

Improved Pig-Keeping

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Thank you very much. I am Daisuke Kohari, and I work as a lecturer at Ibaraki University. President Toyoshita of Porkland has just talked about the actual practice of rearing pigs at the production site. I myself have actually worked at Porkland, where I conducted research into welfare-oriented pig keeping systems and how much effect they have on pigs compared with conventional piggery systems, [slide 1]. And today I would like to tell you about this research.

But before that, let me talk first about the methods of rearing pigs, [slide 2]. There are a great many methods of rearing pigs. Some of these photos show pigs being kept in pasturage and others show them being kept at a livestock farm. When it comes to keeping pigs in barns, there are a number of forms. Also, there are a great many pig-raising methods. For example, depending on the brand, there are all sorts of rules and standards to be observed, such as that pigs must be kept in this or that way, etc. Even for the same variety of pigs, there are different rearing methods.

Now, when we think about comfortable pig farming, what sort of factors should we consider? [Slide 3]. I have listed five things on this slide. But actually, these are merely some more concrete expressions for the five freedoms that have been mentioned many times already. They are: 'provide pigs with feed and water in the proper way', 'keep them under conditions that are neither too cold nor too hot', 'prevent them from becoming injured or developing diseases', 'don't scare them unnecessarily', and 'allow them to behave in line with their natural habits and environment'.

By practicing these things, pigs can live healthily, and at the same time, they are able to use their original abilities to the full. This in turn ensures their comfort, which is

the gist of the animal welfare concept.

Actually, in order for pigs to make use of their adaptive abilities to the full, we need to know what kind of behavior they carry out. So in order to do this, I made a list of the pigs' behavioral repertoire, [slide 4]. I took this from a well-known textbook *Kachiku Kodo Zuzetsu* (Illustrated Livestock Activity), and the full repertoire consists of between 70 and 100 behaviors. In here, I have listed approximately 70 of these behaviors that pigs naturally perform when they can. Accordingly, allowing them to perform these behaviors helps bring out their adaptive behavior. However, as a practical matter, pigs are not required to express all of these behaviors, and under modern pig keeping methods, there is a considerable variation in the possibility of expressing these behaviors depending on how the pigs are kept.

Still, when pigs have an opportunity to carry out a wide-ranging activity repertoire, they actually adjust themselves to the environment by carrying out appropriate activities such as lying around, eating grass whenever they choose, or, when they feel hot, wallowing in mud to cool down. By contrast, however, as this next picture of pigs kept in confined conditions shows, [slide 5] when pigs are unable to satisfy their desire for activities, or when they cannot adapt to their living environment, a variety of behavioral problems occur, such as biting other pigs or people, which can result in injuries, etc.

Now, by how much can the behavior and the lives of pigs be improved by switching to keeping methods that pay consideration to the pigs' amenities? On this occasion, I studied the differences between the biobed system operated by Porkland (as introduced earlier), and ordinary confined production systems, with special reference to the following three points, [slide 6].

Firstly, by how much can the pigs' fighting or abnormal behavior be ameliorated? Secondly, how much tolerance do pigs have for the stresses placed on them? Or, in other words, how strong does their resistance against stress become? And thirdly, how do pigs respond when their keepers change?

Now I will introduce the rearing system in question. This is the biobed system that I mentioned earlier, [slide 7]. In this system, rice husks are laid on the floor to form a layer approx. 30~40cm thick and perhaps 50cm thick in the deepest places. This material is then allowed to ferment by installing a fermenter. Of course, pig excrement falls onto the layer, but the generation of ammonia from the excrement is moderated due to the effects of the fermentation. The keeping area is also made slightly wider than is the case under a conventional rearing system. As the floor is covered with rice husks, it doesn't matter if the pigs dig into it with their snouts whenever they like. The pigs can also play and jump about while ranging freely within a broad area. Moreover, the outside air moves through the keeping area, and the animals are exposed to natural light, while the temperature differs from place to place depending on the degree to which the pile of husks is fermenting. This means that the pigs have the opportunity to gather where the floor temperature is lower on hot days and where it is higher on cold days.

For a comparison with the biobed system, let's look at this windowless confinement piggery, [slide 8]. Actually, this example is quite a lot wider than an ordinary piggery. I think there are probably about 400 pigs there, and the keeping area is larger than that of an ordinary piggery. It is very rare to see confinement pig rearing carried out on this large scale, but because this time we were interested in making a comparison with the biobed situation, we chose a large-group rearing facility rather than an ordinary piggery where the animals are divided into smaller groups. As you can see, there are no windows letting in light from the outside at all. Although there are some small windows along one side that has a corridor for operator use, these are merely to allow people to observe the interior of the piggery, not to let in daylight. As for the floor, quite unlike the

biobed system, this piggery has a concrete draining-board floor. Now let's see the comparison, [slide 9]. Firstly, look at this table I produced comparing hostile behavior and abnormal behavior (Kohari, unpublished). The upper "conv." figures refer to conventional confinement rearing data, while the lower "bio" figures refer to biobed rearing data. You can see that hostile behavior is much less common under biobed than confinement conditions and the frequency of fights is also much lower. Also, regarding abnormal behavior, the survey checked three things: Firstly, sham chewing, which is a typical form of abnormal behavior among pigs (they chew even though they don't have anything in their mouth because they feel the need to chew something); secondly, biting other individuals, as I mentioned earlier; and thirdly, roughly biting fences and other facilities. As the figures show clearly, all three forms of abnormal behavior were frequently observed in the confinement piggery but hardly ever observed in the biobed piggery.

Here are the results of a second survey, [slide 10], this time on the subject of resistance to stress. The subjects were placed under some stress and then their stress resistance was measured. The method used was a restraint and blood stress test. As you can see from the picture, when collecting blood from pigs, if the nose is tied and pressure is applied (nose retention) while restraining the individual, they are unable to move. The first blood sample is collected shortly after the restraint begins, and a second sample is collected after the individual has been restrained for five minutes. Because the pigs are restrained throughout this time, they are placed under stress. Then the difference in the stress indicators for the two tests is measured.

The indicator of stress selected was the blood cortisol level. The first blood sample was taken within one minute of the start of the restraint, and this length of restraint had little effect on the blood cortisol level and produced no significant difference between biobed and windowless confinement-raised pigs. However, five minutes later, the blood cortisol level had risen steeply among the windowless confinement-reared pigs. By contrast, while the cortisol level also rose in the case of

biobed-reared pigs, the rise was considerably less pronounced. This result (Kohari, unpublished) shows that the biobed-reared pigs had greater resistance than confinement-raised pigs did to the same degree of stress.

Moving on to the third test, [slide 11]. This time, I checked the animals' reactions to people. (This table also includes the results of a novelty object introduction test as well.) Since people also represent a new stimulation, what I did was to let people stand in the piggery and then check how long it took for pigs to approach the people and how the animals behaved towards the people. As Prof. Sato mentioned during his lecture, when people go into a piggery, the pigs tend to rally around them en masse, so people may kick the animals unintentionally. And as we saw earlier, confinement-style rearing environments tend to have a rather uniform and simple structure. Of course, they are designed in that way to simplify hygiene management. But under such environments, the pigs get very little stimulation so, when some new stimulation appears, the pigs move towards it and gather around it. The amount of time people stood in the pig-rearing area was only about 30 seconds. This is because they couldn't stand to remain there any longer than that. The way this test was performed was that people would enter the piggery and be asked to stand at the center of a circle with a radius of one meter for 30 seconds. During this time, the degree to which pigs came close to the people and sniffed or bit them was measured. The results are as shown in the lower part of the table. Compared with biobed rearing, in the confined rearing environment the animals came close to the people much more rapidly, commonly within 2 seconds or so, and they bit the visitors regardless of whether they were men or women. After the pigs sank their teeth into the people they would not release their grip for around 25 seconds on average (Kohari, unpublished). In the biobed case too, there were pigs that came close to people, sniffed them and bit them. But in this case, they would approach the new arrivals in a more guarded fashion, and only when they had assured themselves it was OK would they bite. The results show that both the length and the degree of biting were greater in the case

of confined rearing, where the animals get less stimulation.

As I explained earlier, by rearing pigs in a way that enhances their degree of freedom and pays due consideration to their amenities, as in the case of biobed rearing, it is possible to reduce the amount of abnormal behavior such as fighting displayed by the animals. In addition, their stress resistance is enhanced and their reactions to people become milder. These were the results I obtained. However, although it is very encouraging from an animal welfare standpoint that this kind of rearing is being carried out at Porkland, there are difficulties to be overcome in practicing this form of pig rearing commercially. Much of the problem stems from the common consumer sentiment that, "all in all, as far as animal products go (including pork), it's OK as long as it's cheap." Moreover, consumer consciousness about how pig rearing is carried out or how animal products are made is very low. Indeed, my actual feeling is that almost all consumers know little or nothing of the subject. Accordingly, in order to actually carry out rearing that is comfortable for pigs and, what's more, to popularize and promote it, it is vital to have highly aware producers (of course) but also consumers. It is necessary for the consumers, those who actually benefit from eating pork, to develop an interest in how pigs are reared and feel that they 'wish' to consume pork reared in the more comfortable way, and that they understand what animal welfare entails. I think these things are essential if we are to realize pig farming that is comfortable for the pigs at pig farms throughout Japan.

ブタの特性に配慮した快適な養豚



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【Slide 1】




【Slide 5】

ブタの飼育法

【Slide 2】

ブタの快適性に配慮した飼育法の影響

- 喧嘩や異常行動は少なくなるか？
- ストレスに強くなるか？
- 飼育者など人間に対する反応は変わるか？



【Slide 6】

快適な養豚とは

- 新鮮な餌や水の充足
- 病気や怪我の予防・処置の充足
- 暑さや寒さに対する配慮の充足
- 不必要な恐怖などの回避
- 動物の習性や生態に基づく行動実行可能性

↓

ブタが健康であると同時に
適応能力を十分に発揮できる状態が必要

【Slide 3】



【Slide 7】

ブタの行動レパートリー

維持行動	摂食行動	摂食・飲水
休息行動	休息行動	立位休息・横臥位休息・伏臥位休息・犬座位休息・翻転
探索行動	探索行動	嗅覚・嗅探
理身行動	理身行動	バンディング・自擦・日光浴・泥浴・脱がし
身づくろい行動	身づくろい行動	身掻く・舐める・噛む・掻く・磨り付け・伸び・砂浴び
寝床行動	寝床行動	寝く・寝る・寝る・寝る・寝る・寝る・寝る・寝る・寝る
社会行動	社会行動	社会行動
社会的探索行動	社会的探索行動	社会的探索行動
敵対行動	敵対行動	敵対行動
親和行動	親和行動	親和行動
社会的遊戯行動	社会的遊戯行動	社会的遊戯行動
生殖行動	生殖行動	生殖行動
母子行動	母子行動	母子行動

(佐藤ら1995 家畜行動図鑑より)

【Slide4】



【Slide 8】

快適な飼育法は敵対および異常行動の出現頻度を变化させる

	敵対行動		異常行動		
	攻撃	闘争	偽咀嚼	他者寄り	物体寄り
conv. 前期	30	11	122	34	5
conv. 中期	22	8	30	21	7
conv. 後期	21	1	89	21	8
bio. 前期	16	6	0	0	0
bio. 中期	7	7	0	1	0
bio. 後期	19	2	3	6	1

*P<0.05; †P<0.001; ††P<0.0001

【Slide 9】

あなたはどのように飼われたブタを食べたいですか？

【Slide13】

快適な飼育法はストレス耐性を变化させる

調査項目(種) 香川県 バイオベッド 姫路農大

調査項目(種)	香川県	バイオベッド	姫路農大
新奇物反応			
接触潜時	1.0±1.3	5.0±2.3	NS
噛付き潜時	6.2±6.8	16.6±4.9	NS
噛付き時間	5.6±7.5	11.4±4.9	NS
対人反応			
女性			
接触潜時	2.0±0.0	7.2±2.9	*
噛付き潜時	4.8±2.6	16.0±3.0	**
噛付き時間	25.2±2.6	13.2±2.5	**
男性			
接触潜時	2.0±1.0	8.8±3.9	*
噛付き潜時	6.2±1.1	19.6±2.1	**
噛付き時間	23.8±1.1	9.0±3.0	**

【Slide 10】

快適な飼育法は対人反応を变化させる

調査項目(種) 香川県 バイオベッド 姫路農大

調査項目(種)	香川県	バイオベッド	姫路農大
新奇物反応			
接触潜時	1.0±1.3	5.0±2.3	NS
噛付き潜時	6.2±6.8	16.6±4.9	NS
噛付き時間	5.6±7.5	11.4±4.9	NS
対人反応			
女性			
接触潜時	2.0±0.0	7.2±2.9	*
噛付き潜時	4.8±2.6	16.0±3.0	**
噛付き時間	25.2±2.6	13.2±2.5	**
男性			
接触潜時	2.0±1.0	8.8±3.9	*
噛付き潜時	6.2±1.1	19.6±2.1	**
噛付き時間	23.8±1.1	9.0±3.0	**

【Slide 11】

快適な養豚の実現のために

ブタの快適性に配慮した飼育では・・・
喧嘩や異常行動は減り、ストレスにも強くなり、ヒトに対する反応もマイルドに！

↓

ブタの特性や欲求に配慮した飼育の実践とともに
そのような生産方式に対する関心・理解が必要

**生産者とともに消費者もブタのウェルフェア
(アニマルウェルフェア)に関心を持つことが必要**

【Slide 12】