Session 32, Theatre 4, stadnik@af.czu.cz

Comparison of sperm motility and progesterone level in relation to pregnancy rate of Ovsynch-treated Holstein cows

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Introduction

- Situation in the Czech Republic:
  - decline of reproduction results (RR) in cows,
    - pregnancy rate: 56.7% 1990
      47.8% 2007
  - tendency of Czech breeders to increase RR – pedometres, OvSynch, PreSynch, timed AI,
  - programs of cows synchronization – wide usage in the Czech Republic, not for problem cows only

Introduction

- Presumption:
  - level of progesteron (P4) relates with post-partum ovarian activity or NEB, sperm motility in cervical mucus – trait of ability to conceive,
  - determination of P4 – objective evaluation of cow´s ability during 1st period of lactation,
  - new service for whole population –

    P4 determination in milk laboratory of Bohemian and Moravian Breeder´s Corporation – ELISA

    (milk recording system, individual cases)

Objective

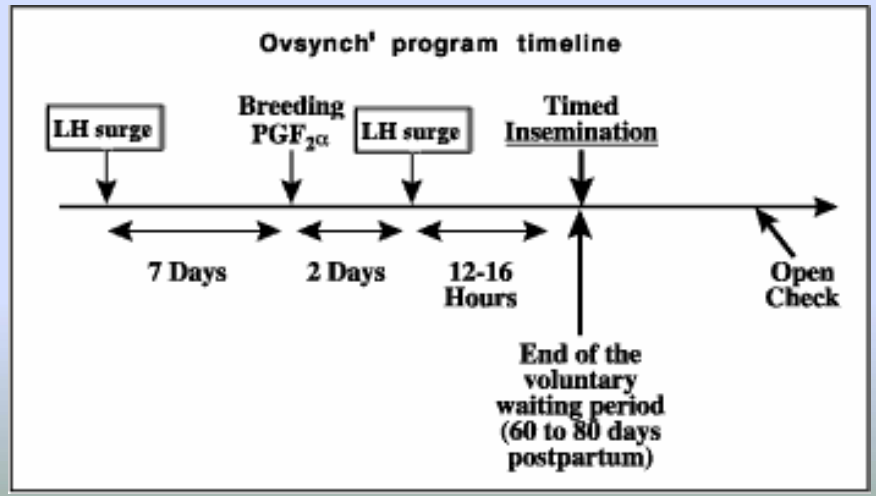
- to determine course of progesterone level (P4) in milk of Holstein Ov-synch treated cows between 10th day before and 35th day after evaluated AI and their pregnancy rate (PR) in relation to sperm motility (SM) in their cervical mucus during survival test (from 30 to 90 minutes),

Material and methods

- milk samples - collected and analysed during 45 days after the beginning of the Ovsynch,
- from 10 days (Day-10) before timed AI to 35 days (Day 35) after evaluated insemination,
- collection of milk samples:
  - Day-10, Day-3,
  - Day+0 - on the day of timed AI,
  - Day+8, Day+13, Day+18, Day+21, Day+25, and Day+35,

Material and methods

- cow treatment – GnRH injection followed by the first injection of PGF2α 7 days later, second GnRH injection 48 hours after the PGF2α, with the timed AI 18 hours after the second GnRH



Material and methods

- sperm survival test:
  - cervical mucus with sterile pipette by the recto-vaginal method at the time of AI,
  - AI doses - 5 Holstein bulls, SM – 50%
  - progressive moving of sperm - phase contrast,
  - motility - 30, 60, and 90 minutes (38±1^{o}C),
  - SM scale: 0%-without, 1%-sporadic, 10%, 20%, 30%, 40%, and 50%

Material and methods

- n = 27 Holstein cows included to Ovsynch,
- observation from February to April,
- timed AI - March,
- daily milk production – 1st month = 31.48 kg with a protein content of 3.39%,
- 10142.2 kg of milk with a protein content of 3.31% in 305 days of lactation,

Material and methods

- dataset was analysed by ANOVA,
- factors of linear models:
  - calving period,
  - parity,
  - group of milk production in 100 days,
  - number and result of evaluated AI,
  - health status of cow and mucus sperm motility in % after 30,60, and 90 minutes
- in relation to P4 level

Results

- May to September - lower P4 on Day+0, but higher P4 from Day+8 to Day+21 (on Day+18 $P < 0.05$), with subsequent higher PR by 29.95% (NS).
- higher P4 – in primiparous cows, on Day+25 and Day+35, $P < 0.05$, little differences of P4 from Day+0 to Day+21 and of PR too, only 3.9%.

Results

- milk production - no significant differences, but a trend toward higher P4 in high production cows,
- first-time AI cows - lower P4 on Day+0, higher P4 on the following days (7.41 ng, Day+18, $P < 0.05$) and higher PR by a 16.17%.

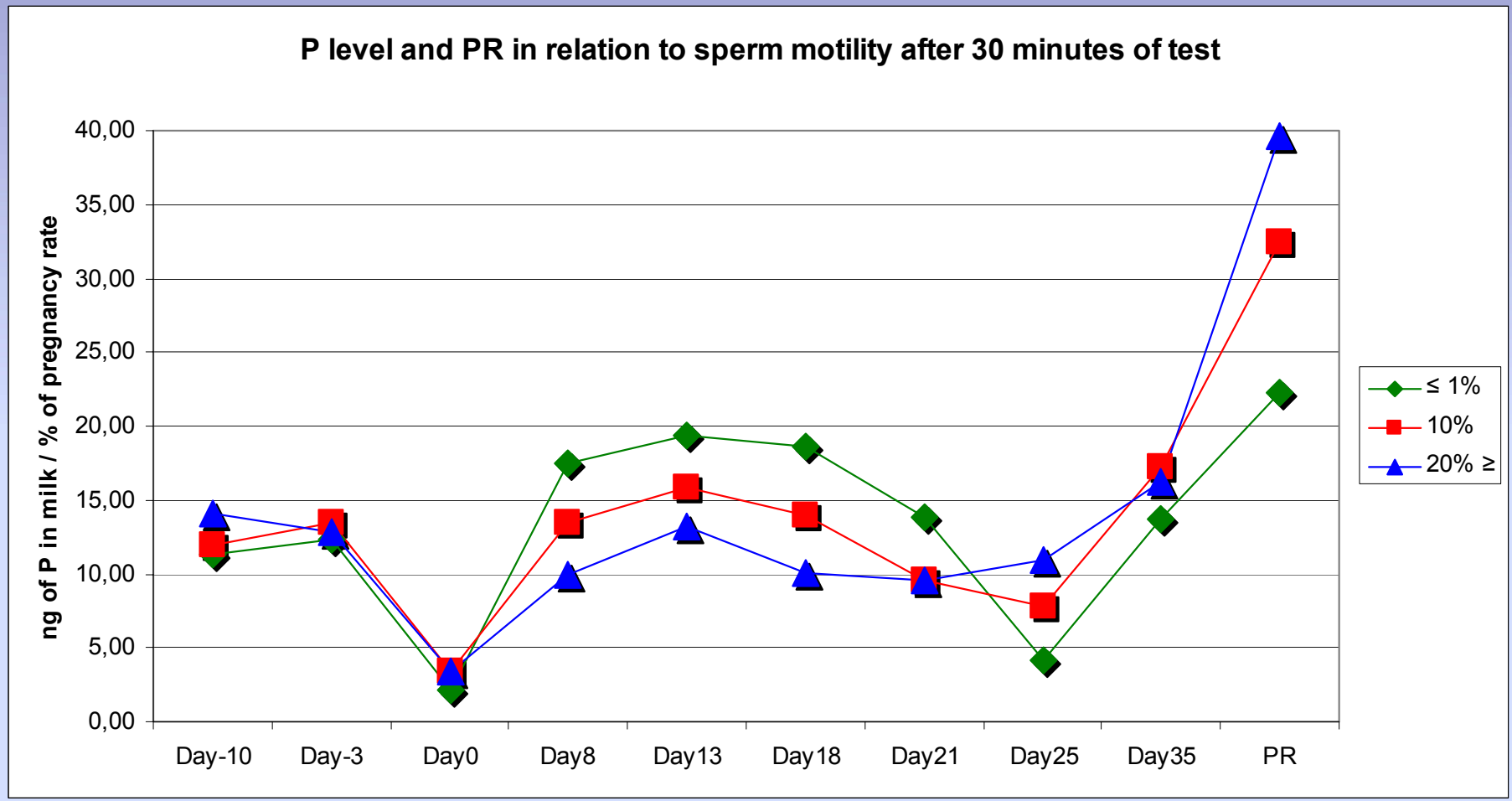
Results

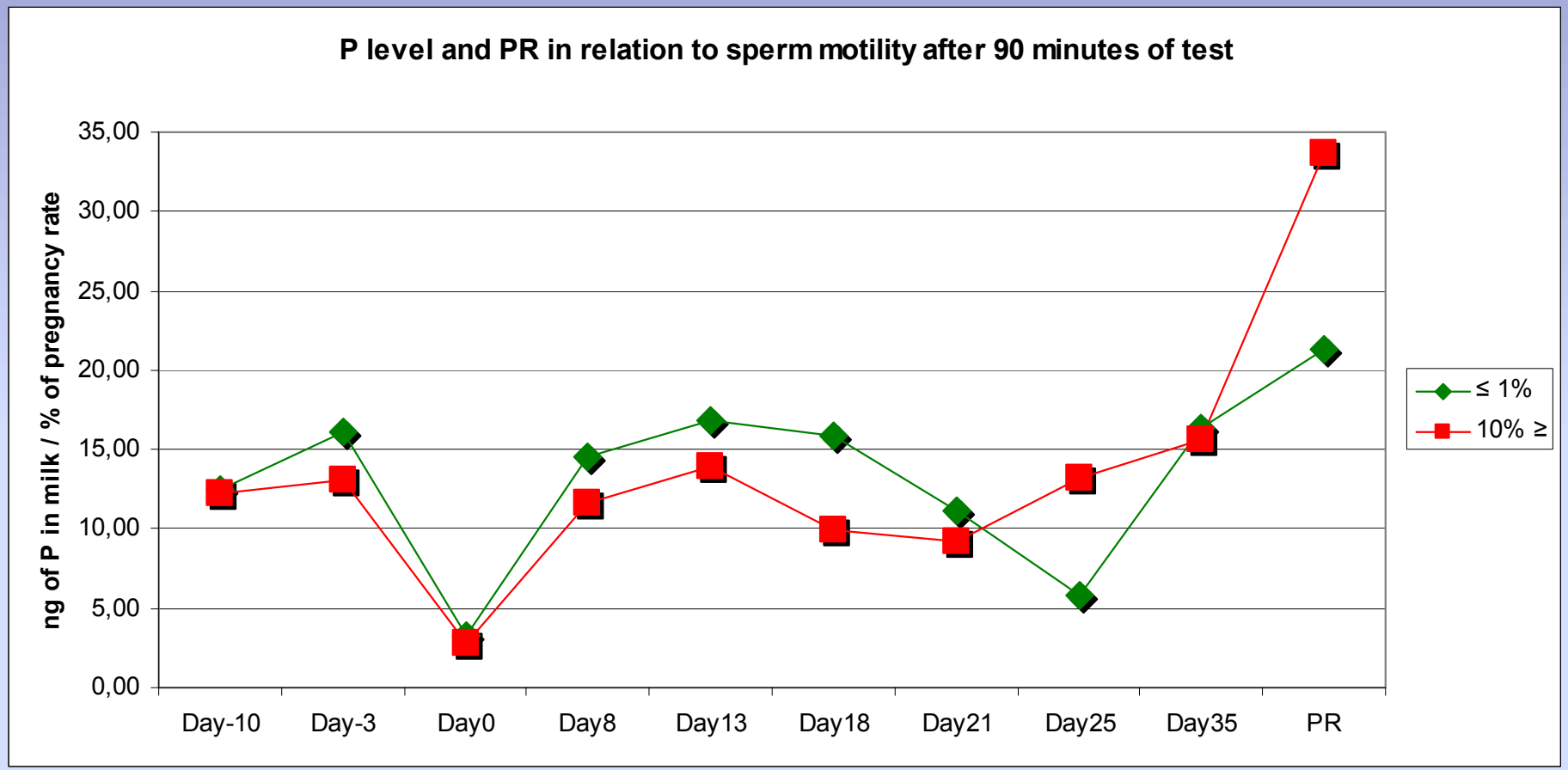
- cyst occurrence before Ovsynch – trend of higher P4 from Day+0 to Day+13 and consequent decline to Day+35,

- multiple cyst occurrence –
  - significantly lower P4 on Day+0 and Day+21, differences 2.53 ng and 6.88 ng ($P < 0.05$),
  - PR lower by 47.33% (NS)

Results

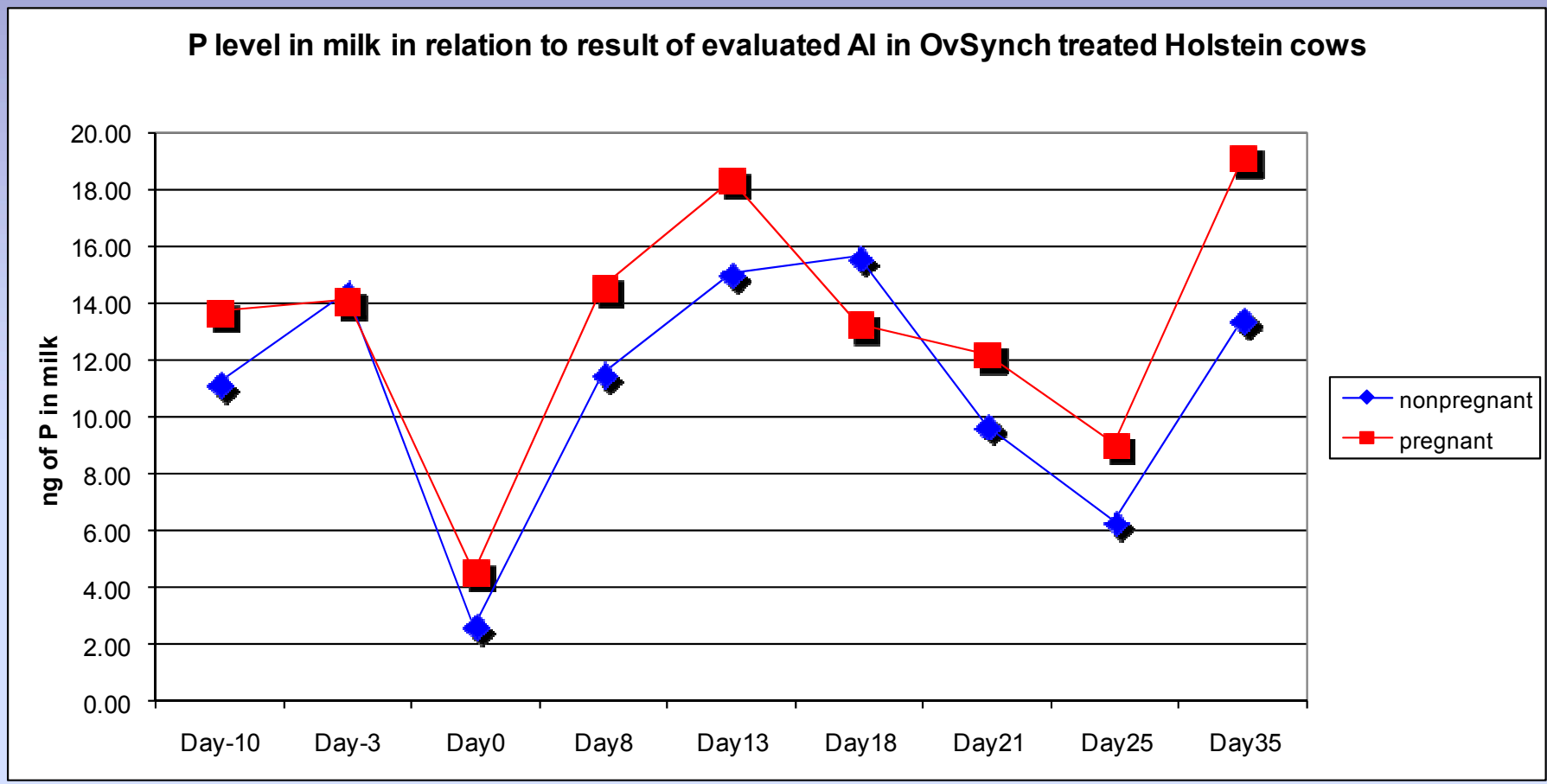
- highest PR, lower level of P4 from AI to 18th day and subsequently higher P4 on 25th day ($P<0.05$) in cows with best sperm motility in their cervical mucus after 30 and 90 minutes of survival test
  - differences from -8.5 ng to 7.58 ng of P4 level ($P<0.05$) and 12.47-17.28% of PR (NS).


P level and PR in relation to sperm motility after 30 minutes of test
ng of P in milk / % of pregnancy rate
40,00
35,00
30,00
25,00
20,00
15,00
10,00
5,00
0,00
Day-10
Day-3
Day0
Day8
Day13
Day18
Day21
Day25
Day35
PR
≤ 1%
10%
20% ≥


P level and PR in relation to sperm motility after 90 minutes of test
ng of P in milk / % of pregnancy rate
35,00
30,00
25,00
20,00
15,00
10,00
5,00
0,00
Day-10
Day-3
Day0
Day8
Day13
Day18
Day21
Day25
Day35
PR
≤ 1%
10% ≥

Results

- level of P4 in Ov-synch treated cows differed from standard curve:
  - from 1.89 ng to 5.28 ng in Day0 (AI) – supposed level about 1.5 ng,
  - lower increase of P4 level from Day13 than supposed


P level in milk in relation to result of evaluated AI in OvSynch treated Holstein cows
ng of P in milk
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Day-10
Day-3
Day0
Day8
Day13
Day18
Day21
Day25
Day35
nonpregnant
pregnant

Summary

- significant differences ($P<0.05$) in P4 level and pregnancy rate in relation to:
  - calving season,
  - parity,
  - number and result of evaluated AI,
  - health of cows,
  - sperm motility after 30 and 90 minutes of test,

Summary

- results describe differences in course of P4 level in OvSynch treated Holstein cows,
- results indicate higher significancy of sperm survival in cervical mucus in relation to P4 level in milk for early determination of cow´s biological ability to conceive,
- however, significant differences in P4 level offer possibility of the wide use of P4 determination (by service) during first lactation period as a simpler way to determine cow´s ability to conceive for breeder


Thank You for attention.