CANNIBALISM IN PIGS

K. W. F. Jericho and T. L. Church*

CANNIBALISM manifested as tail and ear biting in pigs reared in confinement has been described as a social disease (2), but its etiology is undefined. To elucidate the contributing conditions for social breakdown in groups of pigs Ewbank (2) called for three preliminary moves:

1. The collection of detailed, accurate case histories of individual outbreaks;
2. The study of the social organisation of the pig group;
3. The devising of an experimental method of inducing the condition.

This case report is presented in detail to respond to requirement 1 and to assist in point 3.

SUBJECTS AND MANAGEMENT

Piglets

The two farrowing barns were temperate, draft-free and without excessive odors. The farrowing pens were approximately 7′ × 8′ in size. No problems had occurred before or after farrowing. Piglets were given 1 cc of injectable iron[1] once in the second week of life after which they were given the freedom of the passageway of the house to mix with other litters. Piglets were weaned at six weeks of age.

Weaners

Three kinds of housing (A, B and C) were in use:

A. A new barn for weaners, 100′ × 36′ × 8′, to hold 40 pens, had been built. Six pens, 5′ × 16′ each, were in use in one corner of the concrete floored and walled building. After September 21, 20 pens were occupied and 32 pens after October 21. A central 3′6″ wide passage divided the building longitudinally. Six fans at 7′ height, at equal intervals along one side, extracted air from slit openings at the opposing rafter. Ventilation was adequate to avoid undue humidity and odor accumulation but failed to prevent a rise in temperature on hot days. The pen partitions were three foot heavy wire mesh. A wood slatted dunging area, 5′ × 4′, was located at one end of each pen. The watering bowl was mounted over this area. Feed was dispensed on the concrete floor on the passage-end of the pen. Bedding was not provided. Pigs in this building only were kept in darkness. As this barn had insufficient pens, other weaners had to be housed in temporary quarters B and C.

B. This was a one room 40′ x 16′ x 10′ barn loft. Deep straw litter covered the floor. Ventilation was provided by one vent in the center of the roof, and two doors and two windows at floor level on opposite sides. On days free of wind, ventilation was considered inadequate as there was excessive accumulation of heat and odors. Three troughs of 45′ total length were in use.

C. This third type was a converted wooden farmhouse. There were four rooms: 15′ x 11½′, 15′ x 15′, 8′ x 11′ and 7′ x 10′; each was 8′ high. Ventilation by windows was inadequate. Little straw bedding was provided. Floor and trough feeding was practised. Water was supplied manually in two troughs as often as possible.

Hogs

Pigs for fattening were transferred to a new hog barn identical in structure to weaner barn A. Forced ventilation was adequate, to avoid undue humidity and odor accumulation, but failed to prevent a rise in temperature on hot days. The wire mesh partitions were 3′6″ high. This barn had been occupied to capacity by pigs for five months. Previous to the month of April it was the practice to sell the pigs as grown weaners.

Treatment House

One wooden house with a single room of 15′ x 20′ was used to accommodate about 30 weaners severely debilitated by cannibalism.

Feeding and Watering

Methods of feeding and watering are indicated in Table I. These duties were temporarily performed by one young man. Feed was given to sows, weaners and hogs twice a day, in amounts which would leave the pigs without feed for most of the intervening period.

*Animal Pathology Division, Health of Animals Branch, Canada Department of Agriculture, Animal Diseases Research Institute (Western), P.O. Box 640, Lethbridge, Alberta (Jericho) and Green Acres Animal Hospital, Lethbridge, Alberta (Church).

[1]Felac, Cyanamid of Canada Ltd., 635 Dorchester Blvd. W., Montreal, Que.

TABLE I

SUMMARY OF SEVERITY OF VICES AND CONDITIONS OF HUSBANDRY

	Farrowing		Weaners			Hogs
	House I	House II	Barn A	Barn B	Barn C	Hog Barn
Ear Biting Sept. 4	—	—	+	++	+++	—
Sept. 21	—	—	+	+	empty	—
Oct. 21	—	—	—	empty	empty	—
Tail Biting Sept. 4	—	—	—	+	++	+
Sept. 21	—	—	—	+	empty	+
Oct. 21	—	—	—	empty	empty	—
Age (weeks)	0–6	0–6	6–7	8–10	12	>20
Castrated	No	No	No	No	Yes	Yes
Bedding	**	**	—	***	*	—
Power Ventilation	—	—	In operation	—	—	In operation
Sq. Ft. per "Unit of Confinement"	Appr 60	Appr 60	80	640	555	80
Sq. Ft./Pig (approx.) on September 4	—	—	2.7	4.2	5.5	5
Sq. Ft./Pig (approx.) on October 21	—	—	2.7	—	—	5.7
Group Size Sept. 4 (approx.)			30	150	100	16
Group Size Oct. 21 (approx.)			30			14
Water Supply	A	A	A	M	M	A
Feed Dispensing	T	T	F	T	F & T	F

Degrees of manifestation of vices:
— Absent
\+ Mild
++ Moderate
+++ Severe

Extent of bedding:
* Minimal
** Moderate
*** Plentiful

Method of water and feed dispensing:
A = Automatic T = Trough
M = Manual F = Floor

After September 4, the amount fed was increased to provide feed for most of the day.

Sows were fed a home-grown ration consisting of ⅔ barley and ⅓ oats. Piglets in the farrowing barns received 18% protein pig starter of Company X *ad libitum*. Piglets ate this ration very sparingly. After September 4, the 18% protein pig starter was supplied by Company Y.

Weaners and hogs were fed a dry diet supplied by Company X[2] until September 4, following which Company Y[3] supplied the feed.

[2]Protein, Min 14.00%, Fat, Min 2.00%, Fibre, Max 7.00%, Salt .60%, Calcium .70%, Phosphorous .60%, Zinc .0075%, Vitamin A 1,500 I.U. per lb, Vitamin D 330 I.U. per lb, and other ingredients listed, no quantity stated.

[3]Formula of feed of Company Y: Oats 200 parts, wheat 200 parts, barley 1300 parts, concentrate 300 parts of the following formula: Protein 40%, Fat 4%, Fibre 8%, Salt 3.3%, Calcium 3.8%, Phosphorous 2.1%, Iron .25%, Zinc .065%, Iodine .0002%, Vitamin A 1333 I.U. per lb, Vitamin D 2667 I.U. per lb. This diet was stated to contain 16% protein and it was calculated to contain on average 2.4% fat and 6.5% fibre.

History and Results

Visits were made to the premises on September 4, September 21 and October 21.

The prevalence and degrees of cannibalism on the three visits, the housing density and clinical observations are indicated in Table I. Cannibalism was most prevalent on September 4. The vices had been evident in weaner house C one week previously and in barns A and B three to four days previously. Tail biting in the fattening house had occurred for some time. Ear biting by weaners in barn A was seen in only three of six pens. On September 4, all weaners were found to be hyperactive, squealing excessively and appeared to be hungry. Clinically-normal pigs could be seen in constant pursuit of their victims, biting at ears and tails (Figure 1).

Twenty pigs had died in a state of emaciation and severe debility, and 30 other debilitated pigs had been removed to the treatment house. Local application of iodine and systemic antibiotic treatment was recommended.

On September 21, weaner barn A had 20 pens occupied and weaner house C was empty. Some, but by no means all the biters,

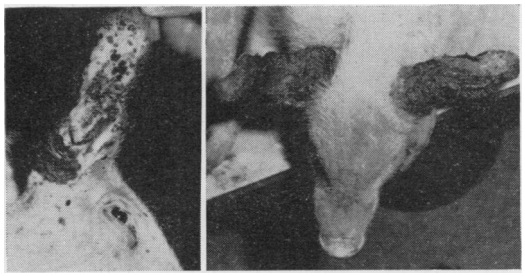

FIGURE 1. Typical lesions at base of ear.

had been removed from their pens. When biters were transferred into another pen they did not resume their aggression. The prevalence of biting was reduced from that observed on September 4. The wounds of pigs in the treatment house had healed and all were recovering.

On October 21, biting had subsided completely in all housing quarters. At this time all weaners were housed in barn A which had 32 to 40 pens occupied and the fattening barn was occupied to capacity with 600 hogs.

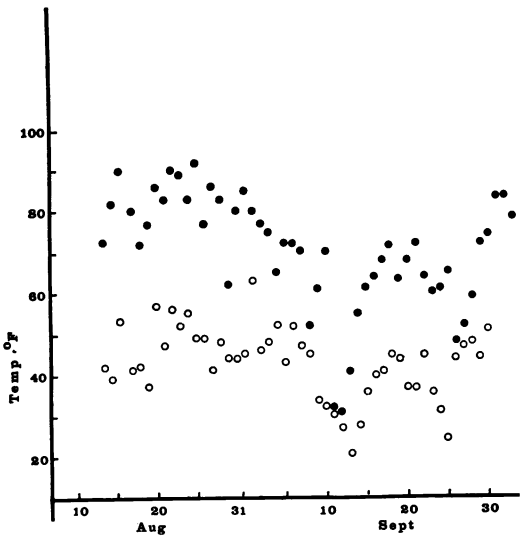

FIGURE 2. Maximum-minimum ambient temperatures for the period August 14, 1970 to September 30, 1970.

The maximum-minimum ambient temperatures from August 14, 1970 to September 30, 1970 are plotted in Figure 2. Ambient relative humidity (%) readings are available for a locality[4] 12 miles away from the pig premises. Four daily readings were taken at six-hour intervals. The mean values for August 1970 were 66, 37, 30 and 54% and for September 1970 were 70, 48, 42 and 63%. The normal values for August 1931–1960 were 73, 43, 33 and 61% and for September 1931–1960 were 76, 48, 40 and 65%.

[4]Lethbridge, Meteorological Branch, Department of Transport.

DISCUSSION

The factors as listed in Table I do not explain the abrupt onset of this episode of cannibalism under these different conditions of housing. Nor can we find the answer in any particular deficiency in the diet. The supplier of feed X supplied the same feed to many other pig producers before and during the peak of the episode. The changed conditions of pig husbandry and area climate which followed September 4, may partially explain the gradual improvement and abatement of the vices within six weeks. These changes are principally (a) the amount of feed provided (feed available for more hours of the day, probable reduction in degree of boredom); (b) cooler weather, and (c) diet change, most notably an increase of protein from 14% to 16%.

Piglets ate Company X piglet starter (18% protein) sparingly. This may compare with the behavioral abnormalities in young adult pigs caused by malnutrition in early life as observed by Barres *et al* (1). A diet very low in protein fed from the third through the eleventh week of life produced heightened excitement of the pigs when they were exposed to adverse stimuli.

The occurrence of the vices in barn A attracts particular attention as only six of 40 pens were occupied, however weaners in the pens were crowded and kept in darkness. This small population for the available air space is not likely to have led to an accumulation of noxious gases or excessive humidity. Tail biting was induced experimentally by van Putten (5) in pigs 19 weeks of age by exposing them to inadequate ventilation and air high in carbon dioxide and ammonia gas.

Extremely high population densities alone, seen in Table I, cannot be said to have precipitated this outbreak; crowded conditions persisted after the behavioral vices subsided. Crowding may be one significant contributing factor with factors a, b, and c above. Consideration must be given to the social stresses no doubt inflicted on the piglets when they were abruptly moved from their very extensive "playground" in the farrowing houses to the crowded conditions in the weaning quarters. The establishment of a dominance hierarchy (4) is pursued with particular vigor under these conditions. There is some evidence (4) that at high stocking rates the

dominance hierarchy is less successful in controlling aggression within the group. Linear-type dominance orders of up to about 12 individuals have been reported in pigs (3); a group size much smaller than was permitted on this farm. Similarly a group of animals of differing sizes is said to establish a permanent dominance order more quickly than a group of equal-sized animals (3) such as those grouped together in this case.

The opportunity of escape from aggressors was minimal in pens of barn A and the hog barn, but it was available in barn B and more ample in house C. The high stocking rate in pens of barn A and of the hog barn must have led to severe competition for floor feeding space.

If the foregoing factors are of significance, their relative time of occurrence may have triggered this episode of cannibalism. Population densities and diet had been unchanged for many months. However, duration of feed availability and high environmental temperatures were conditions which did change with resultant diminished intensity of cannibalism. Marginal nutritional deficiencies possibly present before September 4, in conjunction with the other conditions of stress, should not be overlooked.

It is concluded that high population density (high stocking rates and large group sizes) with the resulting social stresses (increase in corticosteroid levels (3)), limited food availability (boredom, competition for food, and hunger), high ambient temperatures and possible low protein diet contributed to this outbreak of cannibalism.

Summary

Tail and ear biting in pigs of different ages under different conditions of housing at one establishment are described. A detailed description of the husbandry is given and the multiple factors which may have produced this episode of cannibalism are discussed. These factors were believed to include high population density, limited food availability, high ambient temperatures, and possibly low protein intake.

Résumé

Les auteurs décrivent du mordillage de la queue et des oreilles qui a sévi sur une ferme, chez des porcs de différents âges gardés dans des conditions variées. Ils détaillent aussi les méthodes de régie et ils commentent les facteurs susceptibles d'avoir causé cette attaque de cannibalisme. Parmi ces facteurs, ils incluent la surpopulation, la sous-alimentation, la température élevée du milieu ambiant et probablement l'ingestion d'une faible quantité de protéines.

Acknowledgments

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ABSTRACT

Weaver, A. D. (1969). Fracture of the equine pedal bone. Equine vet. J. 1, 283–286 (f.g.sp.). (Univ. Vet. Hospital, Bearsden, Glasgow).

Nine cases of intra-articular fracture of the third phalanx are reported. Five of the horses recovered and were able to resume normal work. It is difficult to form a prognosis by examining X-ray plates.

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