

## Fragmenta Theriologica

### Induction of Ovulation in the Beaver Outside the Normal Breeding Season

Wywoływanie owulacji u bobra poza sezonem godowym

Wirgiliusz ŻUROWSKI & Teresa DOBOSZYŃSKA

Żurowski W. & Doboszyńska T., 1977: Induction of ovulation in the beaver outside the normal breeding season. Acta theriol., 22, 8: 151—153 [With 1 Table & Plate IV].

In 5 experiments on the application of *PMSG* and *HCG* to beavers outside the mating season, administered according to the following formula: 150 IU of *PMSG*+150 IU *PMSG* on the 4th day+300 IU of *HCG* on the 5th day a classic vaginal cycle was obtained in 5 females, of which 3 copulated. The experiments concerning the use of prostoglandine  $F_2$   $\alpha$  did not give positive results, a vaginal cycle and copulation were not obtained. A small number of experiments made it impossible to draw conclusions.

[Popielno Res. Stat., Polish Acad. Sci., 12-222 Wejsuny, Popielno, and Agric. Tech. Acad., Inst. Vet. Sci., 10-957 Olsztyn, Poland].

Beavers fall within the group of animals with a seasonal breeding period and a long — about 5 month — time of reproductive inactivity (Żurowski & Doboszyńska, 1975). In farm breeding it would be interesting to provoke oestrus and mating in this period. In the Popielno Research Station were undertaken investigations concerned with a hormonal stimulation of oestrus and ovulation outside the normal mating season. 45 experiments were conducted with the use of gonadotropic hormones (Doboszyńska & Żurowski, 1975) before obtaining positive results in five experiments (Table 1). Gonadotropic hormones were introduced in form of intramuscular injections. Those experiments were carried out under the control of vaginal smears.

Experiments number 1, 3 and 5 presented in Table 1 were began in the anoestrus phase. In experiments no 1 and 5 after administering the gonadotrophic hormones in the smears were ascertained considerable quantities of fresh parabasal and intermedial cells, leucocytes and a fibrous mucus, what clearly indicated a proestrus stage. On the third and fourth day after the last injection the smears demonstrated a classical picture of oestrus and in the case of female No. 39 copulation was observed, confirmed by the presence of spermatozoons in the smear. In experiments no 2, 3 and 4, on the second day after a *HCG* injection the smears, beside intermedial and parabasal cells, demonstrated flakes of



peeling superficial cells with a diminished number of leucocytes. On the following day a typical proestrus phase appeared, lasting for 4—7 days. Next occurred a very clear oestrus phase, lasting 2—3 days, during which females Nos 38 and 39 copulated (Fig. 1).

Experiments were also conducted outside the mating season with the use of prostaglandine  $F_2$  alfa (Equimate I.C.I. 81.008, Imperial Chemical Industries Limited). It was assumed that the combination of prostoglandine  $F_2$  alfa (Downey, 1974) with gonadotropic injection will eliminate the low fertility often accompanying such experiments carried out on domestic animals. In three cases prostaglandine was administered to females after provoking the oestrus by gonadotropic hormones. Female No. 111 received on the third day after oestrus (21 June 1975) 12.5 microgrammes of  $F_2$  alfa. Seven days later the smears demonstrated a clear oestrus picture, which lasted for 1 day. No external demonstration of oestrus or copulation were observed. After three days of a correct metaestrus there appeared symptoms of disintegration of all the cells on the smear, visible

Table 1  
Doses (IU) of hormones administered.

No. of exper.	No. of females	PMSG				HCG		The recorded date of	
		date	dose	date	dose	date	dose	oestrus	copulation
1	39	29 July	150	1 Aug.	150	2 Aug.	300	5/6 Aug.	6 Aug.*
2	38	30 Sept.	150	3 Oct.	150	4 Oct.	300	12/13 Oct.	12 Oct.**
3	111	30 Sept.	150	3 Oct.	150	4 Oct.	300	14/15 Oct.	— **
4	39	8 Nov.	150	11 Nov.	150	12 Nov.	300	19/20 Nov.	19 Nov.***
5	111	8 Nov.	150	11 Nov.	150	12 Nov.	300	16 Nov.	— ***

\* PMSG in 1 injection as Gestyl N. V. Organon-OSS, Holland,

PMSG in 2 injection as Serogonadotropina Biovet. Drwalew, Poland,

\*\* PMSG in both injections as Serogonadotropina,

\*\*\* PMSG in both injections as Prolan A Bayer Leverkusen,

HCG in all the experiments was introduced in form of Biogonadyl Biomed, Lublin, Poland.

were large flakes of thin squama, leucocytes and cell aggregate (Fig. 2). All the elements were eozynophile. This picture remained for 12 days. On the 12th day the female received another 5 microgrammes of  $F_2$  alfa. During the following 11 days the smears did not indicate the occurrence of phases of the vaginal cycle. Female 38, two days after a provoked oestrus (15 October 1975) received 10 microgrammes of  $F_2$  alfa. The smears demonstrated all types of epithelium cells, leucocytes and small quantities of mucus. The smear was utterly eozynophile. On the 7th day after the last injection another 20 microgrammes of  $F_2$  alfa were administered. The reaction of the smear changed to cyanidophile. In the early stage occurred a disintegration of all the elements as well as cytolysis and phagocytosis. However, no clear phases of a cycle were observed. Female no 111 received 5 microgrammes of  $F_2$  alfa on the day of a prompted oestrus (15 October 1975). During 12 days of observations the picture characteristic for proestrus appeared twice, finishing by a disintegration of cells, cytolysis and phagocytosis. An oestrus cycle was not ascertained.



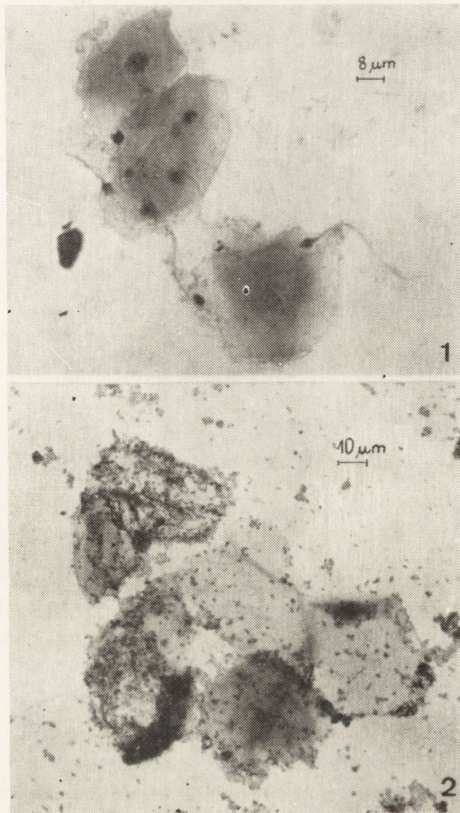


Fig. 1. The female No. 39. The vaginal smear after copulation (6 August 1975).  
Fig. 2. The female No. 111. Cells desintegration after prostoglandine F<sub>2</sub> alfa (5 July, 1975).

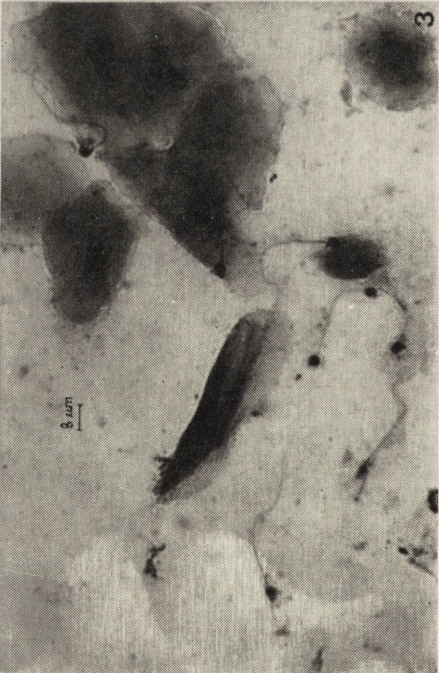
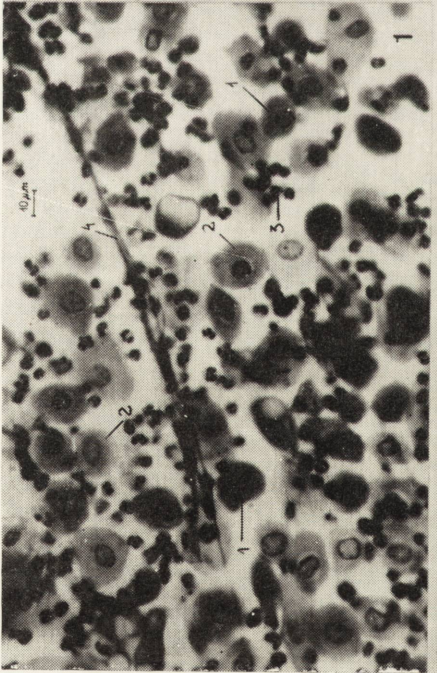
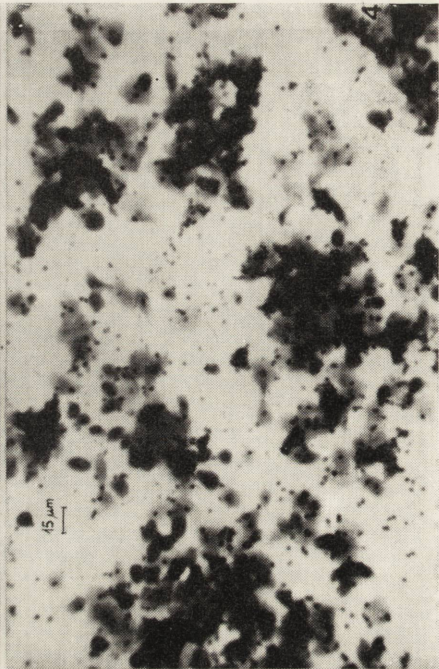
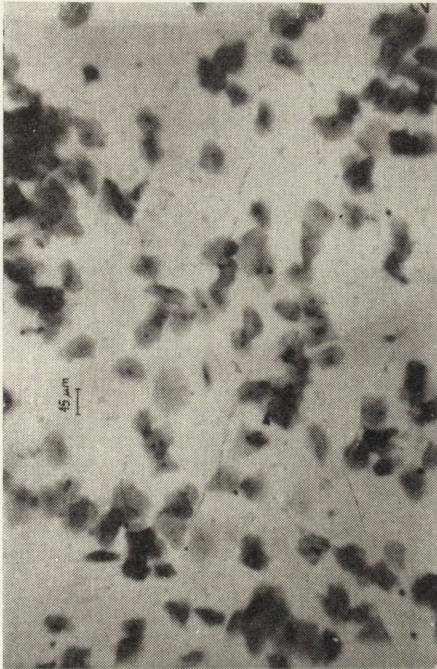
W. Zurowski & T. Doboszyńska

C. Nagięc *phot.*

Explanation of Plate V, (see the next page)

- Fig. 1. The female No. 34 — proestrus (20 January, 1974). In the smear: 1 — parabasal cells, 2 — intermedial cells, 3 — leucocytes, 4 — fibrous mucus.
- Fig. 2. The female No. 34 — oestrus (22 January, 1974). In the smear only superficial cells.
- Fig. 3. The female No. 39 — oestrus (14 January, 1974). The spermatozoons and superficial cells in the smear.
- Fig. 4. The female No. 111 — metaestrus (16 January, 1974). In the smeer appeared intermedial, parabasal and superficial cells. Leucocytes and the superficial cells agglomerated.







Female No. 38 remaining in the metaestrus phase without hormonal stimulation (29 July 1975) received 7.5 microgrammes of  $F_2$  alfa. On the third day after the injection a typical proestrus picture was obtained ending by the appearance of a mass of leucocytes with a considerable number of vacuoles in the cytoplasm, what was succeeded by an incomplete oestrus on the 5th day.

The experiments made it possible to state, that one can prompt the oestrus and copulation in the beaver outside the mating season by way of gonadotropic hormones. The small material used for experiments on prostoglandine  $F_2$  alfa made it impossible to draw conclusions.

#### REFERENCES

- Doboszyńska T. & Żurowski W., 1975: Changes observed in the reproductive tract of a beaver female after high dosages of gonadotropic hormones. Acta theriol. 20, 8: 105—112. Downey B. R., 1974: Control of the estrous cycle with prostaglandins. Vet. Med.—Small Animal Clinician, 69, 7: 880—888. Żurowski W. & Doboszyńska T., 1975: Superfetation in European beaver. Acta theriol. 20, 7: 97—104.

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### Vaginal Smears during a Sexual Cycle of the Beaver

Rozmazy pochwowe w cyklu płciowym bobra

Teresa DOBOSZYŃSKA & Wirgiliusz ŻUROWSKI

Doboszyńska T. & Żurowski W., 1977: Vaginal smears during a sexual cycle of the beaver. Acta theriol., 22, 8: 153—155 [With Plate V].

On 19 females of the European beaver was examined the possibility of applying vaginal smears for diagnosis the generative stages. Ascertained was a complete adequacy of this method. Stained smears made it possible to determine explicitly the occurrence of proestrus, oestrus and metaestrus. Moreover, the occurrence of irregular cycles outside the mating season was stated. A prognosis of cyesis on the basis of smears seems possible in the second half of the pregnancy, but does not give a complete certainty.

[Agric. Techn. Acad., Inst. Vet. Sci., 10-957 Olsztyn, and Inst. Genet. Anim. Breed., Popielno, 12-222 Wejsuny].

Observation on the reproduction of the European beaver (*Castor fiber* Linnaeus, 1758) are, because of their mode of life, very difficult. A knowledge of their reproductive occurrences became necessary when a farm breeding of this species was undertaken. Investigation were started on the utilization of vaginal smears for the diagnosis of generative stages. Because of the specific build of the end part of the generative tract (Gieñc & Doboszyńska, 1972) the smears were taken from the central part of the vagina by a special glass rod protected by a glass