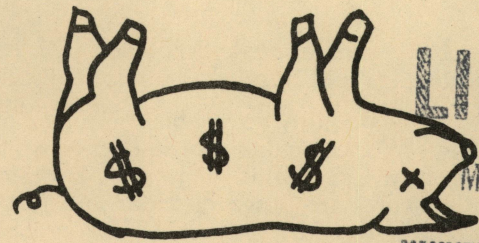




# PSS

## Porcine Stress Syndrome



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Porcine Stress Syndrome (PSS) is a condition that causes unexplained deaths of some heavily muscled hogs. This problem is very likely the same as the Pale, Soft, and Exudative (PSE) condition found in pork carcasses and cuts. Death is caused by circulatory failure related to stress brought about by a complex genetic weakness in the nervous and/or the endocrine or hormonal systems of the animal.

The PSS condition is a major concern for swine producers. Most death losses during transit to market can be blamed on this condition. Estimates are that 3 to 5% of hogs die on the way to slaughter because of PSS. Based upon a total farm sale value of \$4½ billion per year for U.S. swine, annual loss to producers from PSS is \$135 to \$225 million.

A recent National Livestock Safety Committee survey showed that 36% of the swine growers had experienced PSS in their herds. These producers marketed an estimated 44% of the hogs in the U.S. These PSS problem herds averaged marketing transit death loss rates almost 3½ times those of non-PSS herds.

Apparently, PSS-PSE is a hereditary problem. Some animals are genetically predisposed to be susceptible to stress. Reports from the Netherlands indicate one of their swine breeds, particularly noted for muscularity, has had death losses as high as 10% during transit to market.

Biochemical methods of detecting the PSS-PSE condition in breeding animals are being developed. Three methods which show some promise are:

1) Testing for blood pH (pH of 7.0 is neutral; 6.5 would be slightly acid and 7.5 would be slightly alkaline). Swine at rest have a blood pH of approximately

7.45. If swine are stress prone, the blood pH will usually drop to about 7.20 after the swine have been subjected to a stress such as exercise.

2) Muscle biopsy determination of high energy compounds (glucose-6-phosphate). Small muscle samples are taken from the loin muscle through an incision not much larger than one for a back-fat probe. The sample is very small. The wound heals easily. From this sample the muscle content of glucose-6-phosphate (an energy compound) can be measured chemically. Abnormally high levels of glucose-6-phosphate indicate a stress-prone pig.

3) Determination of blood enzymes (creatine phosphokinase or CPK). This method involves measuring CPK enzymes in the blood. This procedure is very complex. Many factors may influence the blood levels of this enzyme. High concentrations of the enzyme indicate stress susceptibility.

All these methods require further work and testing before full use by the swine industry.

These laboratory techniques were demonstrated with both stress-prone and stress-resistant swine during a national pork quality symposium at the University of Wisconsin in June 1972. After the tests were made, the swine were subjected to a stress that consisted of walking on a treadmill for four minutes at three miles per hour. This was not very vigorous exercise. However, temperature was 85 to 90 degrees and the humidity was about 90%.

The swine were then placed in an old pickup truck bed to which a mechanical shaker was attached to simulate hauling over rough roads. Within 10 minutes the stress-prone pigs were all dead or dying.



The most successful methods of avoiding this stress problem have been: 1) careful selection of breeding stock, and 2) crossbreeding, using breeds or lines within breeds which appear to be stress-resistant. Carcass quality information obtained on meat certified litters can be a good guide to follow when selecting replacement breeding stock.

Boars and gilts which exhibit the following characteristics should be avoided:

- Extreme nervousness shown by constant tail twitching, trembling ears, and constant movement.
- Skin splotches when excited. Splotches will be red on white pigs and purplish on black pigs.

Always check carcass quality scores of littermates or other closely related pigs. A quality score of less than 2 indicates stress problems. A quality score of 3 is desirable. These quality scores are based on color and firmness as indicated on a standard 1-5 scale. The carcass quality information obtained on meat certified litters can be a useful guide in buying replacements to correct or avoid a PSS problem. Swine can have reduced back-fat, increased muscling, and good rates of gain and still be free from the PSS-PSE problem. All heavily muscled swine are not stress prone.

Many producers feel confinement operations contribute to the stress problem, but there are no facts to

support this theory. However, confinement systems probably make these problems more evident to the producers.

Some ways of reducing death losses are:

- 1) Careful handling during movement and loading. Avoid use of persuaders if possible.
- 2) Try to prevent fighting. One method is to mix lots of pigs at night.
- 3) Adjust ventilation for both hot and cold weather.
- 4) Provide suitable bedding in cold weather. Wet down bedding in hot weather.
- 5) Try to avoid hauling pigs during the heat of the day.

If a producer ignores evidence of PSS-PSE in his herd, he can expect death losses as high as 10% from weaning to market age.

The economic benefits from minimizing death losses on the farm and during transit could add up to millions of dollars annually.

In addition to economic benefits to producers, overall improvement of the situation would help put pork in a stronger competitive position. The demand for lean, high quality meat is constantly increasing. Pork producers must be able to help meet these demands.

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