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MODELLING the COSTS of LOCOMOTORY DISORDERS & POSTPARTUM DYSGALACTIA in SOWS

RATIONALE

Postpartum dysgalactia (PPDS) and locomotory disorders are common health problems in sows. They reduce welfare, can result in premature removal and cause mortality. Economic consequences of production diseases have not been investigated thoroughly.

OBJECTIVE

The aim was to examine economic losses caused by postpartum dysgalactia (PPDS) and locomotory disorders and their impact on longevity.

DATA

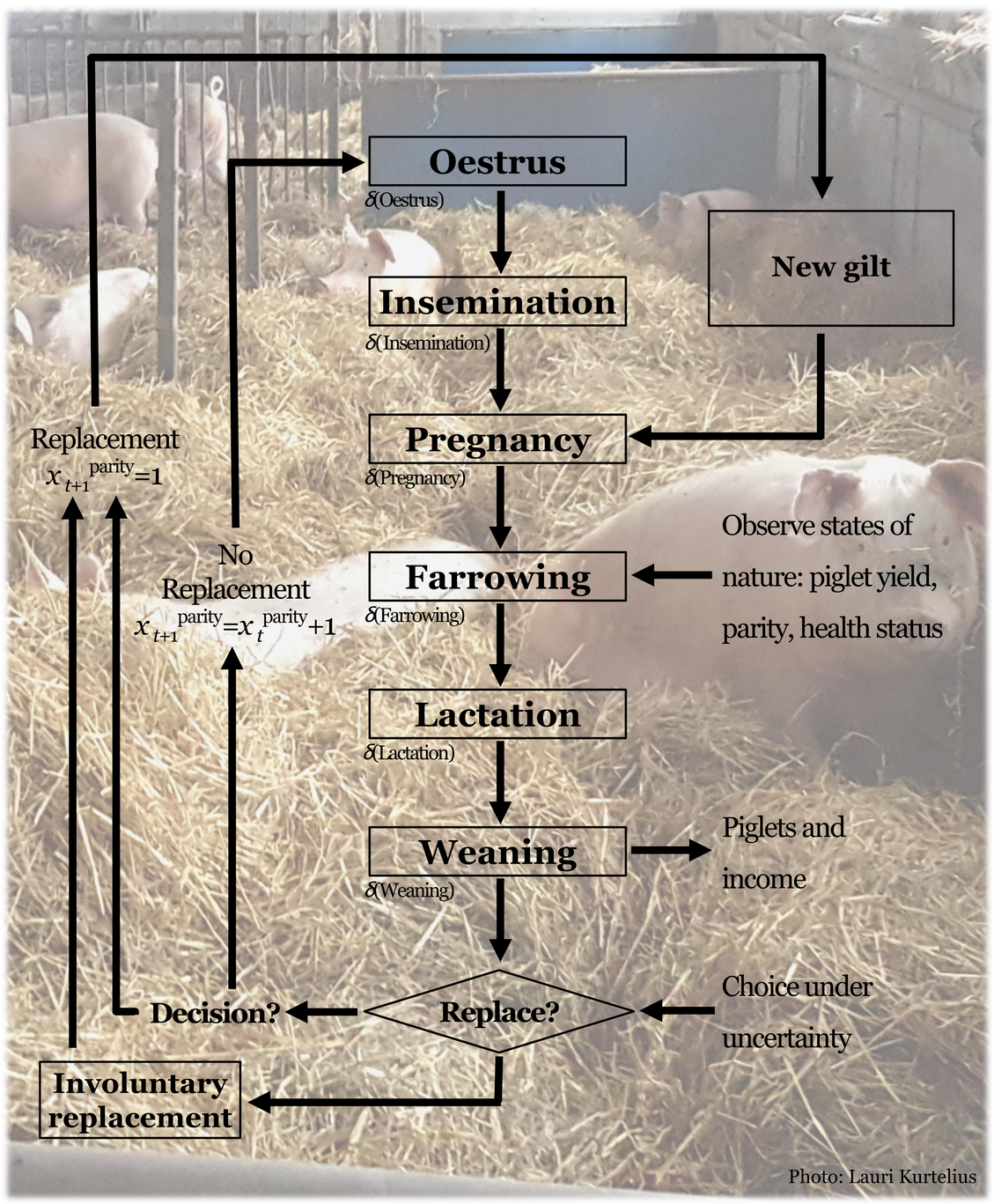
Herd data originating from commercial sow herds was used, with focus on a typical sow on a typical farm. Disease–related parameter values were collected from a research farm with systematic record keeping and educated diagnostic abilities.

METHODS

A stochastic dynamic programming model takes the most important events in the productive life of a sow and her piglets into account. A model maximizing return on sow space unit and assessing sow replacement was developed. The state variables were litter size, parity number, and sow's health status. Nine scenarios were simulated and results were compared to the baseline.

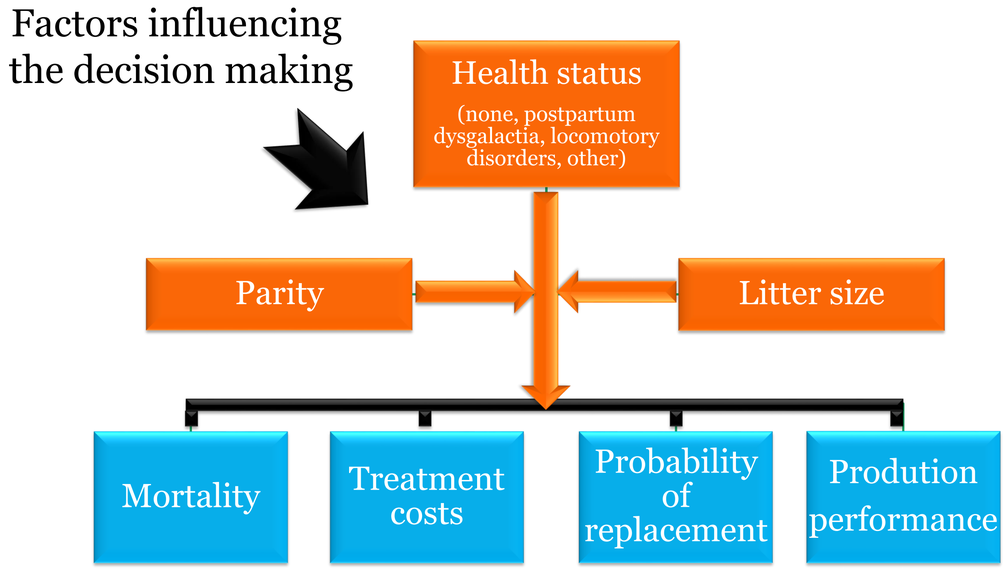
The evolution of litter size was governed by a transition equation:
Current litter size = f(parity number, previous litter's size, animal's characteristics, disease, random effects)

Sow replacement was modelled as a probability:
Pr(replaced)=f(parity number, litter size, disease, animal's characteristics, decision to replace)



RESULTS

- Eliminating the risk of postpartum dysgalactia (PPDS) or locomotory disorders increased the value of sow space unit by €279 or €110 compared to the baseline, respectively.
- Expanding the perspective to national level , a rough estimate of costs of disease was €2 to €4 million per year.
- The average number of litters that the sow would deliver during her lifetime was decreased by about 0.1-0.4 litters because of the risk of disease.
- In general, a healthy sow could stay in the herd until she has produced 6-10 litters.
- Overall herd removal rate, sow health status and productivity level are associated with the most appropriate time of replacement: When sow longevity is increased, the threshold to remove a sow due to small litter is lower.



State variables (in blue) influence economic and physical performance parameters (in orange) of a sow in the dynamic programming model.

CONCLUDING REMARKS

Optimal lifetime of a sow in production depends on several parameters such as realized litter size, piglet mortality, reproductive efficiency and health. PPDS and locomotory disorders reduce economic return on piglet production and reduce sow's longevity, but their modelling, treatment and control is challenging. Rigorous studies are still needed to investigate how improving livestock health impacts farm's economic performance and animal welfare.

REFERENCE Niemi, J. K., et al. (2017). "Modeling the Costs of Postpartum Dysgalactia Syndrome and Locomotory Disorders on Sow Productivity and Replacement."Frontiers in Veterinary Science 4