

X-RAY ANALYSIS OF STRUCTURAL SOUNDNESS IN SWINE

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Briefly, in review, our work with the X-ray has consisted of a study of the bone angles in the skeletal outline as viewed from the side. The attention has focused on shape or height of the skeletal arch; the relationship (angles) of the rear and front leg bones with the skeletal arch. Since the December 1977 NSIF report, breeding project gilts have been assigned a subjective leg soundness score (1-10 with 10 = most sound). Gilts with a leg soundness score of 6 or higher are included in the breeding herd as sound; gilts below 6 are categorized as unsound. All breeding stock is maintained in confinement on concrete with no bedding.

X-rays presented in this discussion represent one pig from each of the two treatments; sound vs unsound females. The sound pig as noted in the slide presented is categorized as a 9 on soundness; his dam was scored as an 8 on soundness. The unsound pig was scored as a 3 on soundness from a dam scored as a 4 on soundness.

The sound pig has a characteristic curvature to the front leg as viewed from the side and displays angularity in the hock as viewed from the side. The unsound pig is obviously extremely straight in both the rear and fore legs.

In the first X-ray slides presented, an extreme difference is noted in height of the skeletal arch. Key vertebrae (thoracic and lumbar) are numbered for your location convenience. A straight line was drawn under the spinal column in each slide to illustrate the arch differences.

Through the use of a series of slides, differences in the angle formed at the juncture of the ilium-ischium bones (over the rump) with the femur was shown to be 60° in the sound pig as contrasted to a 74° angle in the unsound pig.

The angle formed at the stifle by the juncture of the femur-tibia fibula bones is a 100° angle in the sound pig as contrasted to a 118° angle for the unsound pig.

Differences in the angle at the hock joint was noted to be 125° in comparison to 160° angle for the unsound pig.

In each case, the unsound pig has a larger angle at the junctures illustrated by the X-rays. This is, in effect, a straightening of the rear leg bones and joints which is readily observable in the live pig.

Front leg X-rays reveal a pattern in angles similar to that discussed in the rear legs. Of particular interest is the angle formed at the elbow by the juncture of the humerus-radius ulna bones. The sound pig has an angle of 92° vs an angle of 101° for the unsound pig. The humerus bone is more nearly parallel to the underline of the body in the sound pig.

These two pigs as well as others from the treatments have been necropsied. No indications of osteochondrosis or other arthritic joint problems were noted in these pigs. Necropsy findings did reveal a "tendon shortening effect" in the unsound pig; the condition of which is reported with some regularity in horse unsoundness.

In summary, these pigs illustrate a small sample of an experiment designed to identify angularity of joints and the relationship to structural soundness. The value of the X-ray is probably best described as a tool to help identify and reinforce the validity of visual observations of structural conditions of swine at an early age.