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Agricultural
Research
Training
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OBSERVATIONS ON SWINE PRODUCTION AND PERFORMANCE

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Observations on Swine Production and Performance
on North Andros Island, Bahamas

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11

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INTRODUCTION:

The preferred red meat in the North Andros Household survey was pork and pork products. However, pork production in the Bahamas is a small industry, limited to several families with backyard maintenance of one or two sows, and few intensive, large-scale, specialized swine producers. Only about 10% of the pork consumed in the Bahamas is raised in the Bahamas, and over \$5.5 million of pork products were imported from other countries in 1975. To a certain extent, consumption of pork products depends not only on the cost of pork, but also on the relative cost of alternative meats. Swine production ranks high among the livestock species with regards to projected profitability (see Final Report No. 16, "Economic Analysis of Hog Production on North Andros Island"), suggesting that competitive production of other meats may be relatively low. Consumption trends of pork are difficult to predict. However, pork consumption should continue to increase because of the high ranking of pork as a desired staple in the diet, the increased population of the Bahamas, and the probability of relatively low amounts of other meats being profitably produced.

An initial concern regarding the economic feasibility of swine production was the absence of Andros-grown grain crops. Although grain production efforts on BARTAD have resulted in some advances in grain production, analyses of alternative feed sources for swine production indicated that imported complete rations were more economical than rations based on Andros-grown grains. This was primarily due to the relatively low yields and high costs of grain production on Andros. Naturally swine feed costs will vary from year-to-year depending on world grain prices, but with imported complete mixes, there is little reason for concern for Andros crop failures.

The swine phase of the BARTAD project has been conducted entirely on the Pilot Test Farms, and not on the BARTAD main site. For this reason, much of the data that may have been obtained on a station-based swine herd are lacking. However, the objectives of this report are to summarize the organization of the Pilot Test Farm operations and to present and evaluate levels of performance attained during the relatively short duration of the swine phase.

PROCEDURES:

The first Pilot Test Farm (Farm 2) to include swine was designed with a total of 5 acres of alfalfa. The primary purpose of including alfalfa was to reduce the grain requirements of the mature sow herd and also to aid in forcing exercise of breeding stock and growing pigs. In previous studies, alfalfa grazing has reduced grain requirements of the mature sow herd by up to 50% annually. Alfalfa and other predominantly legume pastures have, at times,

reduced post-weaning feed requirements of replacement and slaughter pigs by 25%, in addition to allowing more exercise which results in slightly leaner carcasses at the same live slaughter weight. As will be discussed later, although legume pastures can contribute to swine production; the pastures, hogs and fences must be carefully managed to allow the pastures to persist and to maintain productivity.

There are several alternatives for swine housing facilities in tropical swine production operations, ranging from intensive, partial or total confinement to extensive, essentially zero confinement. The Pilot Test Farm units established in the BARTAD Project have included two different types of facilities.

Although most of the swine feed has been imported as complete mixes, there were substitutions for some of the imported feeds with Andros-grown corn and sorghum grains. Additional Andros-produced feeds that have not been researched are cassava and "waste" or native feeds, including overripe or damaged fruits and vegetables. However, little information is available regarding the nutritional value and lack of toxic components of these "waste" products, particularly since it is not known at this point the types of horticultural and vegetable commodities that may be raised on Andros. Rations containing vegetable wastes and/or cassava must usually be supplemented with amino acids, protein and/or minerals, based on actual analysis of the waste.

PROCUREMENT AND BREEDING PROGRAM:

Seventeen Yorkshire-Hampshire crossbred gilts, 6 bred and 11 open, were obtained from a swine operation in Greenville, Florida. Two purebred Yorkshire boars were obtained from Tifton, Georgia. All hogs were trucked to the Import-Export Port, Miami, Florida, and flown to Andros in September, 1976. The hogs were taken directly to Farm 2. The boars were unrelated to the crossbred gilts so as to allow several farrowings from matings of the boars and gilts in the initial shipment without inbreeding.

There were several choices of breeds or crossbreds available for importation. The Yorkshire and Hampshire cross is one of the crosses that has demonstrated highly acceptable performance in practically all economic characteristics; number of pigs born per litter, maternal ability, growth rate, leanness and distribution of muscling in preferred retail cuts.

Both herds of origin were accredited swine herds. More information regarding initial health requirements and tests is given in Final Report No. 40, "Procurement, Shipment and Early Handling of BARTAD Livestock." (?)

Six of the gilts were bred when purchased and shipped, and the remainder were open. The gilts bred before shipment farrowed normally, averaging 10 live pigs per litter at birth, although one of the gilts farrowed only two pigs. All hogs were shipped to Andros in September. There were no health or acclimation problems when the hogs were shipped and received on Andros. Shipments during the fall-winter-early spring should result in less environmental stress on animals, particularly hogs.

The importation and use of the feed as complete mixes, especially early in the swine phase, also tended to reduce stress and health problems.

The second Pilot Test swine operation (Farm 10) was initiated in May, 1977, with two sows and four bred gilts (two bred to farrow in June, four in September). A boar and two additional open gilts were added in July. The boar was one of the highest performing individuals raised in the first Pilot Test herd. Litter identification of the progeny born in the first herd allowed the initiation of the second (and subsequent) herds with gilts and boars that were not closely related. These records must be maintained in order to control inbreeding in the herds, and to decrease the need for additional importations. Matings between half-sibs (only one parent in common between animals mated) are the closest type of matings that should be attempted, and even these matings are appreciably less desirable than mating of two unrelated individuals. Additional imports of unrelated boars and/or bred gilts (bred to an unrelated line) should be anticipated, regardless of the expansion of swine farmers, within the next two years.

Future breeding programs can be based only on a Yorkshire-Hampshire, two-breed criss-cross system, or a third pure breed (i.e. Duroc) may be introduced. Generally, the system used will depend somewhat on the number of swine farmers. In order to reduce the frequency of importations, perhaps seedstock, purebred animals of some of the breeds could be maintained within certain of the Pilot Test swine units.

HOUSING AND LOT DESIGN:

Hog lots on both Pilot Test farms have each utilized a total of slightly more than 5 acres and have included separate areas for sows, boars and market hogs. Farm 2 utilizes four, 1-acre sow lots with a boar pen located in the middle of these lots. Lactating sows can be separated from open or gestating sows, permitting the farmer to feed according to physiological need. However, fences need to be maintained to prevent hogs of different types from mixing. The central location of the boar pen allows convenient breeding of sows and aids in heat detection. Four lots of approximately 0.5 acre each are also available for growing market hogs and replacement gilts. Small pens have been constructed for debilitated individuals.

Farm 10 also utilizes four, 1-acre sow lots, with two of these lots each bordering a boar pen of approximately 0.14 acre. Four lots of approximately 0.75 acre each were constructed for market hogs and replacement gilts. Hospital pens are also available. Housing on both operations has been minimal, consisting mainly of shades for protection against the sun and heavy rains. On Farm 10, farrowing is on pasture in portable culvert- or quonset-type huts constructed of sheet metal and available commercially. These huts are also used as shelter for gestating sows. Farrowing on Farm 2 has been in farrowing crates located in a portable, slatted floor shelter, large enough to accommodate two sows and their litters.

Hogs are watered with 100-gallon capacity sheep troughs located near wells in each pasture and filled with hand pumps. Commercially available hog nipple

waterers mounted on polyethylene pipe are also used. Sows and boars are hand-fed in rubber or wooden troughs. Market hogs are fed with self-feeders.

NUTRITION:

Pasture:

Hog lots on both Pilot Test Farms were planted to an alfalfa-buffelgrass mixture. A poor, grass-dominant stand was obtained on Farm 2 and this stand did not persist after the addition of hogs. In contrast, pastures on Farm 10 are excellent alfalfa-dominant stands and have contributed appreciably towards meeting the nutritional requirements of the various types of hogs.

Pasture management in swine operations is extremely important, especially when alfalfa is utilized. All hogs must be ringed to prevent rooting and adequate acreage must be available to allow for pasture rotation. On Farm 10, market hogs are rotated between three, 1.75-acre pastures. Two to four lactating sows and their litters are rotated between two, 1-acre pastures. Similarly, two to four open or gestating sows are rotated between two, 1-acre pastures. Under these conditions, the alfalfa stands have persisted well during the first 6 months of the operation.

*Should be
0.75 acre?
CCH*

The lack of pastures on Farm 2 and the abundance of good pasture on Farm 10 has resulted in differences in the nutritional programs between the two farms. Hogs grazing alfalfa receive a portion of their nutritional demands from pasture, while those in "drylot" are fed complete rations.

Sows and Boars:

Gestating and open sows on alfalfa pasture are hand-fed 2 to 4 pounds of a complete 14% crude protein hog ration daily, depending on the condition of the sows. The ration is imported from Florida and made up largely of corn meal, meat, bone and fish meals, alfalfa meal, oats and soybean meal. Salt, minerals and vitamins are also included. Boars receive 4 to 6 pounds of the ration daily. Lactating sows on alfalfa pasture are fed approximately 6 pounds of the 14% crude protein ration daily.

Pigs nursing sows on alfalfa pasture are started on a commercial 18% crude protein creep ration. This ration is similar to the sow ration but also contains dried skim milk and whey. The pigs continue to receive this ration for 6 weeks after weaning. At this time they are switched to a similar 16% crude protein pig grower ration. Market hogs are finished on the 16% crude protein ration and alfalfa pasture.

Boars and gestating or lactating sows in drylot are fed approximately 8 to 12 pounds ear corn and 2.5 pounds of a commercial 38% crude protein supplement daily.

Newly weaned pigs in drylot have been successfully started on a ration consisting of 4 parts ground sorghum or shelled corn to one part 44% crude protein supplement. Growing and finishing hogs are also fed 4 pounds of the

ground sorghum-44% crude protein ration daily, approximately 5 pounds ear corn, and 1 pound supplement per day. High gluten flour (9% crude protein) intended for human consumption but spoiled in transport, was purchased from a local grocer and successfully fed to market hogs. A ration consisting of 5 parts flour to 1 part 44% crude protein supplement was used.

Future hog rations utilized by North Andros swine producers will probably depend heavily on imported feeds. However, hog feeding costs can be reduced by the utilization of locally available by-products and by cultivation and use of locally adapted energy sources such as cassava.

REPRODUCTIVE PERFORMANCE:

Reproductive performance can be measured in terms of number of live pigs per farrowing, and as the number of pigs farrowed per sow per year. Both measures depend on the genetic abilities, nutritional and health status, and soundness of both the sow and the boar.

Genetically, the selected stocks should have been capable of high reproductive performance, which was achieved in terms of number of pigs born. If the one initial gilt (which farrowed two pigs the first time) is excluded from the data, the average number of pigs born slightly exceeds 10 pigs per litter. This average includes those gilts which were bred before arrival. The average number of pigs born thus far in the second Pilot Test Farm (four litters, Farm 10) was eight pigs per litter. The gilts were of similar age in the two cases, although slightly lighter-weight when bred on the second farm. The second group of gilts were mainly three-fourths Yorkshire, one-fourth Hampshire. The half-blood gilt and/or the three-way crosses, represented in the first group of gilts, would be expected to produce more pigs per litter because of a more desirable degree of hybrid vigor. In addition, the condition of the second group of gilts (Andros-bred and -raised), as a result of nutritional status, was probably less desirable than in the initial group, especially if compared to the gilts bred before arrival.

There were several instances in which two litters per year per sow were not obtained, primarily because of nutritional status, or not exposing sows to more than one boar at one estrus. Early in the swine phase, foot soundness of the hogs, especially one of the boars, was impaired because of lack of forage cover and rocks. Average number of pigs marketed per sow within a 12-month period, based on limited data, was 11.7. A contributing reason was that this included the immediate post-importation period, and some of the smaller, younger imported gilts did not settle readily. It is critical for both gilts and sows to be on an increasing nutritional level just before, during and just after (3 weeks or more) breeding so as to maximize the number of eggs released and hence litter size. It was observed that certain of the young sows nursing their first litters were in a less than desirable degree of condition which probably decreased subsequent litter size. Naturally, "breeding condition" does not mean a high level of fatness which may also result in small litters or delayed breeding. Exercise must also be available, and forced if necessary, for large vigorous litters to be obtained. The use of different service boars during the same estrus also usually increases litter size, and was not accomplished in all cases.

There was an average of less than one pig lost between live birth and weaning. This is quite desirable and is based almost entirely on the records of the first swine pilot test farm, which had more sophisticated farrowing and pre-weaning confinement facilities. However, limited production data on the extensive facilities (culvert or quonset huts) are also available, and do not differ from the intensive facilities. However, continuing attention to use of guard rails, pre-weaning iron shots, observation of young litters, nutritional status (especially mineral supplementation) and sow temperament is required so that the maximum number of live pigs born are raised to weaning.

GROWTH:

The market barrows and gilts produced thus far on the Pilot Test Farms have averaged approximately 5 months of age when slaughtered at 220 pounds liveweight. Weights and gains on 21 market hogs, half barrows and half gilts, averaged 1.28 pounds of weight per day to 130 days of age, for an average live weight of 167 pounds. This is an acceptable growth performance, only slightly less than comparable averages in U. S. commercial swine herds. The above averages are of particular interest since this weight is similar to, or slightly greater than, the liveweight preferred to produce light-weight carcasses. Therefore, light-weight carcasses can be successfully produced at about 125 days of age, and the medium- to heavy-weight carcasses produced at 160 days of age.

The desirability of the growth attained thus far by the swine herd progeny indicates that under adequate nutritional programs, the environment on Andros is conducive to successful swine production. Better utilization of alfalfa, or possibly other legumes, in rotational grazing systems should reduce feed costs and slightly increase reproductive performance, but would not be expected to increase pig growth rate. As more Andros-available feeds are substituted in imported complete feed mixes, growth may decline if proper amino acids, vitamins, and mineral supplements are not obtained and included as pre-mixes.

SLAUGHTERING AND MARKETING :

It has been estimated (Final Report No. 16, "Economic Analysis of Hog Production on North Andros Island, Bahamas") that the population of 5000 people on North Andros represent a possible market for 600 to 800 hogs annually. If this market is satisfied, the Nassau market is potentially quite large. Traditionally, the preferred live weight of market hogs in the Bahamas is approximately 160 pounds, commensurate with English swine marketing systems. This system results in a relatively efficient feed conversion when only the growing-finishing phase is considered. However, less pounds of pork are marketed per sow maintained, and dressing percent of the light-weight market hog is less than a middle- or heavy-weight hog. The amount of fat trim is naturally greater on heavier hogs, but usually this additional fat can be used in the household. Within the past five years, there has been a tendency for market hogs in the U. S. to be sold at increasingly heavier weights. This has been justified primarily because of the genetic changes made in the hogs, resulting

in heavier-muscled, faster-growing hogs that reach the point of decreased feed efficiency and increased fat deposition at later stages of maturity. However, the desired slaughter weight continues to be related to feed cost; heavier hogs being generally more desirable under a relatively low feed cost situation.

The average carcass weights of market hogs slaughtered from the first Pilot Test Farm has been 148.5 pounds. On Andros, the pork carcass has either been sold in 5- to 10-pound parcels directly to the consumer, or wholesaled to a middle man. In either method, the middle- to heavy-weight carcasses have been acceptable to Andros families and have commanded an average of \$1.25 per pound of carcass. However, carcasses of this same weight have not obtained a similarly acceptable price in Nassau at least to this time. Apparently, until the Nassau market will accept at least moderate-weight carcasses, heavy-weight carcasses will have to be marketed on Andros and the Nassau market should be considered as a "specialty" market for light-weight hogs. Additional information on the total herd efficiency of operations marketing hogs of different weights would certainly be beneficial, with different feed costs and hog prices imposed on the resulting data.

Slaughtering has been done by the Pilot Test Farmer, with some assistance at his farm. A modest "kill floor," with water and septic system available, and a cutting table and room, is desirable. Carcasses resulting from the swine herd have been acceptable with regard to eatability and leanness, and seem to compare favorably with average U. S. carcasses when slaughtered at comparable weights.

SUMMARY:

The BARTAD swine phase has consisted entirely of two pilot test farm operations. The first farm (Farm 2) was stocked entirely with imported hogs, and the second farm (Farm 10) was stocked with progeny from the original importation. Number of pigs born per litter was less from Farm 10 than from Farm 2 (8 versus 10 pig per litter). This indicates that reproductive performance, especially if measured in terms of total number pigs born per year, may be less in subsequent Andros swine herds (but still acceptable) than in commercial U. S. herds. Based on limited initial data, number of pigs marketed per sow per year was 11.7, which is the least desirable production characteristic measured in the swine herd, and reflects primarily the reduced number of litters born per sow per year. Growth rate has been relatively high with lightweight and medium- to heavy-weight carcasses produced at about 125 and 160 days of age, respectively. There remains additional opportunities to reduce feed costs by better management of alfalfa pastures and use of locally produced feeds or waste products.