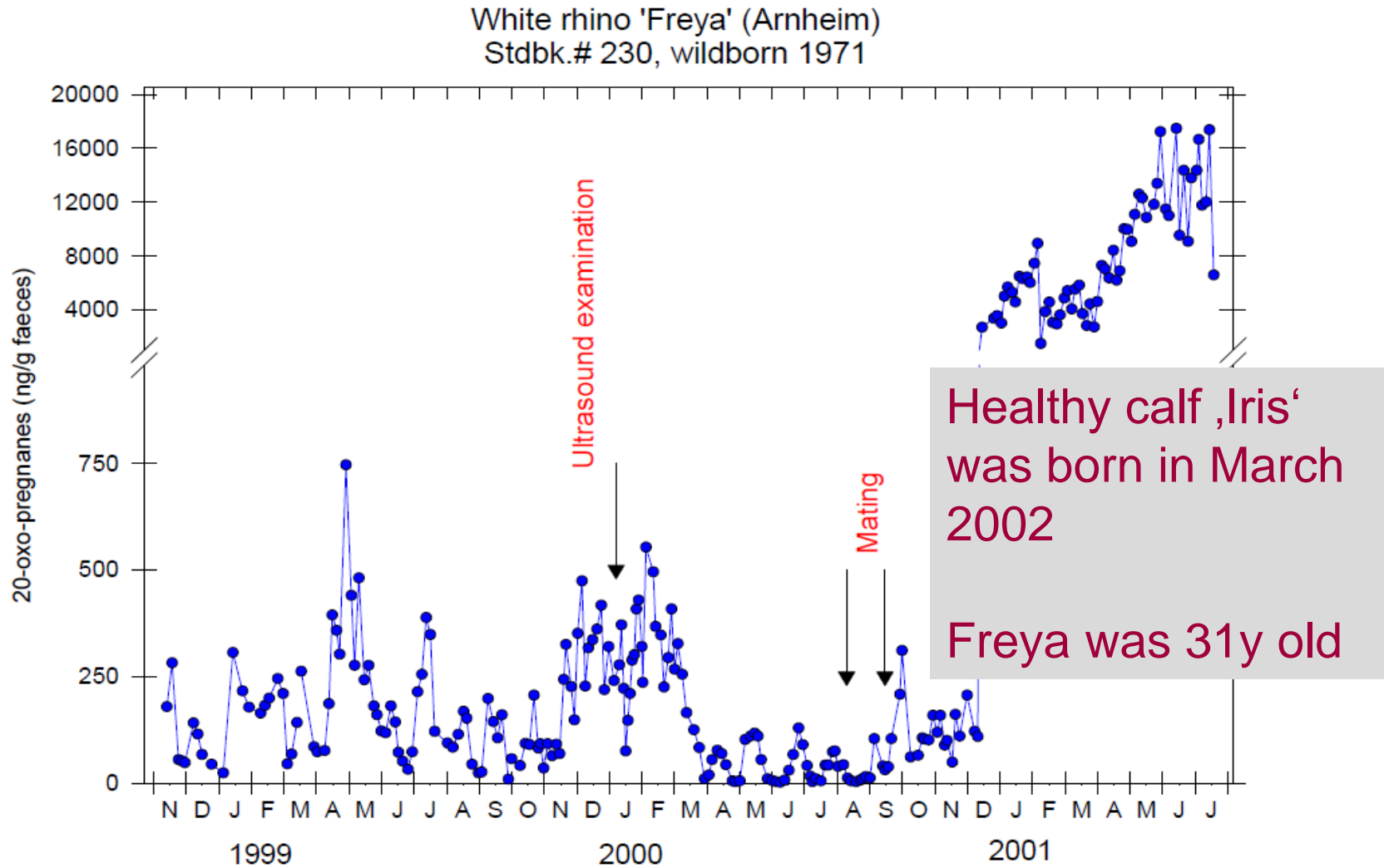
White Rhino 'Doris' (Safari Hodenhagen)
Stdbk.# 494; wildborn 1969



White Rhino 'Molly' (Safari Hodenhagen)
Stdbk.# 496; wildborn 1969

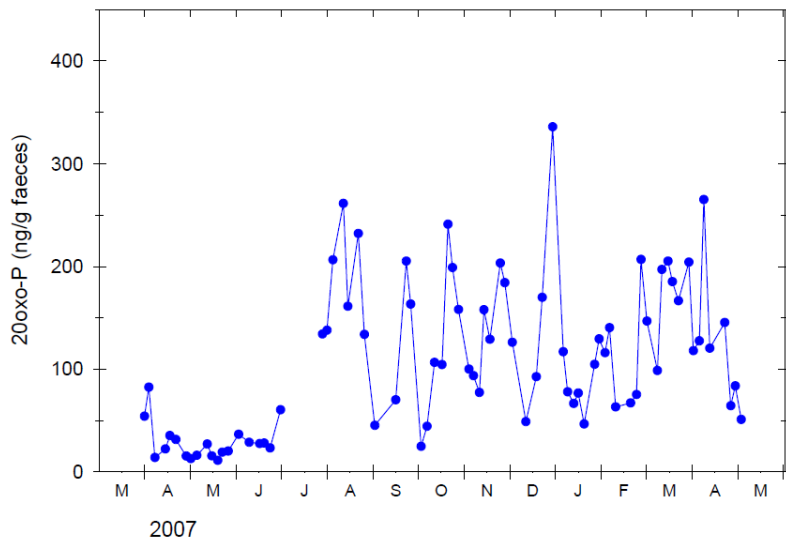


Case report: Freya (born in 1971) had a calf in 1979; no further calf was born for the following 21 years

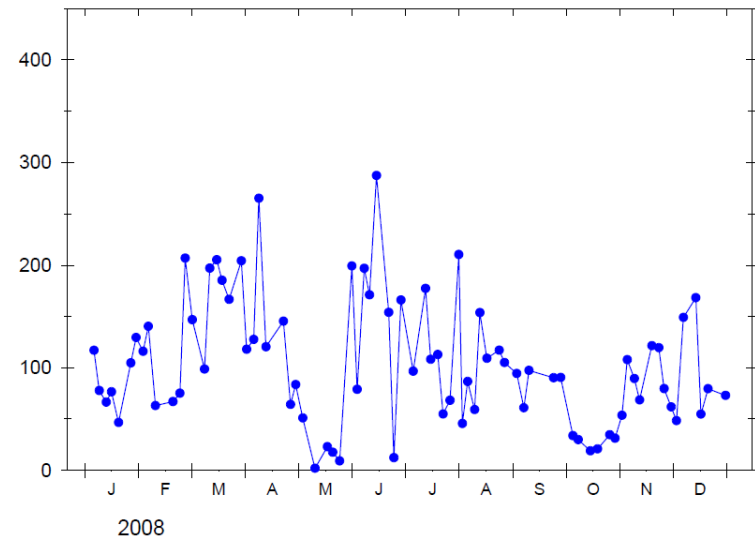


Freya at the age of 36, 37 years

White rhino 'Freya' (Arnheim)
Stdbk.# 230, wildborn 1971

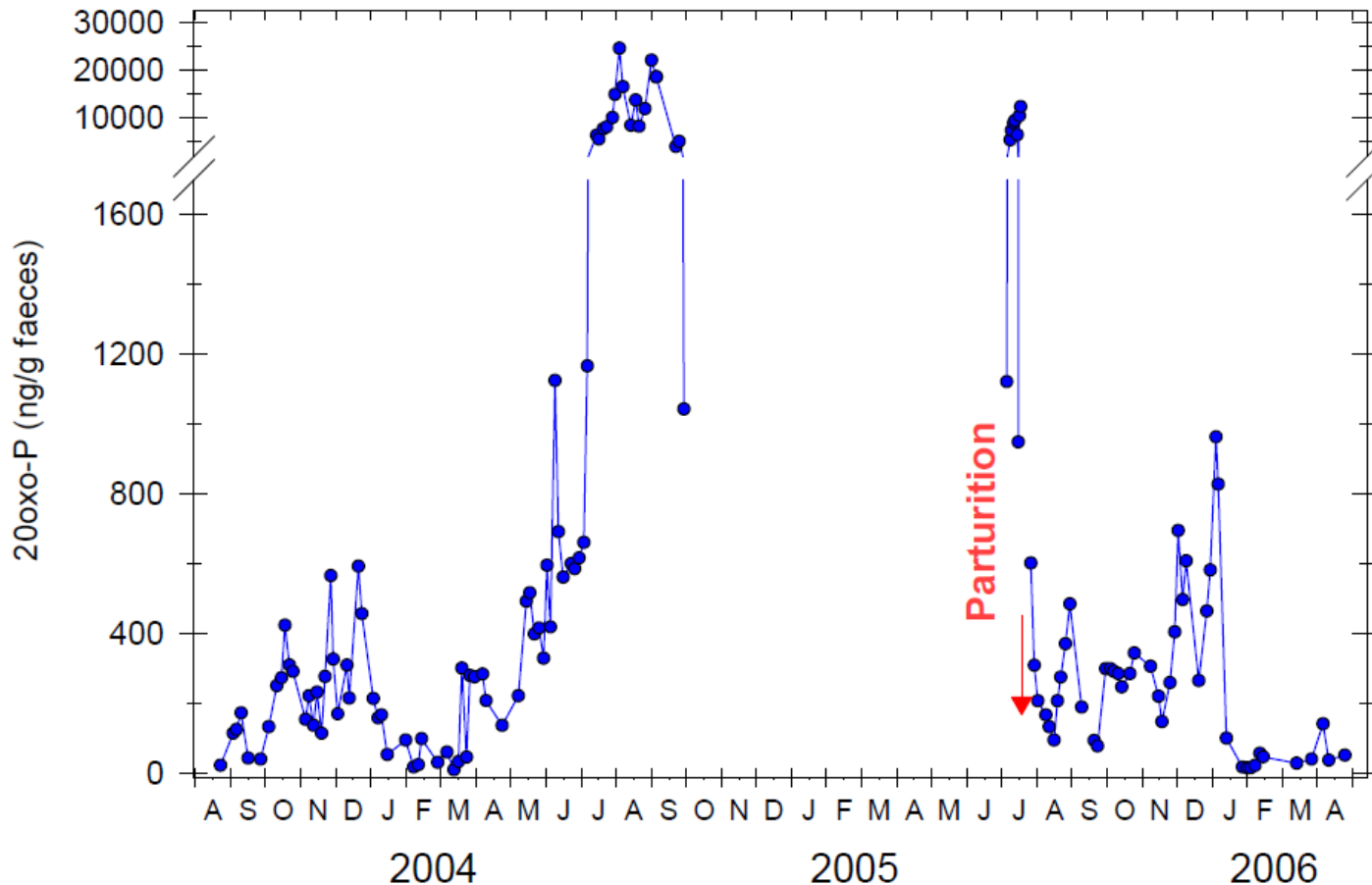


White rhino 'Freya' (Arnheim)
Stdbk.# 230, wildborn 1971



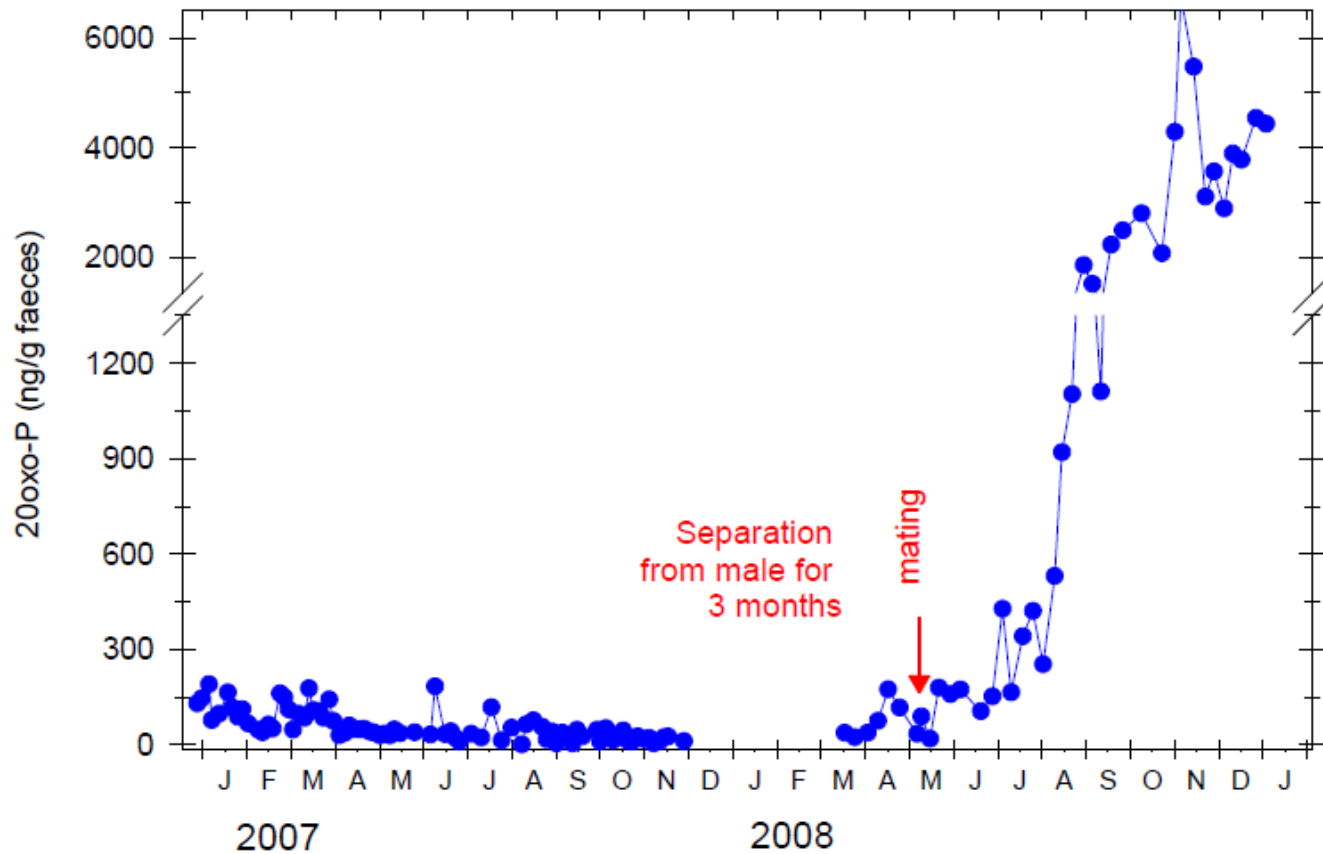
Case report: Emmy had calves in 2000, 2005, 2009 and 2011

White rhino 'Emmy' (Zoo Münster)
Stdbk. #967; captive born Oct. 1990

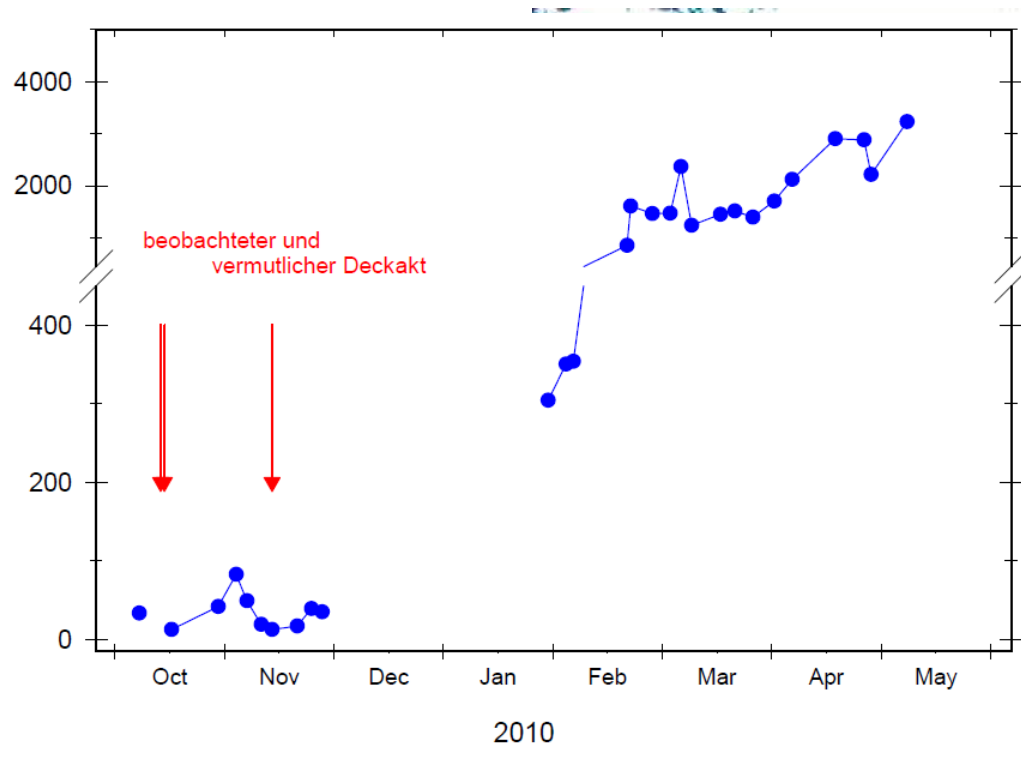


Emmy: separation within the zoo for about 3 months

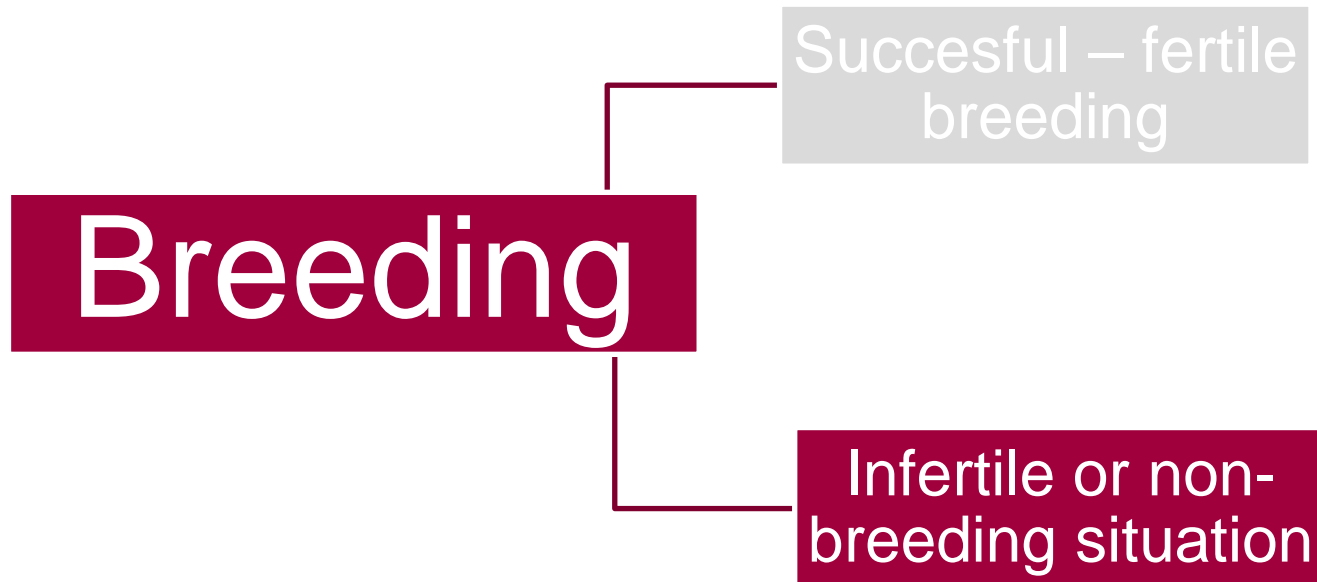
White rhino 'Emmy' (Zoo Münster)
Stdbk. #967; captive born Oct. 1990



Emmy post partum Oct and Nov 2009

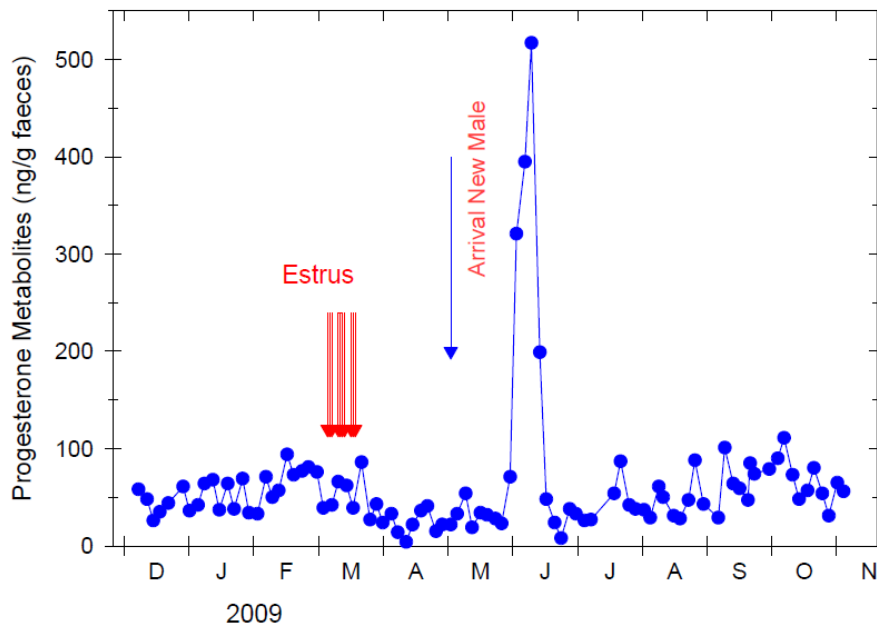


How will ovarian activity in adult rhino cows develop ?

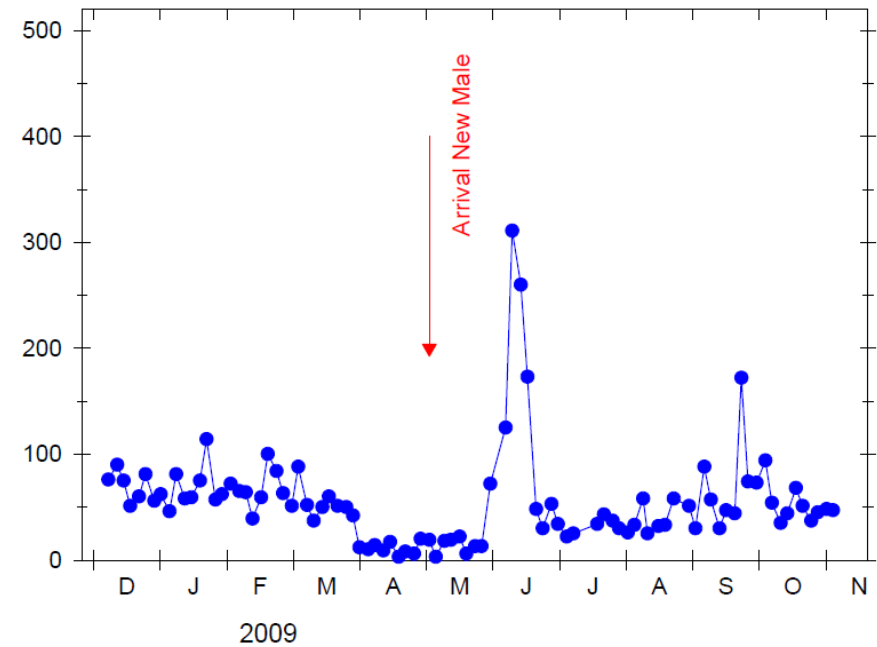


Amneville, France – arrival of new male ,Manzy' and ,Tswanee' at the age of 9

White Rhino 'Manzy' (Zoo Amneville)
Stdbk.# 1444; wild born 2000

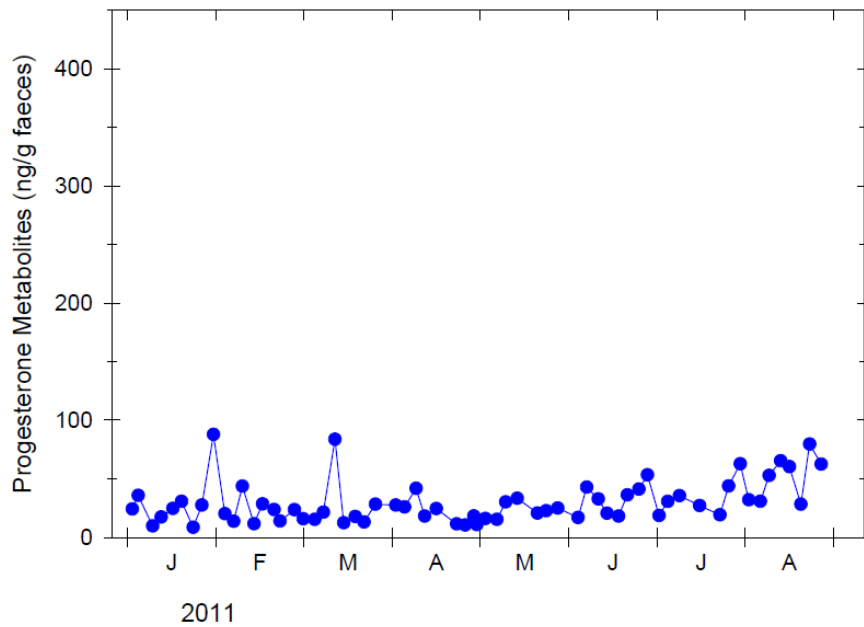


White Rhino 'Tswanee' (Zoo Amneville)
Stdbk.# 1445; wild born 2000

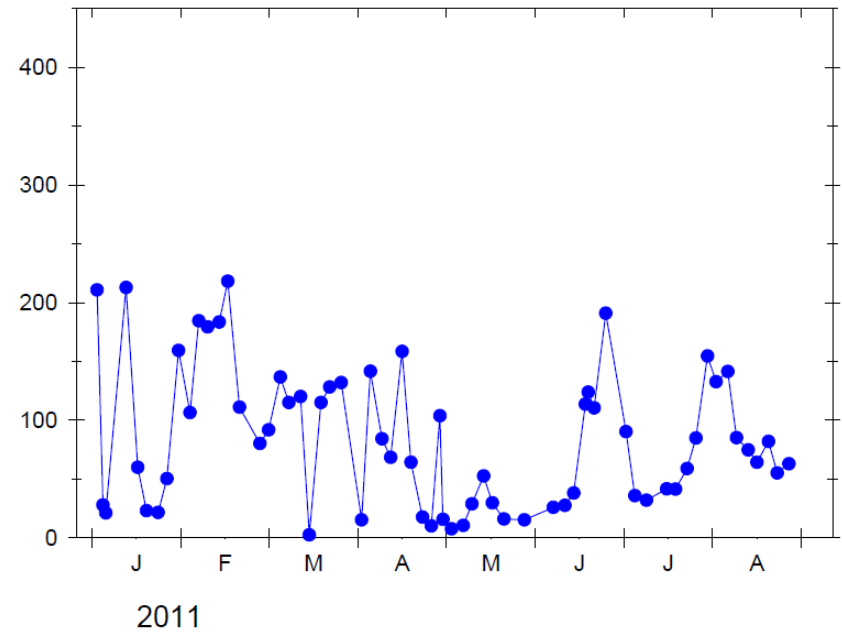


'Manzy' and 'Tswanee' at the age of 11

White Rhino 'Manzy' (Zoo Amneville)
Stdbk.# 1444; wild born 2000

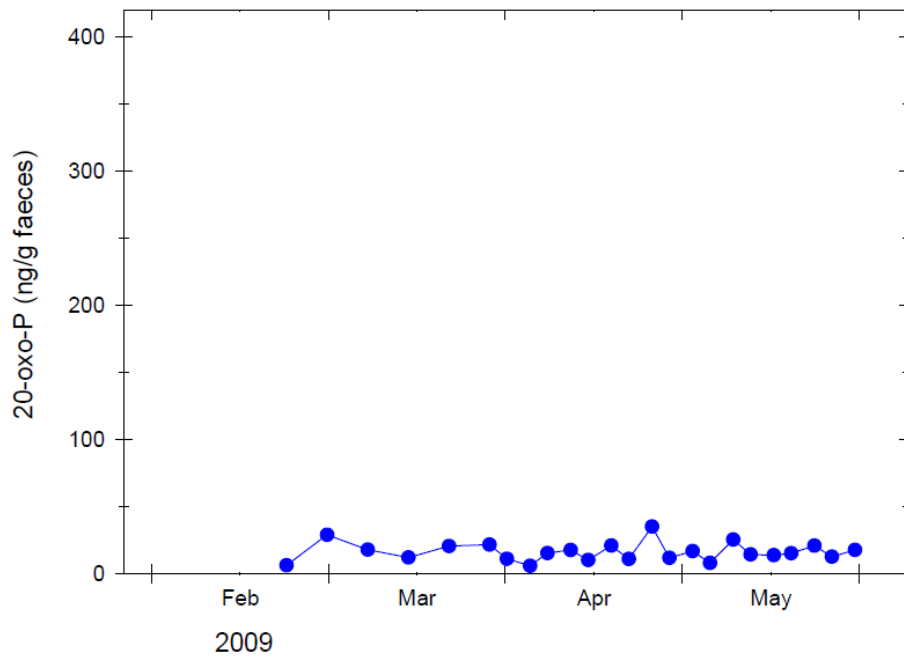


White Rhino 'Tswanee' (Zoo Amneville)
Stdbk.# 1445; wild born 2000

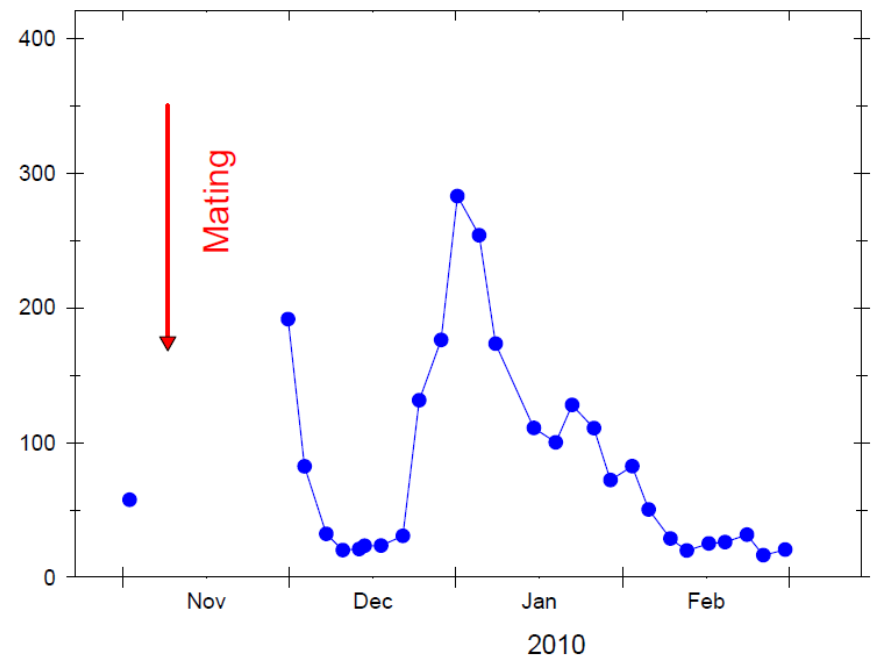


'Marashi' and 'Razina', Longleat Safari, UK, at the age of 10

White Rhino 'Marashi' (Longleat Safari, UK)
Stdbk.# 1545; wildborn 1999

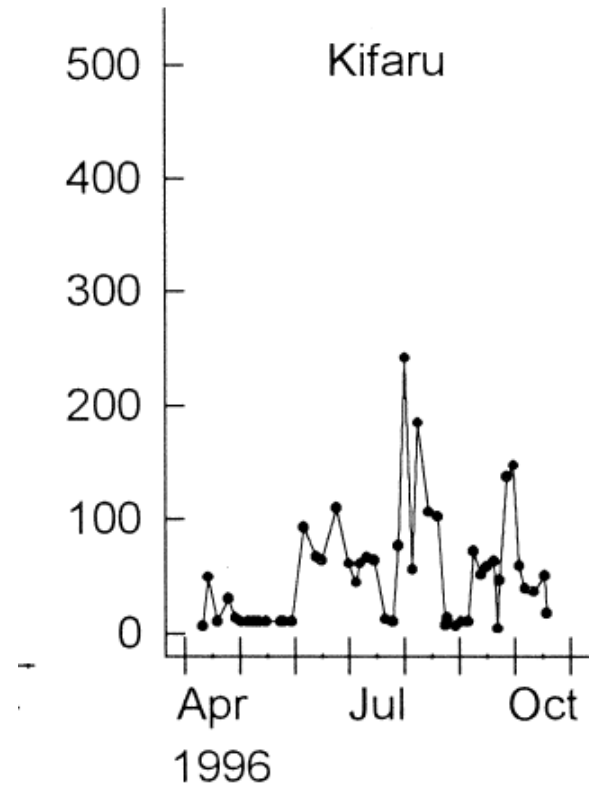


White Rhino 'Razina' (Longleat Safari, UK)
Stdbk.# 1551; wildborn 2000



Persisting luteal activity in Kifaru at age 14

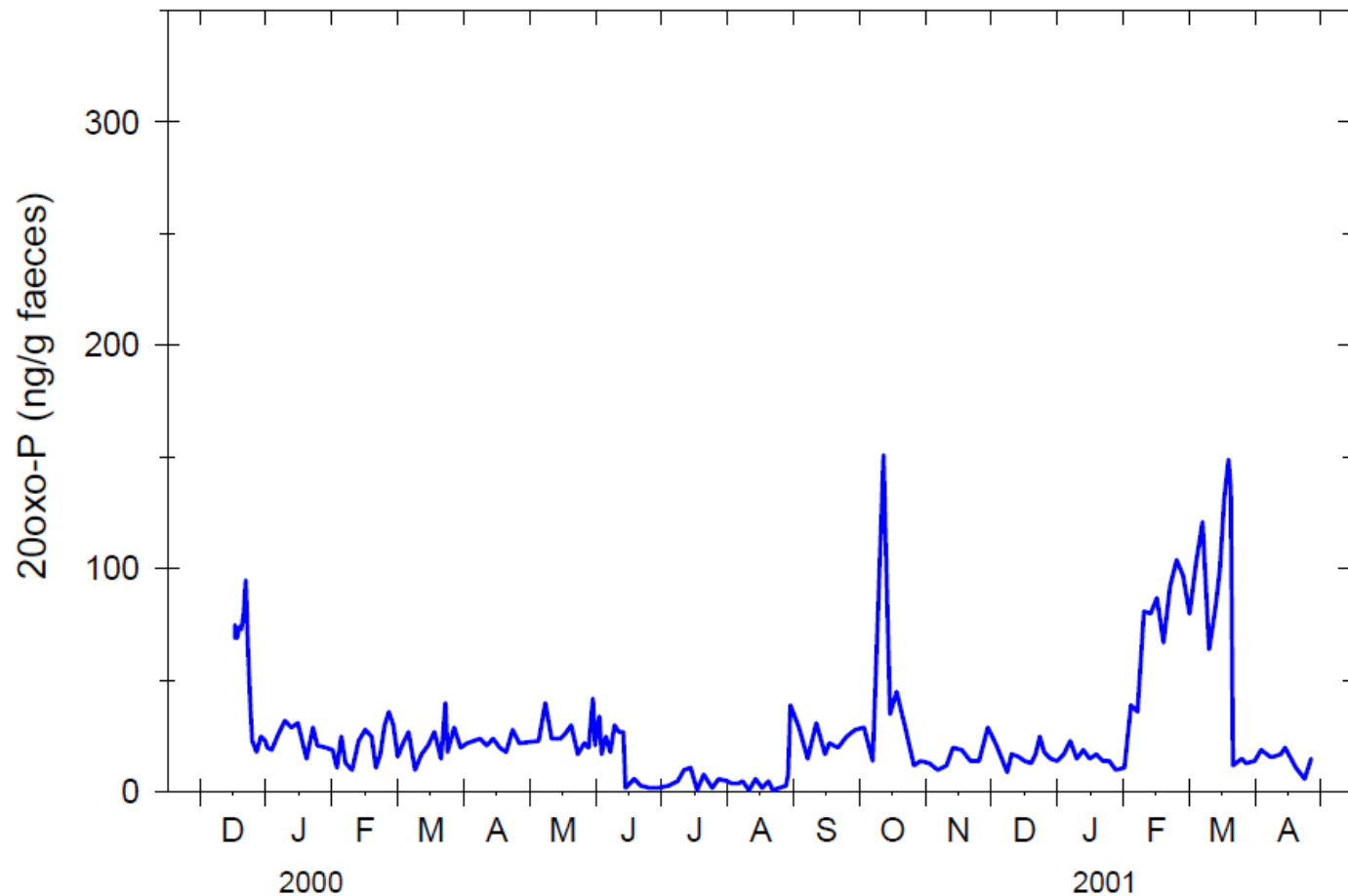
Stdbk.# 773; captive born 1982



Schwarzenberger et al.; Anim. Reprod. Sci. 1998

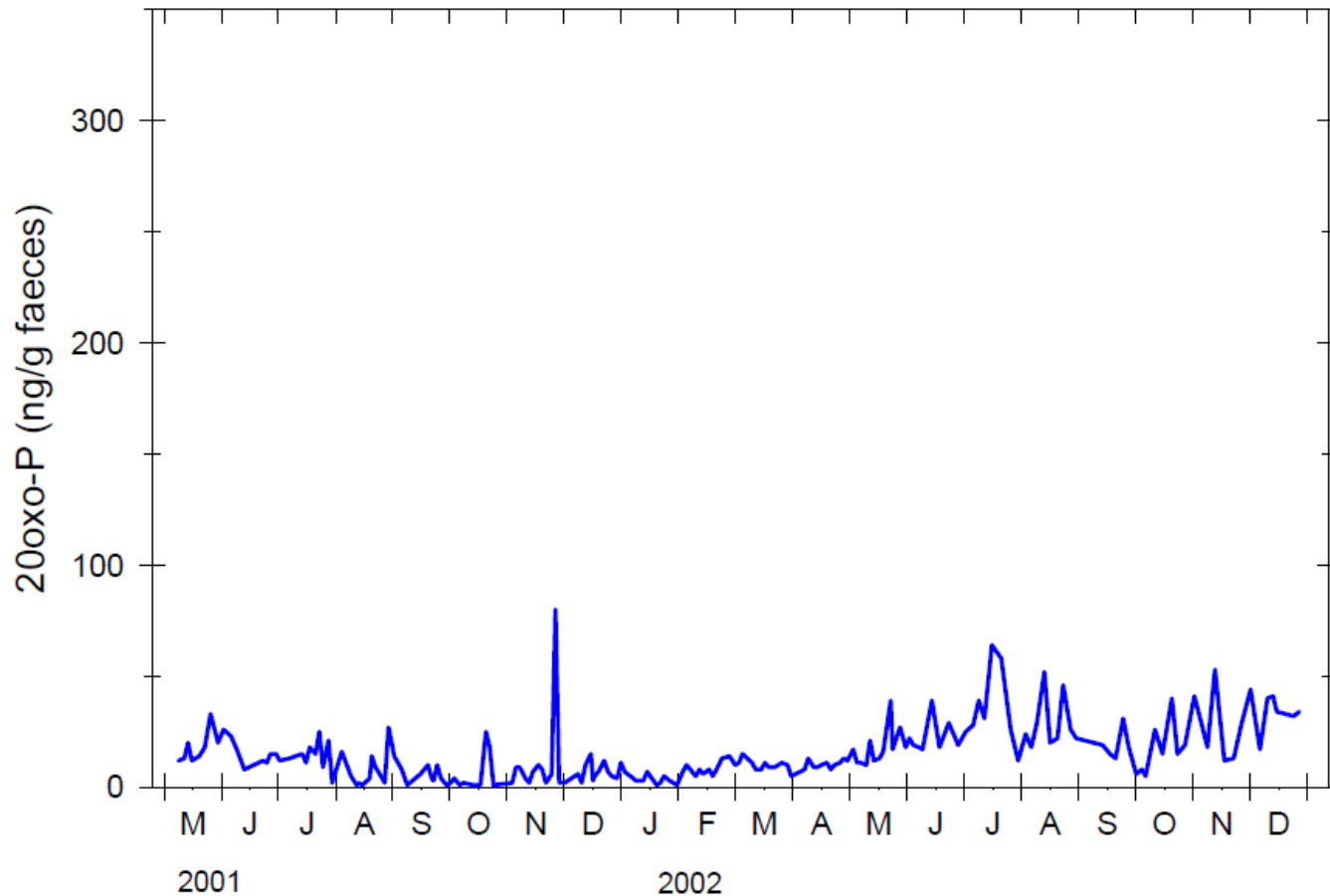
‘Kifaru’, Salzburg zoo, at the age of 18 years +: persisting luteal activity

White Rhino 'Kifaru' (Salzburg zoo)
Stdbk.# 773; captive born 1982



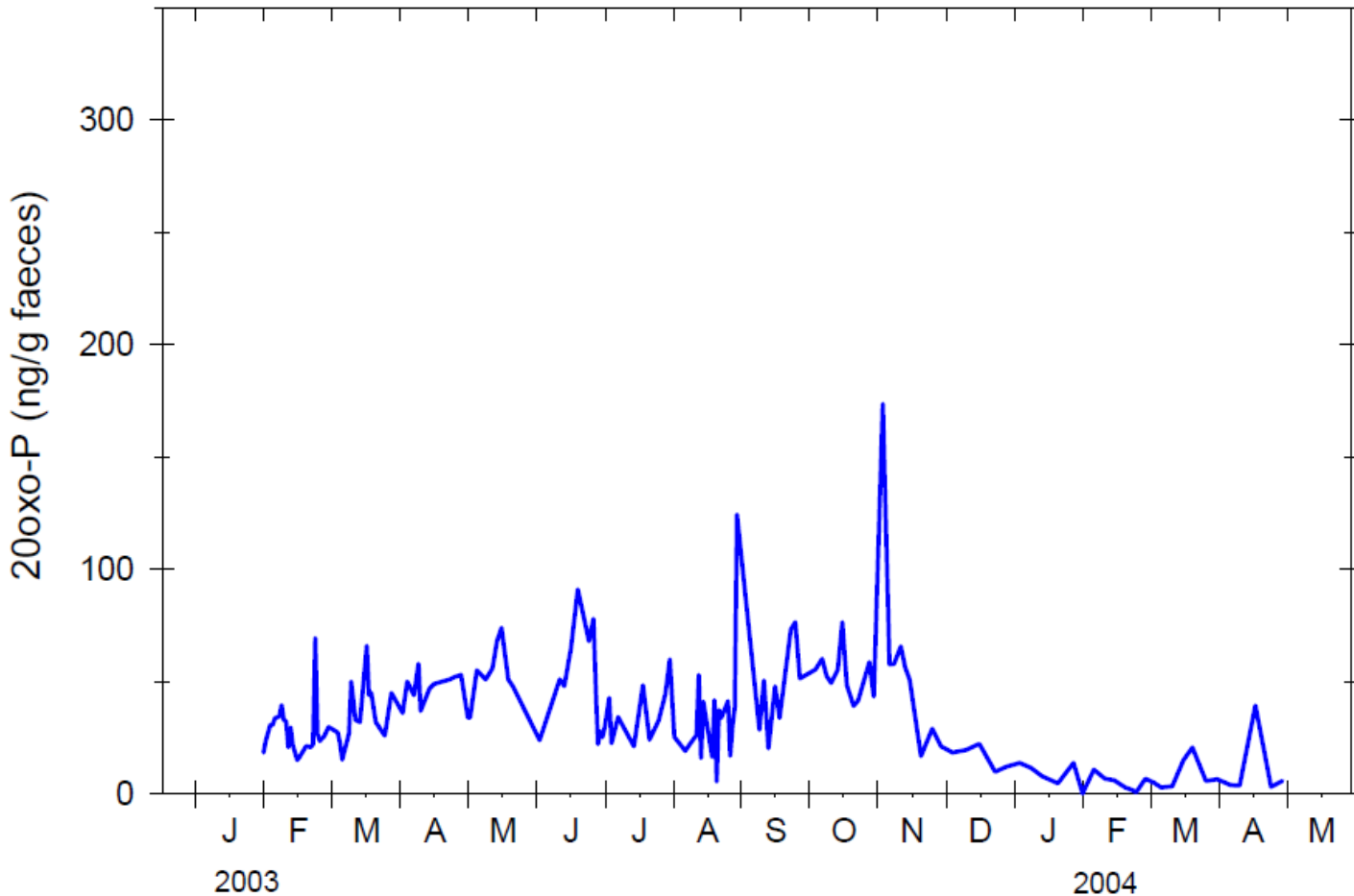
„Kifaru“, Salzburg zoo, at the age of 20 years: persisting luteal activity

White Rhino 'Kifaru' (Salzburg zoo)
Stdbk.# 773; captive born 1982



„Kifaru“, Salzburg zoo, at the age of 21 years +: persisting luteal activity

White Rhino 'Kifaru' (Salzburg zoo)
Stdbk.# 773; captive born 1982





<http://www.muzic-world.com>

Management suggestions

Management suggestions

- Faecal monitoring in combination with ultrasonography is a very helpful diagnostic tool
- Puberty in white rhinos is at around 5 years
- Every effort should be undertaken to successfully breed white rhinos between 6 – 9 years of age
- **Every effort** means even moving imported females to other institutions for breeding purpose

Thank you for your attention !



Answers to questions raised in the abstract?

- Oestrous cycle length
- Development of ovarian cycles in subadult cows
- Development of reproductive pathologies

- Move animals to other institutions
- Reproductive seasonality
- Keep animals in groups
- Stress hormones





Überschrift



