

A new approach to predict the success of insemination of cows using a systematic heat-assessment

Von Tavel L., Schmitz-Hsu F., Witschi U., Kirchhofer M.

Swissgenetics, 3052 Zollikofen, Switzerland

lv@swissgenetics.ch

EAAP 2019, Ghent, Abstract number 31614

Pictograms and pictures as examples

Position of the vulva (+ n -)



vertical



< 50% horizontal



> 50% horizontal, suspected vaginal prolapse

Quantity of mucus (- n +)



No or little mucus



Moderate mucus, mucus discharge with massage



A lot of mucus, spontaneous mucus discharge

Uterus tonus (- n +)



Weak tonus, uterus not very contracted



Moderate tonus, uterus moderately contracted



Strong tonus, uterus very contracted

Size of the uterus (- n +)



Uterus hanging over the pelvic bone



Uterus located on the pelvic floor



Uterus can be gathered up by hand

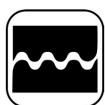
Cervix passage (n + -)



No resistance through the cervix



Moderate, correct resistance through the cervix



Strong resistance through the cervix

Period of insemination (- + n)



Rather early



Good timing. Tolerance reflex 12-24 hours ago



Rather late. e.g. bloody mucus

General impression



Six factors with three levels each. The technician must choose one per line.

The pictograms are linked with +/n/- for the evaluation of the cow's heat and the success of insemination.

Background

The success or failure of an insemination depends mainly on the cow. The heat-assessment of a cow by a technician in the routine process must be done quickly and whenever possible without the need of information from a third party, e.g. the farmer.

For this purpose, a simple but effective system is needed to judge the cow in order to predict the success of insemination.

We designed a system with which the technician evaluates the relevant data about the cow during the insemination process. The data is recorded using a tablet in the field.

The goal is to collect data in order to derive a more reliable estimate of the bull's non-return rate.

Methods

Based on literature, an initial set of six factors was chosen to assess the status of the cow and was evaluated in a field test.

- Position of the vulva
- Quantity of mucus
- Uterus tonus
- Size of the uterus
- Cervix passage
- Insemination timepoint

These six factors of the cow are scored with three levels each:

+ plus for quite good / n for neutral / - for quite bad.

They are linked to each pictogram and the technicians do not see the +/n/-.

To simplify data entry and to increase the tangibility for the technician, only pictograms are shown on his tablet.

Additionally, the technician enters a score from 1 to 6 indicating his personal prediction of the probability of success of the insemination.

The collected data are used in the statistical analysis of the insemination result using the non-return rate at 56 days (NR56).

Results

In a field-test for two months, 8184 inseminations done by 27 technicians were evaluated.

The system acceptance by the technicians was good.

The full range of the scores was used.

The evaluation of the combination of factors, which occurred more than 100 times, showed that the proposed heat-assessment scores are positively associated with the probability of success of the insemination. There was a difference of 34.7 %-points in the NR56 between the subset with the best level of all factors and the subset with the worst level of all factors.

The personal prediction of the technician (1 - 6) at the time of insemination was consistent with the NR56.

Compared to the previous heat-assessment system, the new approach allows a much more differentiated prediction of the success of insemination.

Conclusion

The proposed system helps considerably to evaluate the cow during the routine insemination process.

The obtained data also improve the evaluation quality of the bull's NR56, which is essential for AI organisations in terms of quality control of semen straws released to the market.

Outlook

Swissgenetics introduced the heat-assessment system nationwide (240 technicians) in June 2019.

Literature

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