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New Pork Industry Problems: PSS and PSE

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Over the past decade the swine producer has made tremendous strides in producing leaner and more heavily muscled hogs which yield a higher proportion of their carcass weight in lean edible portion. The modern pig has excelled his ancestry in total performance, growth, feed efficiency and muscle producing ability. Because of the advances made in nutrition, breeding and management, the meat type pig of today is more efficient than ever before in conversion of feed protein to muscle protein. In addition, the environment under which many pigs are raised has been changed from the customary pasture and dirt lot to a mechanically operated confinement system. These changes in production have added some new problems to the swine industry.

Important on the list of these new problems is the Pork Stress Syndrome (PSS) and the production of pale, soft and exudative pork (PSE). Both of these problems arise because of the inability of many pigs to adapt to the numerous stresses to which they are exposed. The lack of ability to adapt to stress may show up in one of two ways, (1) the PSS syndrome which refers to a condition prior to slaughter (often resulting in death) in which pigs show obvious symptoms of excitement when exposed to the usual stresses of medical treatment, weighing, hauling, mixing, sorting and fighting, or (2) the PSE condition which refers to a poor quality carcass that lacks normal grayish-pink color, is very soft to the touch and lacks ability to hold moisture.

Researchers have indicated that the symptoms and events leading to the development of PSE and PSS are very similar. Animals which possess the shock-like syndrome are very excited as indicated by tail tremors, shortness of breath, rapid breathing, elevated body temperature, noticeable skin blotching and evidence of stiffness. Such conditions in the live animal may ultimately result in death before slaughter. If the pig lives until slaughter, the carcass will exhibit rapid rigor mortis and will lack the color, firmness and water binding capacity of normal pork. In addition, PSE pork also lacks marbling.

The overall eating acceptability of pork is most often based on the flavor, juiciness and tenderness of the chop. Because of the lack of marbling in PSE pork, most taste panels indicate that PSE chops lack some of the juiciness and tenderness of normal pork. The poor water binding capacity of PSE muscle is of concern to the packer because it shrinks more than normal muscle and thus results in reduced yields of cured products.

There are profound differences among animals of different breeds and among those of the same breed in their ability to adapt to or cope with stress. Some animals are capable of restoring physiological balance in muscle during severe stress, whereas others apparently do not possess this ability. The difference between various breeds of swine based on their ability to withstand stress and produce normal quality carcasses varies from one study to another suggesting that no single breed can be deemed "stress susceptible." Crossbred animals have also displayed the condition, indicating a similar genetic mechanism in all breeds.

The influence of genetics on the problem of PSS and PSE is not completely known, but it is the opinion of most researchers that the condition is moderately to highly heritable. Heritability estimates of various measures of quality suggest it to be in the range of 30 to 50 percent. Therefore, this trait could be changed by selection, provided quality potential was measurable on the live animal. Because the characteristics of PSS and PSE are strongly influenced by heredity, breeders should avoid keeping stock in the herd that produce pigs which are stress susceptible and result in poor pork quality (or death as often occurs with PSS).