Piglet mortality

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Traditionally, crushing of piglets, has been considered unfortunate events, related to the designing of the farrowing pens.
Later studies add new and interesting data to the fact that sows actually are responsible for the deaths of some of their youngs. Some suggest that their abilities as caretakers and providers are pre-determined, while others think this may actually be a more or less intentional way of regulating the size of their litters.

Piglet killing related to behaviour?
A study performed in Denmark, „Early piglet mortality in loose-housed sows related to sow and piglet behaviour and to the progress of parturition" by Lene Juul Pedersen, Erik Jørgensen, Teresia Heiskanen and Birgitte I. Damm, shows the result from 152 farrowings.
The study compares the number of deaths among piglets related to four different causes, where crushing by the mother is one of them.
In this study, sows in bad condition, e.g. obese sows, or sows with bad legs were excluded from the study.
The deaths of the piglets were also seen in relation with other factors, e.g. behavioural factors, that may possibly be part of the reason why they died.
In the case of crushing, the sow`s time spent in lateral recumbency before birth and nest building activity were evaluated as possibly related factors.
The study shows that 6,8 % of the piglets that were live born, were killed by the mother crushing them. The correlation to the related factors concerning behaviour was that the sows spent more time in lying in lateral position before birth of the forst piglet, and that she spent more time building a nest before the birth of the first piglet.

Caring vs non-caring mothers?
„Crushing of piglets by the mother sow (Sus scrofa)—purely accidental or a poor mother?", a study carried out by Inger Lise Andersen, Synne Berg, Knut Egil Bøe claims that as high a number as about 50% of live born piglet deaths is due to the crushing by the mother.
This is when the pigs are kept in a loose farrowing pen.
The question of this study is whether individual differences between the sows make them «good or bad» moms. Some sows kill several piglets, while others kill none or only a few, plain and simple.
The study states that both wild and domesticated sows may show agressiveness towards or even savaging their young. This seems to be related both to the maternal abilities as well as their general behaviour pattern.
Sows crushing none or few piglets seemed more alert and responsive to the distress of the piglets, and showed a more frequent physical contact with them.
As factors influencing maternal abilities in a group of mammalian species, including pigs, they point out age, experience and dominance as well as genetic inheritance.
The study also points out the importance of keeping nesting material available to the sow, as an aid to prepare her mentally (and the environment for the coming piglets physically). They actually suggest that part of the reason for a lot of crushing, is related to differences in the farrowing environment.

Another aspect mentioned, is the social distress of the pigs. During regrouping within the population, the hierarchy is repeatedly disturbed. Not many studies have been done considering this aspect, unfortunately, so confirming data are missing.

The results of the study show that nesting-activity differs clearly.
Non-crushers spent more time building a nest before parturition than the crushers did. They also responded sooner to distress calls from the piglets, they seemed to move more carefully and have more nose contact with the piglets, and they avoided other sows to a greater extent after the farrowing than the Crushers did.(Even though they did more exploring of other members of the group and seemed to be more socially active)
A question mark is set to the fact that more crushing happened to a greater extent in „oversized" litters, meaning that the number of piglets was higher than the number of functional teats. The suggestion is that the crushing sows are regulating the size of the litter so that the chance of bringing up healthier, better conditioned piglets improves.

Favouring of male offspring?
A study performed in central Spain, investigating 58 litters of free ranging wild boar, investigates more closely the theory of piglet-crushing as a regulation tool considering both the litter size and sex ratio: „Sex allocation in a polygynous mammal with large litters: the wild boar" by Pedro Fernandes-Llario, Juan Carranza and Patricio Mateos-Quesada.
The method of investigation differed widely from the one used in the previously mentioned studies, because these animals, living in the wild without daily human contact, had to be hunted and killed in order to be examined and for litter sizes and sex ratios to be determined. For this reason, all measurements done were carried out on dead animals, and included litter sizes, sex ratio within the litters, physical condition of sows and piglets, herein the difference between male and female piglets.
It is mentioned that pigs, producing litters of more than one offspring, probably doesn' t harmonize well with Trivers & Willard's theory of differential investment in male and female offspring, one of reasons being that sow s would benefit more from regulating the size of the litter.
The results of the study show that the ratio of sexes, males/females equaled to 0,523, which corresponds to the already mentioned assumption made by the writers of the study.
However, it did show that the sows invest more in male than female offspring, regardless of the condition of the sow herself. The piglets in the best condition, thus often being males, got the front teats, being the highest yielding ones. From this follows that the less dominant piglets, often females, had to spend more time by their hind, less producing teats, and were therefore more likely to get crushed. This would presumably indirectly influence the litter sex ratio in the direction of a majority of males.

Reflections
As it turns out, the fact that sows frequently kill some of their offspring is a not quite solved case.
These studies definitely imply, though, that the answer is a complex mixture of factors, both dealing with genetics, physical and mental circumstances, individual differences and maybe also a portion of coincidence.
The wish to decrease this problem to the farthest extent possible, is of course great, considering todays society and economics require the best possible results, considering both quality and price.
An alternative to a solution is given in an article in Time.com:
http://www.time.com/time/magazine/article/0,9171,889377,00.html , „Pigs without moms".

The experiment described in this article was carried out in Shoemakersville, Pennsylvania, where recorded sound effects were used to awaken the piglets, this actually being difficult without the familiar grunts from the mother or the hungry shrieks from siblings. After awaking, the piglets consumed their meal from rubber nipples providing a mixture of skimmed cows milk, vitamins and antibiotics.
I can easily see how this is a tempting and of course easy way to reduce deaths and secure good production numbers. However, we must also remember the importance of body heat, physical contact and mothers milk, being a new born individuals whole life the first part of its life.
Another alternative would of course be to raise the prices for meat, giving a lowered pressure on the farmers considering survival rates of their animals.
Or maybe this is just a short-lived comfort, that will soon be outconquered by continously increasing human consumption and higher requirements set by mankind.

Sources

Articles:
„Early piglet mortality in loose-housed sows
related to sow and piglet behaviour and to the progress of parturition" by
Lene Juul Pedersen, Erik Jørgensen, Teresia Heiskanen and Birgitte I. Damm

„Crushing of piglets by the mother sow (Sus scrofa)—purely accidental or a poor mother?", a study carried out by Inger Lise Andersen, Synne Berg, Knut Egil Bøe

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