Initiating a Swine Production Medicine Program

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INTRODUCTION

The role of veterinary medicine in the United States food animal industry is currently changing. Veterinarians are no longer viewed as mere providers of clinical services such as healing individual sick animals. This traditional role is being replaced with planned animal health programs for the entire herd. The objective of production medicine is to consistently maintain overall animal health and increase production cost-effectively to attain optimum economic returns for the producer. This holistic approach to animal health and production reduces the importance of specific infectious agents per se, and concentrates on the effect of interactions of these agents, environment, nutrition, genetics, and management on animal performance. Attempting to assimilate all these factors, in hopes of developing specific recommendations for the producer, may seem overwhelming when starting a production medicine program. This case report will illustrate the diagnostic procedures used to evaluate these factors when initiating a program for a swine herd in central Iowa.

In September of 1985, the owner-manager of a 600 sow farrow-to-finish swine operation requested assistance from the clinical epidemiology section of the Veterinary Teaching Hospital at Iowa State University. The manager also farms 750 acres of crop land and is involved in feed sales. His primary complaint was a high incidence of atrophic rhinitis and slow rate of gain in his finishing units. He initially wanted a new immunization program developed to solve these problems.

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CLIENT CHARACTERISTICS

Prior to evaluating the enterprise the veterinarian must evaluate the client's goals, receptivity, financial capability, and timetable. Goals to be considered are intentions to stay in the swine enterprise, expansion or reduction plans, retirement plans etc. Receptivity to new ideas and criticisms to current managerial practices are often unknown until after recommendations have been made, but a subjective feeling for this receptivity can be made by evaluating the producer's progressiveness and personality. Patience for results is a very important attribute if production medicine is to work since many recommendations and the eventual progress to be made will take several months or years to be realized. Currently, financial capability of starting a production program and merely staying in business is a crucial point to consider. Production medicine cannot solely save a financially drowning operation which is close to bankruptcy and it would be a disservice to the client to imply that veterinary services can be a financial cure-all.

This client's goals consisted of producing pork indefinitely for a profit with future expansion plans to assist his son in starting in the swine business. Receptivity to suggestions and criticisms is questionable since the client initially requested veterinary assistance to design an immunization program to cure all production inefficiencies and other impediments to his profitable swine production. His initial timetable for results was relatively short because of his assumptions that his production problems could be cured with new immunization programs. Financial capability to continue the swine enterprise appear adequate.

PHASE PARTITIONING

The farrow-to-finish enterprise was divided into five separate entities for evaluation:

1. Breeding/Gestating
2. Farrowing
3. Nursery
4. Grower
5. Finishing

Each of these areas was evaluated individually to specifically locate problems. Each area's environment, nutrition, current managerial/preventive practices, current disease status, and clinical signs were analyzed for effects on production performance. Performance was evaluated objectively via production records and subjectively on farm tours. Performance was compared to standards for the swine industry as listed in Table 1. The values listed under the "Target" heading are goals to maximize production consistently. Although these tables are ten years old they remain realistic parameters.

BREEDING/GESTATING

Environment

The breeding facilities consist of buildings six and seven on the the building site map Figure 1. The breeding barn (six) is a pole building open to the south with five breeding pens. Boars are housed in the breeding barn (six) and the boar barn (two). The early gestating pens (seven), adjacent to the breeding barn, are also used for pen breeding. The early gestating pens are on solid floors both inside and outside with approximately 25 to 30 sows per pen. Near-term gestating sows are housed in a "multi-purpose" building (15) in both individual gestation crates and small groups of six to eight on partially slatted floors. Sows are also kept in a converted corn crib (13) with a partially slatted floor and an adjacent lean-to (14) with solid floor and an outside feeding floor. Lighting appears adequate in the gestating facilities in which the sows are housed completely inside. Since the farm tours, which this paper is based upon, occurred during late fall and winter, most facilities with open fronts and solid flooring were utilizing manure pack inside. Sanitation seemed adequate.

Managerial Practices

All sows are hand-mated during their first estrus postweaning in the breeding barn (six). Attempts are made to breed each sow twice with different boars during this first estrus. Groups of twenty to thirty sows are then moved into the adjacent early gestating pens. Two boars penmate any of these sows returning to estrus. The gestating sows are then moved to buildings 13, 14, 15 or 17 for the duration of their pregnancy.

Pregnancy diagnosis with a linear ultrasound device is done only sporadically due to labor limitations. Pregnancy is diagnosed primarily by visual inspection and lack of return to estrus. This inadequate pregnancy evaluation allows sows to remain open several months before being detected, thereby decreasing the average number of litters farrowed per sow per year.

TABLE 1 Targets of Production and Interference Levels in the Swine Herd Weaning Piglets at Three Weeks of Age.

Management of Performance	Target	Interference Level
Average days weaning-to-service interval	7	9
Average age at first service gilts (months)	7	8
Returns to service (percent)	6	12
Abortions (percent)	0.8	2.5
Infertile services (percent)	2	5
Farrowing rate (percent) = $\frac{\text{No. of farrowing}}{\text{No. services}} \times 100$	89	80
Sow deaths (percent)	2.2	3
Sow culling/100 sows/month	3 or 36 per year	3 or 36 per year
Piglets born alive (number)	10.9	10
Piglets born dead (percent)	5	8
Mummified piglets (percent)	0.5	1
Litters of less than eight pigs (percent)	10	18
Laid on (percent)	5	7
Congenital defects (percent)	0.5	1.5
Low viability (percent)	1.5	3
Starvation (percent)	1	3
Deaths from diarrhea (percent)	0.5	2
Number weaned per litter	9.6	9.0
Preweaning mortality (percent)	8-12	12-18
Litter scatter (percent)	10	18
Litters per sow per year	2.25	2.0
Number pigs marketed per sow per year	21	19
Postweaning death (percent)	2	3
Mortality during growing and finishing period (percent)	1.0	2.5
Average age in days to market	160	170
Feed efficiency (kg. feed per kg. body weight gain)		
Market pigs	3.0	3.5
Breeding herd	3.5	4.0

FIGURE 1

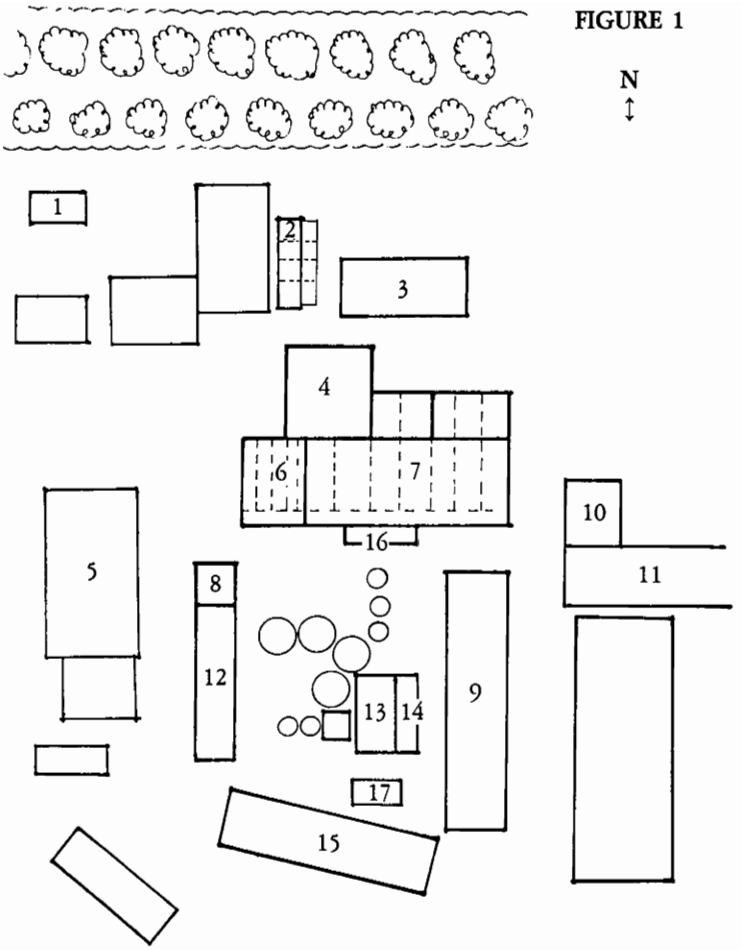

FIGURE 1: Building Site Map

Legend - FIGURE 1

1. Isolation
2. Boar housing
3. Grower
4. Finishing
5. Machine shed (overflow farrowing)
6. Breeding
7. Early gestation
8. Office
9. Finishing
10. Nursery
11. Farrowing
12. Farrowing
13. Gestation
14. Gestation
15. Multipurpose (Farrowing to Finish)
16. Gestation Feeding stalls
17. Gestation

TABLE 2. Serology

		Sows n = 30			Pigs n = 60		
Pathogen	Pos. Titer	# Pos.	# Neg.	% Pos.	# Pos.	# Neg.	% Pos.
PRV	1:4	30	0	100%	49	11	81%
TGE	1.8	0	30	0%	9	60	0%
Parvo	1:64	30	0	100%	38	22	63%
Swine Influenza	1:20	22	8	73%	14	46	23%
Eperythrozoonosis Epy	1:80	2	20	6%	0	60	0%
HPP	1:8	18	12	60%	5	55	8%
Myco hyo.	1:8	5	25	16%	12	48	25%
Trep. hyo.	1:16				6	54	10%

All gilts selected as replacements for the sow herd are immunized for Erysipelas, *Bordetella bronchiseptica, Pasteurella multocida* A and D, parvovirus, seven serotypes of *Leptospira interogans* and Pseudorabies prior to breeding. The sows are then wormed and immunized for *Bordetella bronchiseptica, Pasteurella multocida* type A and D, and Erysipelas prior to farrowing. *Escherichia coli,* pilus types K88, K99 and 987P commercial vaccines are also given prior to farrowing to achieve passive immunity via the colostrum for neonatal pigs.

Replacement females for the breeding herd are primarily selected from the finishing herd prior to marketing to reduce the potential of introducing new diseases to which the herd may be naive. Boars are generally purchased from outside sources for genetic advancements. Although no breeding stock entered the herd for us to examine entry procedures, the manager reported that all new herd entries remain isolated in building one a minimum of thirty days for observation.

Nutrition

All prebreeding and gestating sows, as well as boars, are fed a complete feed ration in meal form. Sows are limit-fed six to eight pounds of feed per sow per day. Although individual feeding crates (16) are available near the early gestating pens they are not used. The sows are group fed allowing aggressive sows to be overfed while timid sows are underfed. The gestating ration appeared adequate and no specific problems related to nutrition imbalances were observed other than the feeding procedure so we did not pursue the breeding/gestating nutrition further.

Current Disease Status

A random sample of thirty sows was selected to collect blood for serology. This statistically significant population was used to determine the current disease exposure/immunological base of the herd. The sow herd was tested for pseudorabies virus, transmissible gastro-enteritis virus, parvovirus, swine influenza virus, eperythrozoonosis, *Haemophilus pleuropneumoniae, Mycoplasma hyopneumoniae* and *Treponema hydodysenteriae* titers. Table 2 is a summary of the serological results. Titers considered to indicate exposure are listed under the positive titer heading. A significant percentage of the sows tested had exposure level titers to pseudorabies virus (through immunization), parvovirus (through immunization and natural exposure), swine influenza, *Haemophilus pleuropneumoniae,* and *Mycoplasma hyopneumoniae.*

Performance

Performance is evaluated by the client on an individual sow and boar basis. Each animal is tagged in both ears for individual identification. Breeding dates and farrowing data are recorded and entered into a computer program on the farm to evaluate and rank each sow's production. Unfortunately, input was haphazardly entered. Many sows lost their ear tags and retagging was seldom accomplished so a percentage of sows effectively lost all identification.

We attempted to evaluate breeding herd performance with another commercially available software program. Each sow and boar history was entered from the client's past records. Unfortunately the performance reports were very difficult to interpret due to the inaccuracies of input data. There were many "ghost sows" entered which were either culled or assigned a new eartag number and not recorded. These incomplete sow histories dramatically affected herd production averages and percentages making it very difficult to objectively evaluate the breeding performance.

However, an "action list" generated from the program was helpful in diagnosing a major problem in the breeding herd. Only fifty percent of the sows due to farrow at a given date were actually in the farrowing house. The remaining fifty percent were farrowing several weeks after their due dates based on post-weaning breeding dates. Several sows were over sixty days behind schedule.

This failure to conceive on the first estrus post weaning was reducing the farrowing rate and litters produced per sow per year which significantly increases the cost of production per pig marketed. Rebreeding failures also forced early culling in the breeding herd. Two hundred sows were recorded as being culled in 1985. The average parity of these culled sows was 2.6 which is well before they reach expected economic lifetime production potential. Increasing culling necessitates increased replacement gilts needed to maintain production which increases the capital expense per sow, as well.

Boar numbers were adequate for the number of females bred per week. Likewise no single boar appeared to be overused. Most sows were mated within seven days following weaning so failure to cycle post weaning or failure to detect estrus

for the first hand mating were not considered to be the cause of the low conception rates. Unfortunately, breedings cannot be recorded in a pen breeding situation in the early gestation pens following the first hand mating. Therefore, we do not know the recycling period from first service to repeat services. Many sows were noticeably thin at weaning due to a possible negative energy balance during their lactation period which may play a role in the repeat breeding problem.

Eighteen sow deaths were recorded in 1985 (3% of the breeding herd.) However, estimates of mortality based on evidence observed at the time of farm visits, indicate several deaths were not recorded so the economic impact is not fully realized by the client. No clinical signs or causes of death were recorded. No necropsies were performed.

FARROWING

Environment

The farrowing facilities consist of buildings 11, 12, and 15. Building five is a machine shed with six farrowing pens used on an "overflow" basis. Building 12 has 28 farrowing crates in one room. Building 11 has 32 crates divided into two rooms. All farrowing crates in both farrowing houses are on partially slatted floors over a pit with slats at the back of the crate. Louvers with heat lamps are located in the front of each crate for baby pig heat. The ambient temperature and humidity seemed adequate during the walk through tours; however, there were no working thermometers at the sow or baby pig level.

Building 15 is an "all-purpose" facility with pigs of all ages and sizes in one large room. The farrowing in this barn is done in raised individual crates decked on top of the gestation stalls. The flooring is expanded wire mesh. Pigs are under heat lamps in this building also. Although the actual ambient temperature was not taken, the temperature at sow level seems very warm which may decrease feed consumption and milk production.

The ambient temperature is not controlled in machine shed five but a hover with heat lamps provides temperature control for the baby pigs in this building.

Sanitation in all farrowing pens and crates was marginal with several day's feces built up in many crates. None of the farrowing facilities had ever been power washed after a group of sows were weaned, nor had any of the buildings been left empty. As soon as one sow and litter were moved out, another sow was moved in.

Managerial Practices

Farrowing observation occurs only when an employee is not busy with other farming tasks. Sows with prolonged parturition are administered oxytocin if the farrowing is observed during working hours. Sows receive an intramuscular penicillin-streptomycin combination injection post-farrowing. Baby pigs are earnotched to identify month born and litter number, injected with long acting tetracyclines, needle teeth clipped, and tails docked at birth. An iron dextran compound with gentamycin is administered and the boar pigs are castrated on day four to seven.

Nutrition

Sows are fed a complete feed with five percent fat. The sows are fed and watered in the farrowing crates or pens so they are never turned out. Sows are limit fed the first day post-farrowing and increased to full feed slowly to meet the energy demands of lactation. The feeders are filled and inspected once daily. Several feeding cups contained moldy feed and were improperly adjusted, limiting feed intake by the sow. Several feeders were filled to capacity in the morning but were empty by afternoon indicating that the heavily lactating sows were being underfed.

Neonatal pig nutrition consisted solely of the dams milk. No creep feed was offered until weaning.

Disease Status

The client had no complaints regarding neonatal pig infectious diseases. Occasionally a litter was observed exhibiting clinical diarrhea and unthrifty pigs. No veterinary or laboratory diagnoses were made and no necropsies were performed. Sick neonatal pigs were client diagnosed and treated with variable success.

Performance

Farrowing and lactating data are recorded daily on the stall cards illustrated in Figure 2. Each sow has a stall card that stays with her while she is in the farrowing crate. Following weaning, the individual sow data is entered into the computer to obtain statistics on a whole-herd basis.

Table 3 illustrates production statistics on a monthly basis from August to November. The estimated birth and weaning weights are probably inaccurate and detract from the statistic's diagnostic value, but overall the performance records are usable. The most significant defic-

iency parameter is the low weaning weights. The lack of creep feeding the pigs as well as a combination of genetic potential, environment, and sow nutrition play significant roles.

NURSERY

The nursery phase of the operation is designated as the period after weaning (three weeks of age) to six weeks of life.

Environment

The nursery, building ten on figure 1., is divided into two rooms with pens raised off the floor and "decked." Both upper and lower deck flooring consist of expanded wire mesh.

The temperature was maintained at 75 - 80 °F in each of the rooms. The ventilation rates were reduced to maintain warmer temperatures and the humidity and ammonia levels seemed to be inappropriately high, although no specific measurements were taken. Ammonia irritation of eyes and pharynx were experienced and the air felt "heavy." This was noticeable throughout the entire time we were within the rooms. Ammonia at low concentration (20 ppm) causes loss of smell; consciously smelling ammonia after being in the room for a period of time indicates a much higher level, 500-700 ppm. Fifty ppm has been shown to cause a reduction in performance by a direct irritation of mucosal surfaces and by decreased pulmonary bacterial and dust clearance. The high ammonia levels were due to decreased ventilation rates in an effort to conserve heat. In addition, feces fall through the wire mesh and are allowed to concentrate on the solid floor, allowing prolonged exposure to air resulting in excess ammonia production. The manure was not washed down with a hose as frequently as is recommended in an attempt to decrease the relative humidity. Washing with water dissolves the ammonia and reduces free ammonia in the air.

TABLE 3. Farrowing Performances August through November 1985

Total sows farrowed	383
Average sow parity	2.5
Total pigs born	2520
Average pigs born/litter	9.8
Average pigs born live/litter	9.2
Average pigs born dead/litter	.6
% pigs born dead	6.1
Average estimated birth weight (lb)	3.0
Average pigs weaned/litter	7.6
Average estimated weaning weight (lbs)	11.0
% preweaning mortality	17.4

Nutrition

The nursery ration is a pelleted complete feed with Furox, oxytetracycline, sulfamethazine, penicillin, and an arsenical compound added. The most striking deficiency in the nutrition of the nursery pigs is the feeding methods employed. The pigs are fed twice daily in large self feeders which allow the feed to become stagnant, stale, and contaminated with excrement, reducing palatability. Some feeders sit empty for several hours before refilling, also decreasing maximum consumption. Newly weaned pigs undergo a complete change of diet. In contrast to the frequently available milk diet pre-weaning, this new post-weaning diet is only available on a limited basis. Both conditions exaggerate stresses that naturally accompany weaning.

Managerial

There is an attempt to maintain litters grouped together when moved at weaning to nursery pens. However, there is an average of eleven pigs per pen which indicates that litters are not grouped solely together. An effort is made to keep smaller pigs on the warmer and more visible upper decks. Pigs are immunized for erysipelas, atrophic rhinitis, and are injected with Ivermectin prior to movement into the grower phase.

Performance

Production records cease in the farrowing house so production is merely estimated in all phases beyond that. However, the pigs are subjectively lighter in weight than expected at 6-8 weeks of age, averaging 20-25 pounds.

GROWER

The grower phase is considered to be that time period when pigs weigh from 35-140 pounds.

Environment

The grower facilities are located in buildings three and 15. Building three is divided into 20 pens with totally slatted floors. The temperature was adequate at 70 °F, relative humidity was high with water condensation on the center beam and lines of water running down the outside walls. Again the poor ventilation is probably exaggerated in the winter when trying to maintain heat. Several of the slats were spread apart leaving cracks large enough to permit leg trauma.

The north end of building 15 is used as grower housing. The pigs are kept on raised decks with

LITTER RECORD

GROUP NO. _____

CRATE NO. _____ (SELL) (KEEP) SOW

FARROWING DATA		SPECIAL MANAGEMENT DATA	
Litter No.		Clip Needle Teeth & Dock Tails	
Date Farrowed		Antibiotic Injection	
Sow No.		Date of Iron Shot	
Sire		Date of Castration	
No. Pigs Born Alive No. Pigs Born Dead		Date Weaned	
Total Birth Wt. of Live Pigs		Date Erysipelas Vaccination	
No. of Pigs Transferred to Litter Nos.		Date Pigs Wormed & Sprayed Comments in Regards to Sow	
No. Pigs Adopted from Litter No.			
Date at 4 Weeks		Date at 6 Weeks	

SOW RATING

Sow Type	1	2	3	4	5
Mothering Ability	1	2	3	4	5
Temperament	1	2	3	4	5
Milking Ability	1	2	3	4	5
Ease of Farrowing	1	2	3	4	5
Feet and Legs	1	2	3	4	5
Conception	1	2	3	4	5
	1	2	3	4	5

1 = Poor 2 = Fair 3 = Average 4 = Good 5 = Excellent

DEATH RECORD		
DATE	PIG NO.	CAUSE

WEIGHTING CHART					
AGE WEEKS	DATE		AGE WEEKS	DATE	
Litter No.	No. of Pigs	Wt.	Litter No.	No. of Pigs	Wt.
Total			Total		
Average			Average		

FIGURE 2: Stall Card for Recording Daily Farrowing and Lactating Data for Individual Sow.

wire mesh flooring and are also kept directly below the raised decks. Both upper and lower pens are grossly over-populated with less than 1.5 square feet allotted per 80 pound pig. Table 4 lists currently recommended space requirements for pigs. Both upper and lower pens are very difficult to visually inspect so regular monitoring of pigs and feeders is inhibited.

Nutrition

Grower pigs are fed a ground feed containing Tylosin/sulfamethazine and chlortetracycline. The feed is placed in round self feeders as needed. Several feeders were not properly adjusted; some adjusted too wide allowing feed wastage, and some too tight, making it difficult or impossible for the hogs to obtain feed.

Managerial

Pigs are grouped by size upon entering the grower phase. Detailed inspection is neglected, allowing sick pigs to go unnoticed several days.

Current Disease Status

Morbidity and mortality data are not recorded. Sick pigs are owner diagnosed and treated so specific professional and laboratory diagnoses are never made and no necropsies were performed.

Performance

Although no actual weights are taken on pigs entering or leaving the grower phase, the pigs' weights are light, averaging an estimated 80 pounds. There were stunted pigs in every pen causing significantly uneven weight groups.

FINISHING

Finishing facilities are buildings 4, 9, and 15 in Figure 1. Building 9 is totally slatted and building 4 is partially slatted. The temperature was adequate, but overall ventilation was inadequate. The solid floor of building 4 had an approximate 30° slope running down to the slats with a 6 inch drop off at the slats. The humidity was high enough to see a faint hazy fog when looking down the center aisle to the other end. The finishing buildings were never washed or allowed to sit empty between groups of pigs.

Nutrition

The feed is in meal form which is very finely ground. The same type feeders are utilized as in the grower phase. These feeders are not designed for market weight hogs and maladjustment problems are common. One pen may waste feed while the adjacent pen could not get any feed out of the feeder. An estimated 25% of the feeders were wasting feed and 25% were adjusted too tightly.

Managerial

No one single employee is responsible for the finishing phase with duties assigned to anyone who is not busy with other farming tasks. Daily inspections amount to walking through the center aisle and glancing in each pen to detect feeder adjustment, pig health, etc.

Current Disease Status

Sick, treated, and dead hogs are not recorded so morbidity and mortality rates are unknown. Prior to starting the production medicine program, all sick hogs were owner diagnosed and treated and no necropsies were performed.

Table 2 lists serological titers from 60 grower/finishing hogs randomly sampled. The titers reveal that the finishing herd is positive for Pseudorabies, Parvo, Swine Influenza, *Haemophilus pleuropneumoniae, Mycoplasma hyopneumoniae,* and *Treponema hyodysenteriae.*

There was a significant amount of tearing and sneezing during the walk-through tours. Several hogs had laterally deviated noses. There was a high incidence of gaunt pigs. Some had dark-brown to black watery feces.

An extensive slaughter exam involving 13 hogs ranging from 150 to 240 pounds revealed a high incidence of mycoplasmal pneumonia lesions, ascarid liver lesions, gastric mucosal ulcerations, and a moderate incidence of atrophic rhinitis lesions.

Performance

Any parameters regarding average daily gain or feed consumption are not recorded. However, ear notches indicated the average age of market-weight hogs was seven and one half months. Many pens had stunted hogs that were requiring ten to twelve months to reach market weight.

TABLE 4. Space Recommendations for Pigs Using Partial or Total Slats

Pig Weight	Sq. Ft. for Part. or Total Slats
15 - 30 lbs	1.7 - 2.5
30 - 60	3 - 4
60 - 100	5
100 - 150	6
150 - market	8

ANALYSIS OF PIG FLOW

Tables 5 and 6 illustrates ideal capacity and flow schemes for this swine operation. Planned and organized grouping and moving of animals is currently nonexistent from breeding through finishing phases. The flow problems begin with the rebreeding failures spreading farrowings out over several weeks and is compounded by poor rate of gain. Pigs are only moved when there is ample space in the next phase's facilities and then only when time allows. Because each individual phase is inefficient, the overall inefficient flow is unrecognized by the owner. However, when one phase approaches expected efficiency, it creates a back-up in succeeding phases and the client considers expansion of facilities rather than improving the current pig flow pattern.

TABLE 5. Building Capacity

Phase	Building Dimensions	Number of pens	Building Capacity	Sq. Ft./ pig
Breeding		5		
		5	150	
Gestation	40 x 30	4	120	10
	22 x 36	1	79	10
	20 x 20	1	40	10
Farrowing		28 crates	28	
		32 crates	32	
		6	6	
Nursery	28 x 28	40	520	3
	36 x 140		1260	4
	24 x 80	20	480	4
Finisher	56 x 56	10	448	7
	30 x 152	25	651	7

TABLE 6. Ideal Pig Flow

Phase	Capacity	Sow Numbers needed to achieve capacity	Time (weeks)	Weight (lbs)
Farrowing	60 crates	480	3	3 - 14
Nursery	520	464	3	14 - 35
Grower	2080	464	12	35 - 140
Finish	1099	480	6	150 - 220

PROBLEM LISTS

Specific problem areas noted during the farm tours of the operation include:

Breeding / Gestation

1. Rebreeding failures
2. High replacement rates (high culling rates)
3. Limited pregnancy checking
4. Inadequate nutrition (feeding practice)
5. Inaccurate records
6. High death rates of sows
7. No professional diagnosis of #'s 1-6

Farrowing

1. Low weaning weights
2. Inadequate sanitation
   A. While sows are in crates
   B. No cleaning between sows
3. Inadequate nutrition
   A. No creep feed
   B. Poor sow feeding practices
4. Inadequate farrowing observations
5. Inadequate environmental monitoring
6. Neonatal exposure to all ages of pigs
7. Inadequate records (weight estimation)
8. No professional diagnostic relationship

Nursery

1. Poor ventilation
2. Poor feeding management
3. No production records

Grower

1. Poor ventilation
2. Deficient feed management (feeder adjustment)
3. Inadequate building maintenance
4. Lack of production records
5. No professional diagnosis

Finishing

1. Inadequate building management
2. Deficient feeding practices

These specific problem areas are not mutually exclusive, and can be summarized by three major deficiences.

1. Inadequate labor supply and prioritization of other farming tasks over swine operations.
2. Inadequate production records resulting in unknown inefficiencies and unrecognized changing trends.
3. Lack of prior client-veterinary relationship.

ECONOMIC IMPACT OF PROBLEM

Because the primary objective of production medicine involves attaining optimum economic returns, each problem area must be evaluated for its economic impact.

Tables 7, 8, and 9 calculate the economic benefits of increasing productivity and efficiency in three areas. Although these production improvements are predictions of production medicine results, they are achievable. The results of these tables are not mutually exclusive. They are additive, so economic benefits of these three improvements equal $82,000. For example, proper feeder adjustment should increase both rate of gain and feed efficiency. Better first-breeding conception rates will decrease the cost of production and allow better grouping of pigs, improving pig flow, sanitation and health. Calculation of economic returns for every recommendation, at least subjectively, is necessary to indicate the allowable costs of those recommendations. The biological ideal is not necessarily equal to the economic ideal, so cost-to-benefit analysis is important.

RECOMMENDATIONS

Formulating and presenting initial recommendations is a critical point in a production medicine program. These early recommendations may be the first firm evidence of client receptivity, time table, expectations, and faith in professional services, and may determine the direction of the entire program.

Early recommendations can be classified into diagnostic and therapeutic plans. Diagnostic plans must be emphasized early, not only to diagnose current problems, but to act as a base line to evaluate future progress. Therapeutic plans include the corrective measures to improve efficiency. Therapeutics are generally interpreted as a new vaccination program by clients, while managerial, environment, and nutritional alterations are overlooked. Since many clients view immunizations and all other miracle drugs in a syringe as the "meat" of this new-fangled veterinary service, the principles and economic justification of immunization protocols must be explained. The following areas must be evaluated:

1. Risk of contracting disease
2. Cost of contracting disease
3. Cost of preventing disease
4. Efficacy of preventing disease

Although it is difficult to assign exact figures to these questions, subjective and estimated cost effectiveness can be evaluated for each disease. These same four questions also refer to preventive practices other than immunization, such as facility and managerial alterations.

When formulating recommendations, the plans were organized by production phase; however, it must be realized that alterations in one phase will affect production in the entire operation.

TABLE 7. Economic Effects of Increasing Farrowing Rates Projection

	Current	Expected
Interval: First breeding to conception	60	15
Gestation	114	114
Location	21	21
Weaning to First breeding	7	7
Farrowing Cycle	202	157
Farrowings/Sow/Year	1.8	2.3
Pigs weaned/Sow/Year	14.1	18.4
Sow inventory needed for assumed production level	580	484
Sow maintenance cost/year	$211,700	$165,710

Savings of $45,990

Assumptions: 8 pigs weaned/litter
$1/day sow maintenance cost
Current sow herd = 580 sows

TABLE 8. Economic Effects of Reducing Feed Wastage Estimate

Feed consumption/lb. of gain	3.5
Lbs. gain/pig	180
Lbs. feed consumed/pig	630
Currently 20% feed loss (lbs)	126
Reduced to 2% feed loss (lbs)	12.6
Lbs. feed saved/pig	113
Cost = .05/lb. of feed/pig	$5.67

@ 8,000 pigs marketed/year can save $45,360/year.

This loss, seen in approximately 25% of the feeders results in $45,360.00/year x 25% = $11,340.00/year loss attributable to feed wastage.

TABLE 9. Economic Effects of Increasing Rate of Gain

Fixed costs/pig at 5½ months of age market weight:	
Facilities, electricity, water	$ 4.00
Interest	5.00
Labor	3.00
TOTAL	$12.00

Results of reducing market weight age from 7½ months to 5½ months = 26% time savings = $3.12 decrease in fixed costs x 8,000 pigs marketed = $24,960 savings.

A Listing of Recommended Procedures by Phase of Production

Breeding/Gestating

1. Production records:
   - Regular and timely pregnancy diagnosis.
   - Determine interval of first breeding to estrus.
   - Record reasons for culling.
2. Improve farrowing rates:
   - Observation of all breedings.
   - Semen evaluation of boars.
   - Improve lactation nutrition of sow and pigs.
   - Individually feed gestating sows to assure proper level of nutrition.
3. Group all sows breeding.
4. Necropsy all dead sows/boars.

Farrowing

1. Production records:
   - Weigh all pigs at birth and weaning.
2. Sanitation:
   - Group farrow sows to attain all in all out usage of facilities.
   - Manually scrape crates daily.
3. Nutrition:
   - Creep feed neonatal pigs.
   - Inspect sow feeders and feed two times daily.
4. Necropsy selected dead pigs.

Nursery

1. Production records:
   - Record pig weights in and out of nursery.
   - Record feed consumed.
   - Record death loss.
2. Ventilation:
   - Increase air movement.
   - Wash down feces under decks daily.
3. Nutrition:
   - Offer fresh feed in small quantities several times daily.
4. Necropsy dead pigs.

Grower

1. Production records:
   - Estimate feed consumption.
   - Weigh pigs in and out of pens.
   - Test pens with accurate feed measurements.
2. Nutrition:
   - Adjust feeders carefully.
3. Decrease stocking density.
4. Ventilation:
   - Increase air movement.
5. Necropsy all dead pigs.

Finishing

1. Production records:
   - Estimate feed consumption.
   - Record ages of all pigs marketed.
   - Test pens for feed efficiency and ADG.
   - Death rates.

SUMMARY

Initiation of a production medicine program such as this case report illustrates, relies on a dependable data base. Production records are the foundation of this data base. The necessity of these records cannot be overemphasized. The production records isolate problem areas by comparing current performance with standards for the industry and serves as a measure of future progress. Many clients will not be keeping adequate records at the onset of the program so demonstrating their importance may be the first priority. Without records, objective evaluation of current problems and recommendations is impossible, and concrete information is necessary to justify program costs to the client.

Although objective production data is vitally important, it cannot replace the need of on-farm familiarity. Attempting to diagnose problems by merely analyzing computer reports without seeing the environment, management and circumstances first hand at regular intervals is futile. Many managerial, disease, environmental, and nutritional factors are subjective but equally as significant as the objective data.

After the objective and subjective information is collected, it must be assimilated. The amount of information from an operation of this magnitude can be virtually overwhelming. Artificially dividing the operation into manageable production phases (phase partitioning) can help organize the thought process.

Production medicine has an important role in the food animal industry today and in the future. The local veterinarian, by virtue of education, aptitude, and presence at the production unit, is the most appropriate professional to provide this service. However, the veterinary profession has been traditionally viewed as being the authority on infectious animal diseases only. This

emphasis must be expanded to include the interrelationship of disease and management and the effects of these parameters on production if the veterinary profession is to continue to be a vital factor in the food animal industry.

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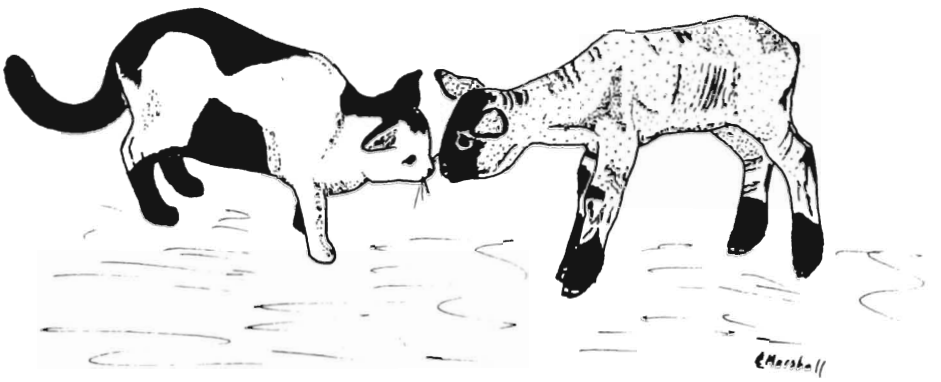

BOOK REVIEW

A Canine Veterinary Dictionary, The Dog's Health From A to Z. By John Belby and Gerald Bishop, Prentice Hall Press, New York, 1986, 331 pages, ill., $19.95, hardcover.

The stated purpose of this book is to provide the dog owner with a quick reference for every aspect of canine physical and mental health.

The book is arranged alphabetically by topics. As with any general book, some topics are covered well and some poorly. However, it serves the purpose of a general reference well, addressing such diverse subjects as behavior, diseases, training and diet. The pictures and illustrations in this book are clear and precise. This book can be recommended as a general reference to the lay public. *Dr. S.E. O'Brien*

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