

APPLIED FEEDING OF LACTATING HYPER-PROLIFIC SOWS

15. September 2020

*Written by Thomas Sønderby Bruun, Senior Specialist, SEGES Danish Pig Research Centre,
thsb@seges.dk (<mailto:thsb@seges.dk>)*

Abstract

The correct feeding strategy for the lactating sow is frequently discussed, and the aim of this article is to describe the latest research results and how they should be used to support nursing capacity, average daily litter gain and subsequent reproduction. A backfat thickness at farrowing of 16 – 19 mm is furthermore a prerequisite for a succesful farrowing and a high milk production.

Recent research has shown that preweaning mortality is low, and that sows that are standardised with 14 medium to large piglets are able to wean 13.5 – 13.6 piglets per litter. The feeding curve in early lactation can not be used to increase the average daily gain of the litter, but can efficiently control sow



weight loss in herds with a high degree of mobilisation. At a litter size of 14 piglets the daily litter gain may on average be as high as 3.2 kg per day. It has furthermore been shown that litter gain is independent of feeding level at peak lactation, whereas litter size has a major impact on litter gain.

As a guideline, feeding around 3.4 kg per day from entering the farrowing section until farrowing may decrease the farrowing duration. Afterwards, a feed allowance should gradually increase to 5.5 – 6.5 kg per day around day 6 – 7 and a maximum feed allowance of 8.8 – 9.8 kg per day should be reached around day 14 – 15. Feed allowance should be adjusted daily at an individual level, and feed troughs should be emptied daily for left overs to ensure access to clean water.

Keywords: Backfat loss, feeding curve, lactation, litter gain, nursing capacity, subsequent litter size, weaning-to-oestrus interval, weight loss.

Introduction

Research has shown that excessive nutrient mobilisation during the lactation period can have detrimental effects on subsequent reproduction in sows in terms of subsequent litter size and weaning-to-oestrus interval [1,2]. Furthermore, sows with a high mobilisation during lactation need extra attention in the subsequent gestation period to re-establish their body condition, and this may be a challenge in certain production systems with loose housed sows. In recent trials carried out at SEGES Danish Pig Research Centre, the feeding of lactating DanBred Hybrid sows has been in focus. The aim of this article is briefly to describe the latest research results and how they should be used to support nursing capacity, average daily litter gain and subsequent reproduction.

Research results and recommendations

Throughout the last couple of years, several trials have been conducted in Denmark to get a better understanding of the impact of feed allowances and requirements on sow and litter productivity. Two trials with a focus on feeding curves and litter size have been conducted recently and are presented below.

Body condition loss should be controlled during early lactation

The body condition of the sows is affected by the feed allowance throughout lactation. In a trial carried out by SEGES Danish Pig Research Centre in 2018 – 2019 in two herds with about 100 sows per group, the effects of increasing the feed allowance during the first two weeks of lactation were studied [3]. As shown in Figure 1, the number of weaned piglets per litter as well as average daily litter gain was unaffected by feed allowance during the first two weeks of lactation. In one herd with excellent management, sow mobilisation was very low, as sows lost only 4.3 – 4.6 kg throughout a 24 day lactation period, and offering the sow 8.3 – 8.7 kg of extra feed over a 14 day period, where the only effect was a decreased mobilisation of backfat. In the other herd, sow weight loss during a 24 day lactation period was reduced by 5.3 kg (32 %) by allowing the sows to consume on average 9.3 kg extra feed. In this herd the mobilisation of backfat was unaffected, and thus, mobilisation was primarily loss of muscle mass. In both herds, the average weight loss was below 7 % of the sow body weight,



and thus, no effects on subsequent reproduction is expected. The study concluded that feeding above the recommended feeding curve is only of relevance if the sows are losing more than 10 – 15 kg during the lactation period. Furthermore, it should be expected that an additional one kilogram of lactation diet can reduce body weight loss by about 0.5 kg [3].

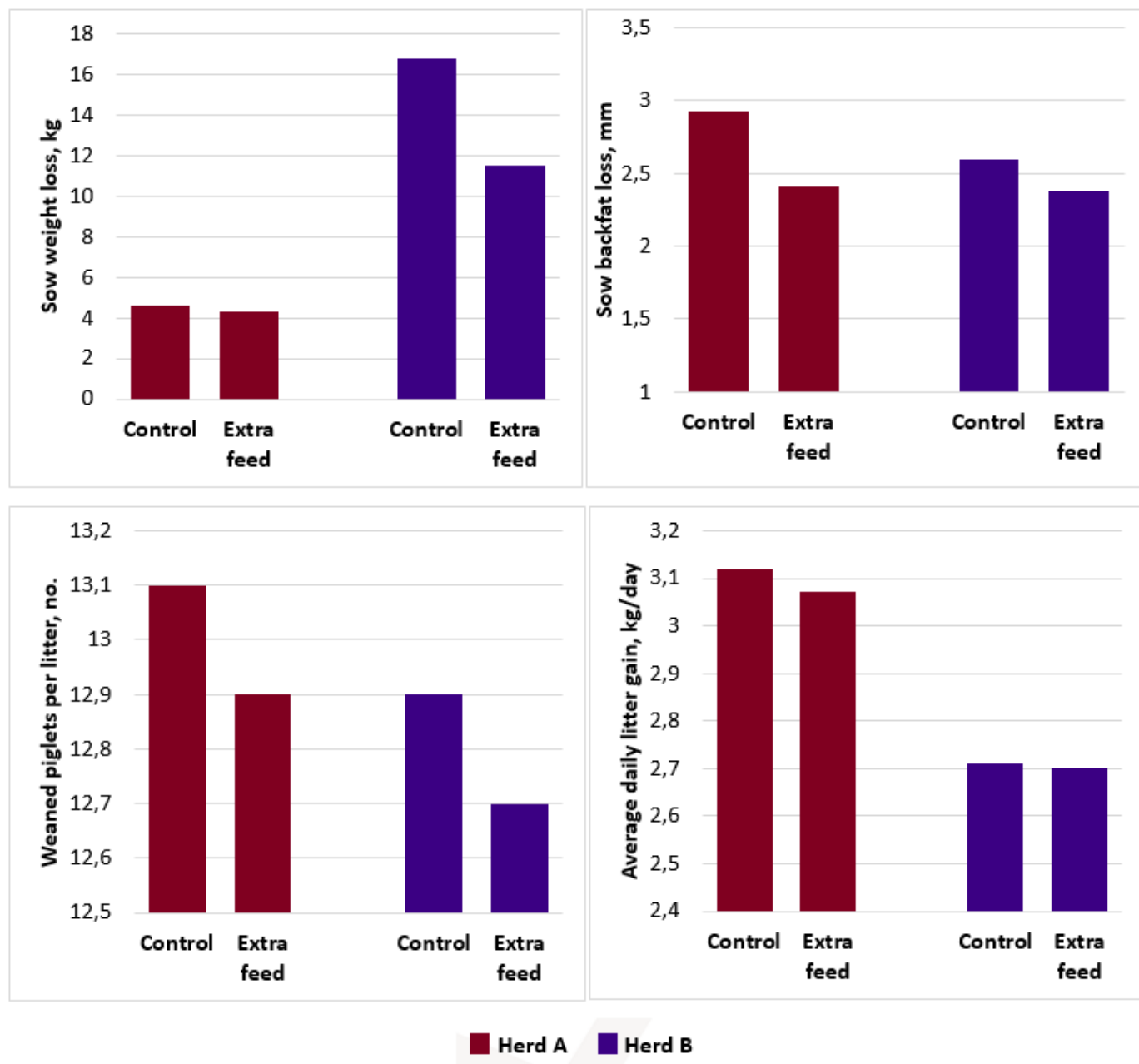


Figure 1 – Effects of increasing feed allowance with a total of 8.3 – 8.7 kg extra feed during the first two weeks of lactation in herd A (red) and in total 9.3 kg extra feed during the first two weeks of lactation in herd B (purple) on sow and litter characteristics [3].

Choosing the right upper feeding level in late lactation

In late lactation, many farmers tend to use a maximum feed allowance, and apply this to all sows in the herd. This common practice may not take the litter size into consideration, and thus, the sow milk yield into consideration [4], which may lead to excessive mobilisation in sows nursing large litters [5]. In a trial



carried out at SEGES Danish Pig Research Centre in 2016 – 2017, the effects of maximum daily feed allowance from day 15 to weaning at day 26 (either 6.9 kg/day, 8.0 kg/day or 9.2 kg/day) and litter size (either 12 or 14 piglets per litter) was studied in a two-factorial approach with two participating herds (with close to 600 sows and their litters included in each herd). There were no significant interactions between feeding level and litter size, and thus, results are presented factor by factor in Figure 2. Prewaning mortality from litter standardization was unaffected by feeding level and were at a low level (3.7 – 4.4 %). Increasing the litter size from 12 to 14 piglets resulted in an increase in mortality in both herds (preweaning mortality from standardisation to weaning were 2.8 – 3.1 % in litters with 12 piglets and 5.1 – 5.5 % in litters with 14 piglets) [1]. Never the less, both sows with 14 piglets and 12 piglets demonstrated a strong ability for weaning large litters in both herds, which testify to very well-functioning sows and thus, sows standardised with 12 piglets weaned 11.8 piglets per litter whereas sows standardised with 14 piglets weaned 13.5 – 13.6 piglet per litter. In both herds, the average litter gain was increased when litter size was increased – but increasing the maximum feed allowance from day 15 to weaning did not affect the average daily litter gain. Sow mobilisation was increased by increasing litter size and the maximum feed allowance was very efficient tool to control the degree of mobilisation (Figure 2). The subsequent reproduction was virtually unaffected by both litter size and maximum feed allowance, and in both herds subsequent litter size was on average 19 – 20 total born piglets per litter.



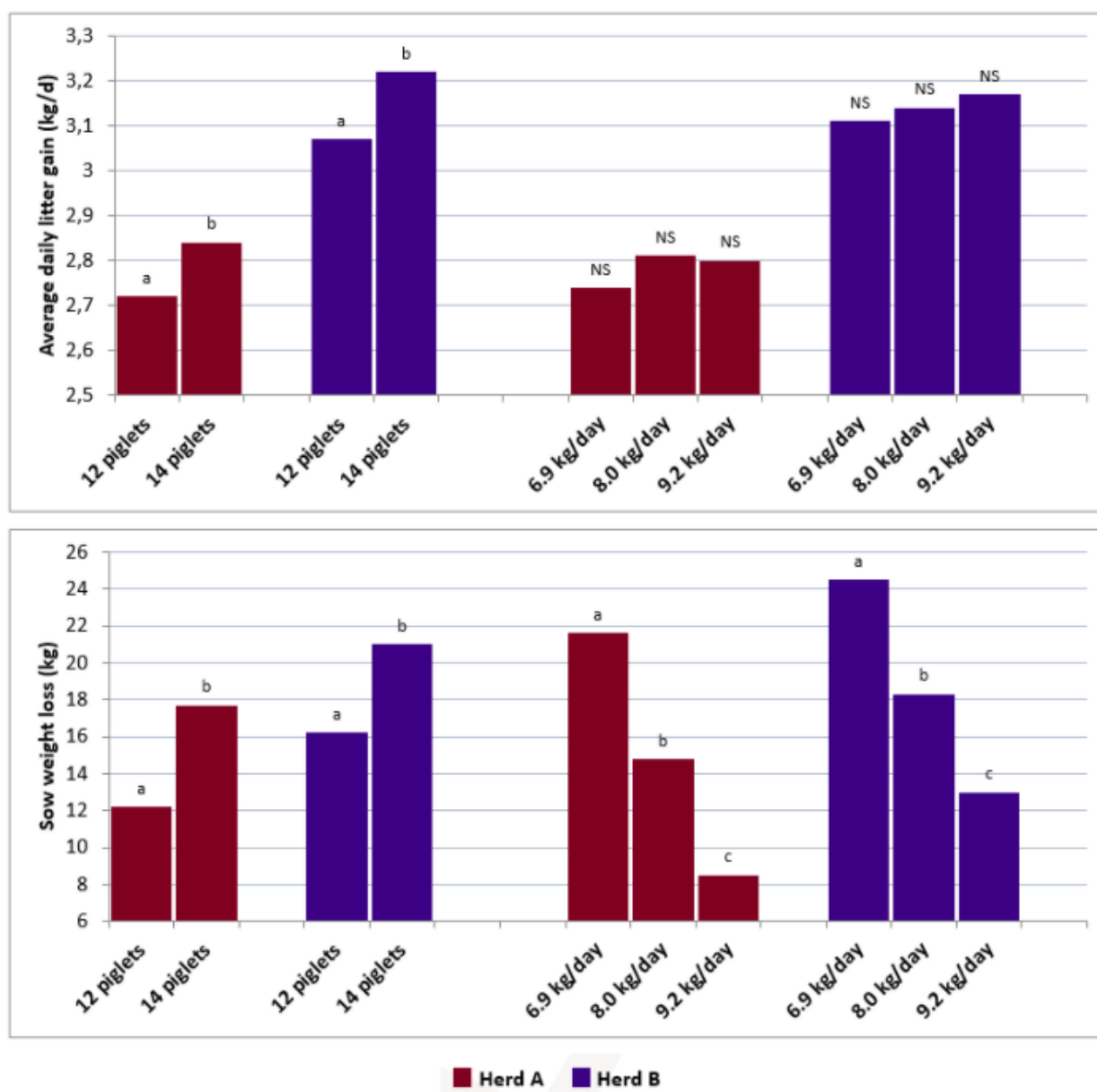


Figure 2 – Effects of increasing litter size throughout lactation and increasing maximum feed allowance from day 15 to weaning at day 26 in herd A and B on average daily litter gain and sow weight loss [1].

Daily feeding management in the farrowing section

The determination of a sows' maximum feed allowance should take sow weight loss and backfat mobilisation and especially litter size into consideration. Actually, the average daily litter gain is the main determinant for the daily requirement, but since this is not monitored litter size has the biggest impact on the requirement. The ideal feeding curve is individual for each sow dependent on sow and litter characteristics, but some "rules of thumb" may be applied in practice. Providing around 3.4 kg per day from entering the farrowing section to farrowing provides energy for the foetuses, production of oestrus and for a quick farrowing process. After farrowing, feed allowance should increase daily and



reach 5.5 – 6.5 kg per day around day 6 – 7, and a maximum feed allowance (8.8 – 9.8 kg per day) should be reached around day 14 – 15. The most important rule is still, that sows nursing a high litter size (13 – 16 piglets) needs much more feed than sows nursing 9 – 10 piglets.

The trough tells a lot

Looking at the sow's feed trough tell us about her appetite and often also her well-being. Figure 3 shows the feed troughs of four different sows that are either fed much below appetite (A), close to appetite (B), slightly above appetite (C) and way above appetite, or as in this case, the sow had mastitis (D). SEGES Danish Pig Research Centre recommends to use a feeding curve, and to adjust slightly below or above according to appetite, and in general the ad libitum feeding of lactating sows is not recommended due to the risk that some sows may gain protein throughout lactation, which has been seen during trials. Remember that a full trough reduces the access to clean water, and hence, the feed trough should be emptied daily for sows with any feed residue.

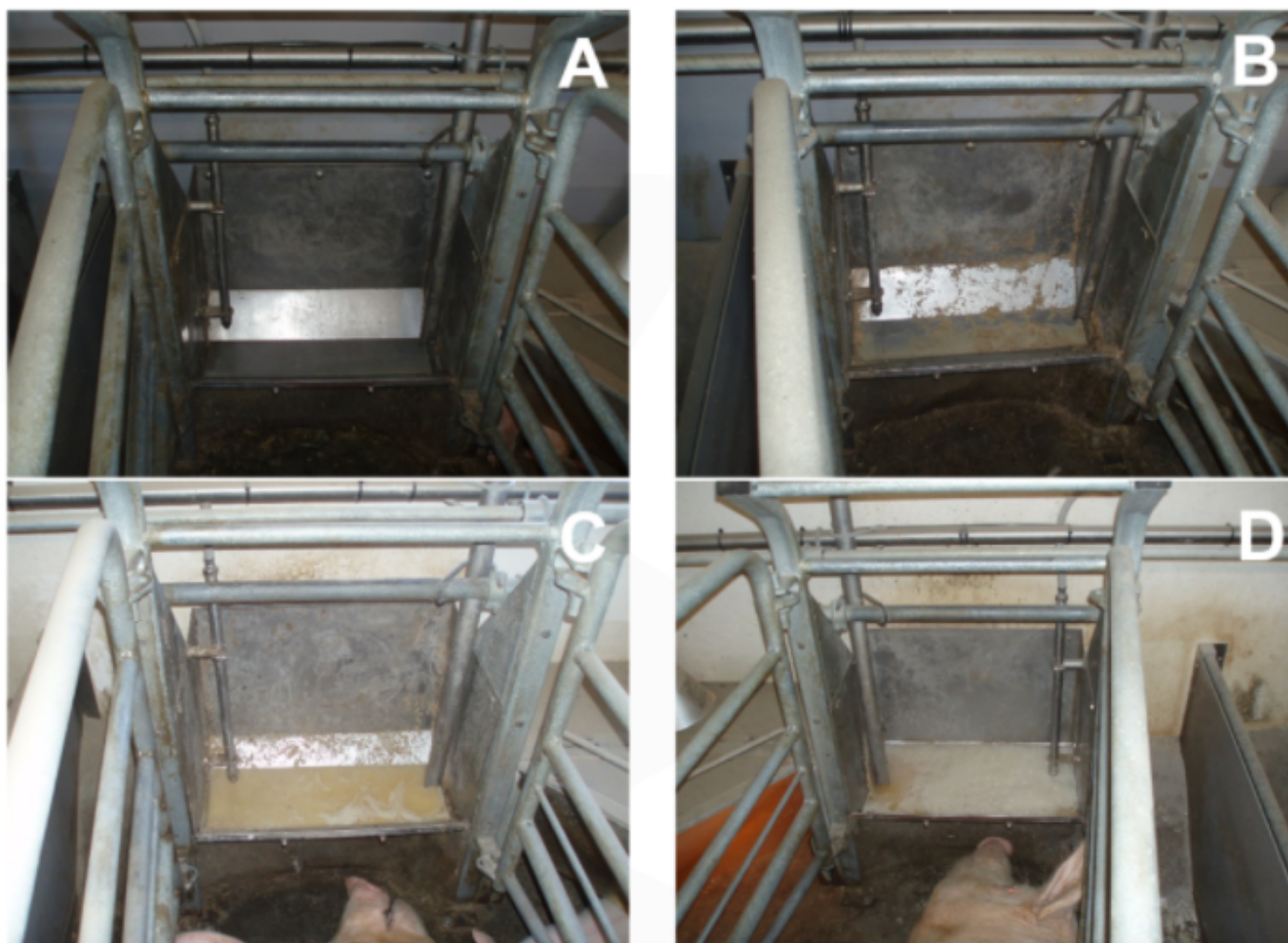


Figure 3 – What to look for when adjusting sow's feed allowance. *Photo credit: Thomas Sønderby Bruun, SEGES*

Use diets that comply with the Danish feeding standards



The Danish standards for nutrients should be applied in herds using DanBred Hybrid sows (The DanBred nutrient specifications can be found

here (https://danbred.com/wp-content/uploads/2020/09/Nutrient-specification-DanBred_v5.pdf)).

Higher concentrations of protein relative to lysine than the Danish standards will increase the excretion of nitrogen and possibly result in a decreased feed utilisation in lactating sows [6,7]. Furthermore, large scale productivity trials have been used to adjust the Danish recommendations leading to an optimisation of the amino acid concentrations and ratios to maximise milk production with as low protein content in the feed as possible [8-12].

Conclusion

In conclusion, the feed allowance does not affect the nursing capacity of hyper prolific DanBred sows, and a nursing capacity of 13.5 – 13.6 piglets per litter is possible when standardising the litter size to 14 piglets after farrowing. The feed allowance in both early and late lactation should be used in order to control sow mobilisation, and based on research the weight loss of the sows should be moderate (i.e. 5 – 15 kg), because this results in a high litter size in the subsequent reproductive cycle. A weight loss above 20 kg increases the risk of a less productive subsequent litter. Feed should be adjusted daily at an individual sow level in order to avoid feed waste and loss of appetite.

Reference List

- [1] Zak, L.J.; Cosgrove, J.R.; Aherne, F.X.; Foxcroft, G.R. (1997): *Pattern of feed intake and associated metabolic and endocrine changes differentially affect postweaning fertility in primiparous lactating sows. Journal of Animal Science. 75:208-216.*
- [2] Clowes, E.J.; Aherne, F.X.; Foxcroft, G.R.; Baracos, V.E. (2003): *Selective protein loss in lactating sows is associated with reduced litter growth and ovarian function. Journal of Animal Science. 81:753-764.*
- [3] Bruun, T.S.; Krogsdahl, J. (2020): *Effect of a rapid increase in feed allowance or supplementing the diet with soy bean meal for lactating sows [Effekt af hurtigt stigende foderkurve eller supplerende sojaskrå til diegivende søer]. Publication no. 1201. SEGES Danish Pig Research Centre.*
- [4] Auldist, D.E.; Morrish, L.; Eason, P.; King, R.H. (1998): *The influence of litter size on milk production of sows. Animal Science. 67:333-337.*
- [5] Bruun, T.S.; Strathe, A.V.; Krogsdahl, J. (2017): *Effect of feed allowance and litter size on daily litter gain and sow weight loss [Effekt af foderstyrke og kuldstørrelse på kuldtilvækst og søernes vægttab]. Publication no. 1118. SEGES Danish Pig Research Centre.*
- [6] Pedersen, T.F.; Bruun, T.S.; Trottier, N.L.; Theil, P.K. (2019): *Nitrogen utilization of lactating sows fed increasing dietary protein. Journal of Animal Science. 97:3472-3486.*



- [7] Pedersen, T.F.; Chang, C.Y.; Trottier, N.L.; Bruun, T.S.; Theil, P.K. (2019): Effect of dietary protein intake on energy utilization and feed efficiency of lactating sows. *Journal of Animal Science*. 97:779-793.
- [8] Strathe, A.V.; Bruun, T.S.; Tauson, A.H.; Theil, P.K.; Hansen, C.F. (2019): Increased dietary protein for lactating sows affects body composition, blood metabolites and milk production. *Animal*. 1-10.
- [9] Strathe, A.V.; Bruun, T.S.; Geertsen, N.; Zerrahn, J.-E.; Hansen, C.F. (2017): Increased dietary protein levels during lactation improved sow and litter performance. *Animal Feed Science and Technology*. 232:169-181.
- [10] Hojgaard, C.K.; Bruun, T.S.; Strathe, A.V.; Zerrahn, J.-E.; Hansen, C.F. (2019): High-yielding lactating sows maintained a high litter growth when fed reduced crude protein, crystalline amino acid-supplemented diets. *Livestock Science*. 226:40-47.
- [11] Hojgaard, C.K.; Bruun, T.S.; Theil, P.K. (2019): Optimal crude protein in diets supplemented with crystalline amino acids fed to high-yielding lactating sows. *Journal of Animal Science*. 97:3399-3414.
- [12] Hojgaard, C.K.; Bruun, T.S.; Theil, P.K. (2019): Optimal lysine in diets for high-yielding lactating sows. *Journal of Animal Science*. 97:4268-4281.
- [13] Bruun, T.S.; Strathe, A.V.; Krogsdahl, J. (2017): Effekt af foderstyrke og kuldstørrelse på kuldtilvækst og søernes væggtab. Meddelelse nr. 1118. SEGES Svineproduktion, Den Rullende Afprøvning.

(<https://www.facebook.com/sharer/sharer.php?u=https://danbred.com/en/applied-feeding-of-lactating-hyper-prolific-sows/>) (<https://www.linkedin.com/shareArticle?mini=true&url=https://danbred.com/en/applied-feeding-of-lactating-hyper-prolific-sows/&title=&summary=&source=>)

