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Cryptorchidism In Swine

Grant M. Carman*

In a previous issue the cryptorchidism of the horse was discussed, with its probable mode of inheritance. The same anomaly is known in other animal species as well, being perhaps most frequent in the horse, with swine, cattle and sheep following in that order.

Cryptorchidism is the failure of one or both testicles to descend normally into the scrotum. The average producer of market hogs discriminates heavily against the use of a cryptorchid boar, and generally demands that both testes be descended normally into the scrotum, and be prominent in outline.

The prevalence of this anomaly has been reported by Nordby (1933) who summarized the data calculated by the following investigators:

<table>
<thead>
<tr>
<th>Investigator</th>
<th>No. Observed</th>
<th>Males</th>
<th>Cryptorchids</th>
<th>% Cryptorchids in £'s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Busman (Chicago)</td>
<td>103,000</td>
<td>49,018</td>
<td>313</td>
<td>0.64</td>
</tr>
<tr>
<td>De Wolf</td>
<td>4,671</td>
<td>4,671</td>
<td>35</td>
<td>0.79</td>
</tr>
<tr>
<td>Jelen (Omaha)</td>
<td>534,486</td>
<td>254,312</td>
<td>2,138</td>
<td>0.84</td>
</tr>
<tr>
<td>Shelton (Denver)</td>
<td>142,000</td>
<td>67,578</td>
<td>493</td>
<td>0.73</td>
</tr>
<tr>
<td>Total</td>
<td>779,486</td>
<td>375,579</td>
<td>2,979</td>
<td></td>
</tr>
</tbody>
</table>

More recent data as to its incidence, taken from the Canadian Live Stock Marketing Division records, is reported by Forshaw in the Country Guide. It may be seen that the percentage of ridged sows in Canadian hogs has ranged between 0.60 and 0.65 through the last five years.

Three types of cryptorchidism in swine are defined by Dollar (1912): "retentio abdominalis, where the testicle lies near the upper wall of the abdomen; retentio iliaca, when it is near the inner abdominal ring, and retentio inguinalis, when it is within the inguinal canal."

During the descent of the testes a pouch of peritoneum grows down into the inguinal canal, carrying fibers of the abdominal muscles which will form the cremaster. The cord known as the gubernaculum testis extends from the epididymis of the fetal testicle to the base of what will become the scrotum, and by gradually shortening its length will guide the testicle through the inguinal canal to its final position. The failure of this guided descent of the testicle at any stage of its development gives rise to cryptorchidism.

It appears to have been generally accepted by various writers that a cryptorchid, from which only the scrotal testicle has been removed, develops secondary sexual characteristics. Contrary to this belief Nordby (1933) reports that, without exception, eight cryptorchid pigs that

This article is the second on cryptorchidism by Mr. Carmen. The first, entitled Cryptorchidism in the Horse was published in No. 1, Vol. XIII, 1951 of this publication. Since that time Mr. Carmen has received his M.S. degree in genetics and is now working on his Ph.D. under Dr. J. L. Lush in the Department of Animal Breeding.

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he raised during his experiments failed to show any signs of sexual development or secondary male characteristics, up to eight months of age. McKenzie (1931), on the other hand, reports that all ten cryptorchids raised in his experiments did develop masculinity, but failed to report the age at which such development was manifested. Further, McPhee and Buckley (1934) reported temporary fertility in a bilateral cryptorchid boar, and also the fact that two similar sons of the original boar had viable semen. Of interest here is the theory, advanced by Nakamura and Makino (1951), that the cause of the retained testicle not producing viable semen is not due to the temperature of the body cavity, which is the generally accepted explanation, but is due to a change in the normal water distribution of the cell.

Hanes and Hooker (1937) extracted the androgenic hormone from cryptorchid pigs, and found the testes of the defective animals contained 50 percent of the androgen found in normal swine testes, per unit of weight. Engberg (1949) reports that due to the lack of androgenic production an increased production of estrogen and pituitary gonadotrophin results in the cryptorchids.

Objectionable Flavor

Conflicting reports exist as to the effect of the retained testis on the flavor of the meat, but it can safely be stated from slaughter-house records and reports that few, if any, cryptorchids that are marketed at approximately 200 lbs. weight, or about six months of age, will develop the objectionable odor characteristic of the mature normal entire male pig.

Price Differential

Where pigs are sold on a straight weight basis, and the retained testis is not discovered until after slaughter, as in most U.S. packing plants, little or no discrimination is possible against the cryptorchid. In Canada and other similar countries, however, where a rail-grading system is practised, the Marketing Service reports in October, 1951, a price differential against cryptorchid pigs to vary from $7.00 to $5.00 below the basic “A” grade price, on a hundred-weight basis. Under such circumstances the cryptorchid pig is a definite loss to the hog grower.

Removal of the retained testis of the cryptorchid is more dangerous than ordinary castration because it involves entry into the abdominal cavity, increasing the danger to infection. Gordon (1940), Gordon and Fields (1942), and Engberg (1949) report on the use of chorionic gonadotropin to induce the descent of retained testes in male humans, prior to the onset of puberty. Complete descent was induced in 45 percent of the cases reported, and partial descent in 33 percent. It is doubtful if such treatment would be warranted in the pig, particularly in view of the results of Nordby, (1933). He states that no odor of the cryptorchid could be discerned if the animal were marketed at approximately six months of age. If removal of the retained testis is desired, surgical removal by a veterinarian is indicated.

Cryptorchidism is considered to be hereditary. McKenzie (1931) found evidence that such is the case. He mated a gilt from a cryptorchid boar to a cryptorchid litter-mate, and roughly 50 percent of the male pigs resulting were cryptorchids. Out of 107 pigs from 12 sows, sired by a normal boar, 10 cryptorchid pigs resulted in five of the 12 litters. The boar was not related to the sows, but three of the sows were daughters of the fourth. When the boar was mated to his daughter, a litter-mate to a cryptorchid male, one sow pig, three normal males, and two cryptorchids resulted. McPhee and Buckley (1934) in experiments with an inbred strain of Chester Whites at the United States Animal Husbandry Experiment Farm, Beltsville, Maryland, report that continuous brother-sister mating to establish an inbred line provided sufficient evidence for them to postulate that cryptorchidism in swine is a sex-limited, recessive character.

Smith, Robinson and Bryant (1936) agree substantially with such an hypothesis, while Couvreux, (1943) attributes cryptorchidism to an hereditary factor.
transmitted by the male, dominant in
the horse, but recessive in the pig, dog
and sheep.

From the preceding it is evident that
cryptorchid boars should never be used
as sires. Boars that appear normal and
sire cryptorchid pigs should likewise not
be used for breeding, and no boar or sow
from a litter that has contained a cryptor­
chid should be retained for breeding pur­
poses. The loss to the producer should
be minimal if the scrotal testicle is re­
moved, and if the animal is marketed
prior to six or seven months of age the
processor of pork products should sus­
tain little or no loss.

Summary

In summary, cryptorchidism in swine is
a sex-limited, recessive factor, of heredi­
tary nature, and widespread in the swine
population of the country. Care in select­
ion of breeding stocks should prevent its
incidence from increasing, and marketing
at an early age will, as far as possible,
prevent monetary losses from being sus­
tained by either the producer or the pro­
cessor.

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Livestock Conservation, Inc.

Consolidation of the National Livestock
Loss Prevention Board and the Livestock
Sanitary Committee has been announced
following a meeting of the directors of
both organizations. The new agency will
be known as Livestock Conservation, Inc.,
and will have offices in the Livestock
Exchange, Union Stockyards, Chicago.

Livestock Conservation, Inc., will be
governed by a 45-man board of leaders
from all segments of the livestock and
meat industry and allied service organiza­
tions. Dr. J. R. Pickard, general manager
of both the loss prevention and the sani­
tary committee, will be general manager
of Livestock Conservation, Inc.

The consolidated educational and re­
search organization will carry forward
the programs of the parent organizations.
Principal attention will be given losses
from disease, parasites, and injuries on
farms and during the marketing process.

Viomycin

Viomycin, one of the newer antibiotics,
has been employed in the treatment of
guinea pigs that had been inoculated
with streptomycin-resistant and strepto­
mycin-sensitive tubercle bacilli. Both of
the above groups appeared to be equally
beneficially affected by the administra­
tion of viomycin.

Also, this antibiotic has been shown to
have low toxicity for rats, cats, and dogs.

Human balantidiasis (Balantidium coli
infection) is contracted from swine, in
which the parasite commonly occurs.
Carbarsone is regarded as the most prom­
ising drug for human infections.

Cattle given all the salt they want are
quieter, eat more feed, and gain faster
at lower cost than animals which are
slighted on salt.