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HOOP SHELTERS – A SYSTEM FOR RAISING PORK

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ABSTRACT

Hoop shelters known for their structure design have in recent years been evaluated by swine producers as an alternative low initial cost housing system. A Nebraska and an Australian swine producer compared performance results of pigs raised in hoop structures with pigs of similar genetics and health raised in conventional housing. The Nebraska producer reported gains of 712 and 816 gm/d; feed/gain of 3.34 and 3.11; mortality of 10.6 and 8.3 percent, respectively, for hoop and conventional housed pigs. Housing system had little effect on carcass yield, lean or back fat. The Australian producer reported gains of 789 and 760 gm/d; feed/gain of 2.8 and 2.7; mortality 2.3 and 4.1 percent; back fat 11.8 and 10.5 mm; respectively, for hoop and conventional housed pigs. The Nebraska producer reported $2 and $0/pig bedding cost; $2 and $2.85 waste removal cost; $2 and $2 labor cost, respectively, for hoop and conventional housed pigs. The Australian producer reported $3 and $0/pig bedding cost; $2.40 and $0/pig waste removal cost respectively for hoop and conventional raised pigs. The Australian producer reported the labor requirement was 25 percent less for conventional housing in comparison to labor for hoop structures. The initial hoop structure and equipment cost was reported to be 53 percent of conventional housing.

KEYWORDS: swine housing, hoop structures.

INTRODUCTION

Swine producers have used low cost housing for raising pigs for years. The recent low pork prices and environmental pressures have caused a continued interest in raising pigs in non-conventional

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type housing known as “hoops” (Connor, et al., 1994, Harmon and Honeyman, 1997 and Brumm, 2000). The name of the structure comes from the arch form created by using curved steel tubes or trusses fastened to the top of wood side walls. An UV resistant polypropylene tarp is used to cover the trusses. The ends of the hoop structures remain open during warm temperatures to allow for maximum air movement and partially closed during cold temperatures. Some air movement is necessary even in cold temperatures.

Most hoop structures have an earthen floor covered with a minimum of 30 cm of various bedding materials. These bedding materials will vary depending upon availability in any given location. The materials used should have a high moisture absorbing capacity. Bedding materials most commonly used are wheat straw, corn stalks, paper, rice hulls, sand and various combinations of these materials.

The feeding and watering area will vary depending on the use of dry or wet/dry feeders. A concrete pad is generally used for the dry feeders and the waterers whereas floating wood platforms or concrete gang slats are used with wet/dry feeders.

Two swine producers, one in Nebraska, USA and one in Australia, evaluated hoop type housing versus conventional housing. Comparison results of pigs raised in hoop and conventional housed pigs marketed in 1999 are summarized and presented.

PROCEDURES

The Nebraska swine producer's hoop structures were 9.15 m x 27.5 m with a 6.1m x 9.15 m concrete slab located on the south end of each hoop building. Two double hole energy free waterers and two 12 hole round dry feeders were positioned on the concrete slabs. The north end of each hoop was closed during cold weather, whereas the south ends remained open. The prevailing cold weather winds were from the northwest.

Pigs were bedded with 30 to 45 cm of bedding consisting of wheat straw, corn stalks or ground grass hay. The mixed sexed pigs were of various genetic sources and were infected with P.R.R.S. The pig space was approximately 1.1 m^2 per pig (225 pigs per hoop structure).

The conventional total slatted buildings were 12.8 m x 62.4 m. The building was divided into four separate rooms with 10 pens each housing 27 pigs per pen. The pigs space was approximately 0.7m^2. The double curtain sided building had insulated curtains on north side and non-insulated curtain on south side. The curtains and pit fans were controlled in each room by separate controllers. The feeders were double sided two space 0.6 m wide wet/dry feeders. The mixed sex pigs were from the same genetic source as the pigs housed in the hoop structure. The feed source and feeding program consisting of corn, soybean meal, minerals, vitamins and one per cent added fat were the same for the pigs housed in each system.

The Australian hoop structure termed "Ecosystem" by the Australians housed 400 pigs per structure with 1.0 m^2 per pig space. Rice hulls were used for the bedding material. The ends of the hoop structures were open to allow for maximum air movement. The wet/dry feeders were placed on platforms and aligned lengthwise in the hoop structures.

The Australian conventional houses had concrete floors consisting of one third solid and two-thirds slatted area for each pen. The pens housed 20 pigs per pen with 0.7 m^2 space per pig. Both dry and wet/dry feeders were placed in the conventional house.

The conventional houses were naturally ventilated with side curtains that were adjusted by controllers. The mixed sexed pigs (50% entire males and 50% females) were of Bunge genetics and grown in both housing systems. The feeding programs were the same for both housing systems and were manufactured at a common feed plant.

RESULTS AND DISCUSSION

Performance results from the Nebraska and Australian swine producers are summarized in Tables 1 and 2, respectively. Pigs raised in the Nebraska hoop buildings had less gain (712 vs 816

gm/day) than the conventional raised pigs. The hoop raised pigs also required more feed (3.34 vs 3.11) to produce pork than the conventional housing. Carcass yield, percent lean and back fat were essentially the same between housing systems.

The performance results from the Australian swine producer showed pigs raised in hoop shelters had 29 grams (789 vs 760 gm/day) better daily gains and 1.8 percent (2.3 vs 4.1%) better livability than pigs raised in conventional housing. The hoop raised pigs also required more feed (2.8 vs 2.7) to produce a kilogram of pork. The back fat was 1.3 mm more for pigs raised in hoop structures than for pigs raised in conventional housing.

The difference in performance results (gains and livability) between the Nebraska and Australian swine producers may have been due to the health status of the animals, experience of the producers raising pigs in hoop structures, weather conditions and/or feeder type. Harmon and Honeyman (1997) reported pigs raised in hoop structures during the colder months have a poorer feed efficiency than pigs raised in hoop structures during the warmer months.

Harmon and Honeyman (1997) also reported 2.6 percent mortality for 3 trials of pigs raised in hoop structures as compared to an average of 2.32 percent mortality for all farms participating in 1995 Pig Champ records. Payne (1991) and Froese and Yacentiuk (1992) reported pigs fed from wet/dry feeders had significantly better gains than pigs fed meal rations from dry feeders. The Nebraska conventional houses had wet/dry feeders and the hoop structures had dry feeders.

The Nebraska producer reported a $2 per pig bedding cost, whereas the Australian producer reported $3 per pig cost. The cost of waste removal from the Nebraska structures was $2 and $2.85/pig for the hoop and conventional structures, respectively. The Australian producer reported a $2.40/pig waste removal cost for the hoop structures.

The Nebraska producer reported equal labor cost of $2/pig for each housing system. The Australian swine producer reported a 25 percent reduction of labor cost for pigs raised in conventional housing as compared to hoop structures.

The Nebraska producer reported a $92/pig space cost for the hoop structures and equipment. This compared to $172/pig space for the conventional housing. The Australian producer did not report a structure cost for each of the housing systems but did report that the hoop building depreciation per pig space was 53 percent of conventional structure system. It is interesting to note that the Nebraska hoop structures cost was 53 percent of the conventional housing.

SUMMARY

Two swine producers, one from Nebraska and one from Australia, compared raising pigs in hoop structures and conventional housing. The performance results showed pigs raised in the Nebraska hoop structures had slower gains, poorer feed conversions and higher mortality than pigs raised in conventional housing. Pigs raised in the Australian hoop structures had faster gains, less mortality but feed conversions were higher than pigs raised in conventional buildings. Carcass quality of the Nebraska pigs was similar between building systems. The Australian producer reported pigs raised in the hoop structure had an average 0.7 mm more back fat than pigs raised in conventional buildings. Both producers had similar bedding, waste removal and labor costs. The bedding cost for the hoop structures approximates the additional interest and depreciation cost of the conventional housing system. The hoop structures offer the swine producers nearly one half the initial housing and equipment cost plus a housing system that is friendly to the environment. The results reported by the Nebraska producer were his first experience raising pigs in hoop structures; in addition, the pigs had P.R.R.S. The Nebraska producer believes with additional experience and healthier pigs that the performance results of pigs raised in the two housing systems will be similar.

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TABLES

Table 1. Performance data comparing Nebraska hoop sheltered and conventionally raised pigs.

	Hoop	Conventional
No. pigs started	898	1083
No. pigs sold	803	993
Starting wt, kg	23.6	25.9
Out wt, kg	112.3	117.9
Days on feed	125	113
Rate of gain, g/d	712	816
Feed/gain	3.34	3.11
Carcass yield, %	74.5	74.6
Lean, %	51.8	52.1
Back fat, mm	21.8	22.1
Mortality, %	10.6	8.3

Both groups had P.R.R.S.
Mixed genetics

Table 2. Performance data comparing Australian hoop sheltered and conventionally raised pigs.

Hoops

No. of pigs started	Wt in kg	Wt out kg	Days	Rate of gain, g/d	Feed: gain	Back fat mm	Mortaility %
400	20.0	99.6	101	782	3.0	12.2	1.9
400	20.0	99.5	101	779	2.9	12.9	2.9
400	19.3	106.1	103	835	2.9	13.1	1.7
400	21.0	102.5	100	811	2.9	12	2.4
400	19.0	99.0	104	770	2.9	12.8	1.8
400	19.2	98.1	105	736	2.9	10.3	4.0
400	19.1	106.3	102	851	2.7	11.7	2.3
400	20.2	94.0	98	740	2.9	10.5	1.5
400	18.7	99.4	97	828	2.6	11.6	1.5
400	20.7	94.7	94	779	2.7	11.9	3.2
400	18.7	90.1	93	764	2.9	11.1	2.0
Av.	19.6	99.0	100	789	2.8	11.8	2.3

Conventional

No. of pigs started	Wt. in kg	Wt. out kg	Days	Rate of gain, g/d	Feed: gain	Back fat mm	Mortaility %
1000	20.0	98.3	106	733	2.8	10.0	3.5
1000	20.0	101.0	106	759	2.8	9.7	2.9
1000	19.4	106.4	105	822	2.6	11.7	3.2
1000	19.8	103.9	104	805	2.6	10.9	2.7
1000	17.8	103.9	111	766	2.7	10.9	5.1
1000	17.3	98.1	112	710	2.8	10.9	7.4
1000	18.4	93.6	99	747	2.8	10.3	5.1
1000	17.5	92.4	99	749	2.5	10.1	4.0
1000	18.5	98.2	106	746	2.5	10.4	2.6
Av.	18.7	99.5	105	760	2.7	10.5	4.1