

United States Department of Agriculture

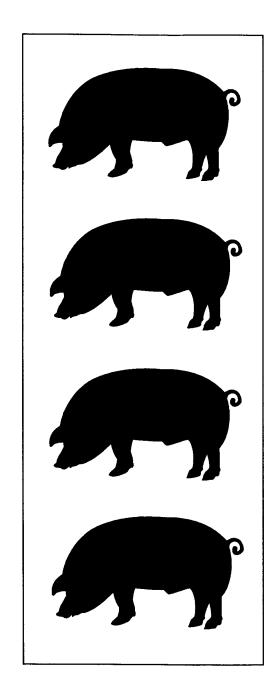
Animal and Plant Health Inspection Service

Veterinary Services

# **Index of NAHMS Swine Information**

National Animal Health Monitoring System (NAHMS) National Swine Studies 1990, 1995, 2000

October 2002



#### Introduction

# **Background**

The USDA's National Animal Health Monitoring System (NAHMS) has conducted three national swine studies, one each in 1990, 1995, and 2000. Data were collected from randomly selected farms via questionnaires, producer diaries, logs, biological sampling, and environmental sampling. This information has been released to the public via seven descriptive reports and a number of info sheets as well as other references. Quickly and efficiently locating specific information has become a challenge.

## **Purpose**

This index has been created to assist in accessing this important information quickly and efficiently.

#### How to Use

- Topics are listed alphabetically on pages 1-25. Descriptive reports, info sheets, and other references indexed are listed in the back (pages 27-30).
- The majority of information generated from NAHMS studies can be found in the seven descriptive reports which are identified as column headings. Page numbers in the column identify where to find information on that topic. Letters A-Y in the column identify the info sheet which contains information on the topic.
- All other reference material is cited by number (1-51) in the last column.

It is our hope that this index will be of value in locating the specific information from our NAHMS studies.

			De	escriptive Repo	rts			Other
	1990	1995-1	1995-II	1995-III	2000-l	2000-11	2000-111	References
Actinobacillus Pleuropneumoniae								
Prevalence			p14	p18 -		p4,25,28-29		
Serology								2 19, 20
Vaccination	p26; C		14	P		<del></del>		2
Aflatoxin				F				2
Air Quality		p17	p23		p46	3		
Air quality testing Ammonia		P17	p20		рчо			5
Dust		p17		J				5
Effect of								
Fat/oil in feed on dust							p38-39	5 <b>5</b>
Relative humidity on dust, armonia			-	**				<b>5</b>
Manure handling on ammonia levels  Air quality on incidence of pneumonia; rhinitis		3, 1						5
Odor							p37-44	
Relative humidity		15,42						5
Temperature							•	5
All-in, All-out		12 10 10 10 10 10 10 10 10 10 10 10 10 10			0= 00			
Farrowing	p35 p38				p27-28 p27-28			
Nursery pigs	p38 p39				p27-28			
Growing pigs Ammonia	pos				p2, 20			
Air								5
Water	p14-16					7.		6, 17
Amoxicillin								
Susceptibility of Salmonella	1.2	12				le.		36, 37
Use in grower/finishers						p46		47
Use in sows								<b></b> /
Ampicillin Susceptibility of Salmonella								36, 37
Use in grower/finisher						p46		
Animal Inventories								
Industry demographics								
Domestic	32	100		p3-8	3	р3	р3	
Global	** _ <b>A</b> **			р9				
Inventory under contract Swine purchased/moved	<b>p35</b> p32-33		p12-13		p31-33			
Swine purchased/moved Swine sold/moved	p35	p21	p12-10		p31-33		p4 :	
Antibiotics (see Drugs, Growth Promotants and specific individual drug	( <b>*</b>				•		•	
Primary decision maker for use	,		199			p20,41,45; T	100	
Records kept						p19,44; T		
Residues			p21					
Source of information			p7; K			p18		47
Treatment regimes in sows				1 2 2 2 2 2	<u> </u>	hio	1	4/

			De	escriptive Repo	rts			Other
	1990	1995-1	1995-li	1995-111	2000-1	2000-11	2000-111	References
Antibiotic Resistance								
Salmonella								36, 37
Antimicrobial Susceptibility								
Salmonella					10			36, 37
Antipyrine								47
Apramycin								
Susceptibility of Salmonella								36, 37
Use in feed or water		7.	p6			p42,48-54	100	39, 44
Use in grower/finisher						p42-54		
Use in nursery pigs			144			p42		
Arcobacter								
Arsenilic Acid								
Use in grower/finisher						p51-54		
Use in nursery pigs						p42		
Arthritis (see also Lameness)								
Condemnation rates		7.7		p32				
Artificial Insemination (see also Breeding)			;	,				
Frequency of use	p41	: p7	100	p19 .	- p4-7			
Veterinary consultation	p28; D	p13		p28	p41			
Ascaris Suum (Roundworms)								
Fecal load								2
Prevalence						p4-6,25-30		
Atrophic Rhinitis (AR)								
Cost								2
Prevalence	p23,25					p28-30		
Vaccination	p26, C				p39			-19, 20
Baby Pig (birth to weaning)				•				
Diarrhea morbidity and mortality	p7-8; B							23, 24
Morbidity Mortality	p7-8; B							
Cost								12, 14
	p5,6 9-11,37; B	р3 *		∑ ∌10-11	p14		p6	15
Reasons	p37-38; A	р3		p12-13	p15		p7	15, 21, 32
Risk factors	1.0						4	21, 32
Performance								
Preventive practices	p11, 27; C	p12		p22	⊳ p37-38; T			
Bacitracin Methylene Disalycilate(BMD)								
Use in feed			p6	100		p42,51-54		39, 44
Use in grower/finisher						p48-54		
Use in nursery pigs						p42		
Bambermycin								
Use in feed						ACCUSED TO ACCUSE TO ACCUS	***	39, 44
Use in grower/finisher	l	ll	L		<b></b>	p51-54	<u> </u>	

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-II	1995-III	2000-l	2000-11	2000-111	References
Use in nursery pigs						p42	7	
Bedding	i							
Bedding-use of, types	p31; F							
Biosecurity								
Animal classes								
On farm (other than swine)	p18						p20	
Animal classes				7.0				
Within 1 mile of farm	p22							
Animal classes		1		7.				
Within 3 miles of farm	p22						_	
Change of boots requirements	, p17; E			,	p42			
Change of coveralls requirements	p17; E	_						
Change of clothes (shower) requirements	p17; E	p14		p30	p42			
Cleaning methods	p30							
Facilities after every group farrowed	p30		-00		p43	•		
Trucks before enter premise	244.00		p22		p43			
Distance from swine farm to	p23							
Farm with poultry	p23							
Farm with sheep	p23							
Farm with swine	p23	p15		p31	p44			
Farm with swine in direction of prevailing wind	p23	Pic		PV.	F			
Feral or wild hogs-threat to herd health	p20	p14.						
Market for swine	p23	p15	p19	p31				
Nearest public road	p23					***		
Nearest lake/pond not on farm	p25							
Employees only-entry of premises restricted to		p14			p42			
Employeesrestricted contact with other swine							p19	
Fencefarms with swine-proof perimeter fence	p18	100		7.				
Footbath use in different facilities	p18; E	p14		p31				
Idle time	p30		. 74					
Isolation and quarantine	p17; E	p16		p27	p10-13			
Days new arrivals separated	p17; E		AL P		p11			
Health testing new arrivals	p17; E	p16		p27	p12			
Removal and return of swine during previous 12 months	p21						1.	
People traffic (times per month)	p21				-10			
Visitor requirements	p18	p14		p30; H	p42			
Birds								
Access to various facilities	p19						p14-17	
Boar								
Culling	2.53				13.5			
Average age	p42							
Rate	p42					* * * * * * * * * * * * * * * * * * * *		
Reasons	p42							
Evaulation and soundness exam (semen testing)		<u> </u>			I			

			De	escriptive Repo	rts			Other
	1990	1995-l	1995-II	1995-111	2000-l	2000-II	2000-111	References
Farms evaluating boars	p43							
Frequency of exams	p43	*						
Types of boars evaluated	p43							
Isolation and quarantine	p17; E	p16		p27; H	p11-12			
Days new arrivals separated	p17; E				p11			
Health testing new arrivals	p17; E	p16		p27; H	p12 "			
Preventive practices	p27; C	p12		p20				
Source of purchased animals	p32-33							
Boar Stud								
Use as source of semen					p7	*		
Brachyspira (Serpulina) Hyodysenteriae (see Swine Dysentery)								
Breeding-Mating (act of) (see also Reproduction)								
Artificial insemination (see Artificial Insemination)								
Bred naturally, artificial insemination	p41	p7		p19	p4-7	**		
Hand-mating sows and gilts	p40	p7		p19	p4-7			
Average number-males/female/heat period	p41	100						
Average times females mated per heat	p41				p4-7			
Pen-malting sows and gilts	p40	p7		p19	p4-7			
Average females per group	p41							
Average males per group	p41							
Frequency of boar rotation between pens	p41							
Efficiency			gast i	100				
Average number of sows/gilts farrowed per farm	p37							
Facility management	4							
Farrowing types practiced by farms	p35							
Gilts	40							
Average age gilts separated from market hogs	p42							
Average age at first breeding	p42							
Farms allowing contact with boars before breeding	p42 p42							
Average days exposed	p4∠ p42							
Farms allowing contact with sows before breeding  Average days exposed	p42							
Mating practices	p42							
Farm average for hand-mated, pen-mated	p40	. p7	·		p4-7			
Sows and gilts hand-mated, pen-mated	p40	p7			p4-7			
Brucellosis	Pio	ρ.			F · ·			
	p23							
Testing to be free of	μzσ							
Business (see also Economics, Marketing, Veterinary Practice)								
Farm personnel			p21					
Training	n24	521	PEI	p25; M	p49			
Marketing arrangements	p34	p21	p18-19	p25, IVI	p49			
Method sold			hio-ia					
Calcium							-	
Serology								2
Use in sows	L	l	L	L	<u> </u>			47

			De	escriptive Repo	rts			Other
	1990	1995-1	1995-11	1995-III	2000-1	2000-II	2000-111	References
Water	p14-16							4, 6, 17
Camplyobacter								
Antimicrobial susceptibility								
Prevalence								
Carbadox								
Antimicrobial susceptibility								
Prevention of diarrhea			p6			p42,51-54; T		<b>2</b> 39, 44
Use in feed Use in grower/finisher			μο			p51-54; T		39, 44
Use in nursery pigs						p42		
Carcass								
Disposal	p24	p18-19		p29	p47-48			
Information producers receive from slaughter plants	p23							
Castrastion								
Baby pigs	p11, 27							
Cats								
Access to various facilities	p19						p14-17	
On swine premises							p20	
Rodent control	p19 :	p15		p29; H	p45			
Cattle								
Distance of swine farm-to-farm with cattle	p23						-20	
On swine premises Within 1 or 3 miles of premises	p18 - <b>p22</b>						p20	
Ceftiofur	Pez							
Susceptibility of Salmonella								36, 37
Use in grower/finishers						p46-47		J
Use in sows						F 10 11		47
Chlortetracycline								
Use In feed			p6			p42,48-54: T		39, 44
Use in grower/finisher						p48-54; T		
						p42		
Circovirus (see also Postweaning Multisystemic Wasting Syndrome)								
			`			p25,28		100
Clostridium								
Cost						_		2
Prevalence Vaccination	p26; C					p7		19, 20
Coccidiosis	pzo, c							19, 20
1								
Fecal load  Eimeria					50 FV-1		s 20 %	2
Isospora								2
Mortality rate								2
Prevalence						p7		_
Prevention	p11, 13, 27							

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-II	1995-III	2000-1	2000-11	2000-111	References
Colibacillosis (see E. coll Enteritis)						10.74		
Composting (see Waste Management)								
Computer (see Records)								
Cooling (see Housing)						•		
Copper		1.0	-					
Feed								2
Serology Water								2 % 4
Copper Sulfate					4			
Use in feed			p6					
Crossfostering	p5, 6			***				
Cryptosporidia								
Fecal load Culling								2
Boars								
Average age	p42							
Rate Reasons	p42							
Breeding age females	p42				p13			
Average age	p42				P.O			
Rate	p31	p7		p14	p8-9		p5	
Reasons	p41	p7			p8-9			
Market swine Rate			p15				<b>-0.10</b>	
Reasons			p15				p8,10	
Dead Animal Disposal			F.V	•				
Method used:	p24	p18-19		p29	p47-48			
Depopulation/Repopulation	•	•		•	•			
Continuously raised on swine farm-number of years Partial	p24		**			p36		
Dermatitis								
Other skin diseases within last 12 months	p25							
Deworming (see Parasites and Anthelminthics)	7		,					
Dexamthasone								47
Diagnosis								1
Use of lab or veterinarian for						p6,8,27,30		2
Diarrhea						(4)		
Cost Incidence								1, 2, 28
Incidence Vision Morbidity	p7-8, 12; B					***		15
Mortality	p7-8, 12, B p9-11							
Prevalence/reason for death loss	p25		)-,0**					
Baby pigs	p37-38; B	p3		p12-13	p15		p <b>7</b>	

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-11	1995-III	2000-1	2000-11	2000-111	References
Nursery pigs	p39	p5		p15	p18-19		p8,9; V	
Grower/finisher pigs	p40	p6	p16	p16	p22		p11	
Breeding females	-							
Fatality rate +								2
Risk factors								7, 16, 23, 24
Prevention								2
Dichlorvos								
Use in grower/finisher						p56		
Disease			•					
Baby pig						p7		
Breeding herd						p4-5		1, 2, 12, 14
Cost								28. 29
Control			p13	T				
Grower/finisher pigs			F			p28-29		
Managing sick pigs			p13, 15					
Nursery pigs			1			p25-26		
Prevalence								
Actinobacillus pleuropneumonia (APP)	p23		p14	p18		p4,25,28		2
Atrophic rhinitis	p23		•	•		p28		
Brucellosis	p23						7.	
Clostridium						p7		
Erysipelas						p4,28		
Escherichia coli			p14	p18		p7,25		
External parasites	p25		1			2.1		
Gastric ulcers						p4,28		
Hemophilus parasuis (Glasser's disease)	p23	100				p4,25,28		
Hemorrhagic bowel syndrome						p28-30		
lleltis (see also Proliferative Enteritis)			p14		12 P	p28		
						p4,5,7,25,26,	1	
Internal parasites	p25					28,29; S,V		
Leptospirosis						, p4		
Lice	p23							
Mange	p23							
Muscle, bone, or joint problems	p25							
Mycoplasma pneumonia						p4,25,28		
Nervous system	p25							
Nonparasitic digestive problems	p25							
Other diseases	p25		p14			p4,7,25,28		
Other skin diseases	p25					-4		
Parvovirus						p4	4 "	
PMWS			-44	-47: O B		p25,28		40
Porcine reproductive and respiratory syndrome			p14	p17; Q, R		p4,7,25,28; V		18
Pseudorables	p23		p14			p4,28		2
Reproductive health events	p25	,						
Respiratory health events	p25					-7		
Rotavirus	L	<u> </u>	Į	L	<u> </u>	p7	L	ll

			De	escriptive Repo	rts			Other
	1990	1995-l	1995-II	1995-III	2000-1	2000-11	2000-111	References
Salmonella			p14	* p18		p4,25,28		
Staphlococcus hyicus (Greasy Pig) Streptococcus			p14			p7,25 <b>p7,25</b>		
Swine dysentery	p23		p14			p4,25,28		2, 9, 10
Swine Influenza	p13, 23		p14			p4,25,28		2, 7, 49
Transmissible gastroenteritis (TGE)	p13, 23		p14	p18		p4,7,25		2, 7, 22
Prevention	p11, 27; C	p12	p6	p20, 2 <b>2</b>	p37-38			
Dogs	p18						p14-17	
Access to various facilities On swine premises	p18						p14-1/ p20	
Doramectin						p55	p20	
Drugs (see also by name and type)								
Administration						p18,40,43		2
Baby pigs	p11, 27							
Biologics (see Vaccines)								_
Cost Employee training			p21					2
Feed usage	p13, 27	p12	<b>р2</b> і р6	p20; K	p37-38	p42,51-56; T		39, 44
Injectable usage	p11, 13, 27	p12	ρo	p20, 22	p37-38	p46-47; T		47
Residue			p21	p32	•			
Source for producers								- 2
Veterinary consultation	p28; D	p13 p12	p6	p28; K <b>p20; K</b>	p41 p37-38	p48-50,55; T		
Water usage   Economics (see also Business, Marketing)	p13, 27	PIZ	ρο	pzu, n	p3/-36	p40-50,55, i		
Cost of disease								1, 12, 14, 28,
Vaccination of E. coli scours								31
Edema Disease								
Prevalence						p25		
EMC Virus, Encephalomyocarditis virus								
Mortality rate								2
Serology Vaccination	p13							7, 8, 11
Enteric Diseases (see also Diarrhea)								
Fatality rate								2
Prevalence/reason for death loss								-
Baby pigs	p37-38; B	n3		p12-13	p15		p7	
Nursery pigs	p39	p5	45.40	p15	p18-19		p8-9	
Grower/finisher pigs	p40	p6	p15-16	p16			p11	
Environment (see also Waste Management)			522. I		n/6		D27 42 44	E
Air quality Ammonia		p17	p23; J		p46		p37,43-44	5
Reduction with Micro-Aid	**						p39-40	
Assessment	A							
Waste management	p29	p10, 17	p9-11; J		p34-36			
Water quality	p14-17; G	p17	p23	J	p46			4, 6, 16, 17, 26

•

			De	escriptive Repo	rts			Other
	1990	1995-1	1995-II	1995-III	2000-I	2000-11	2000-111	References
Veterinary consultation		p13		p28	p41		1	
Environmental Assurance Programs								
Waste disposal	•		p10					
Eperythrozoonosis								
Serology								2
Erysipelas								
Cost								1
Prevalence				p32		p4,28		
Serology								
Vaccination	p26; C	p12		p26-27; I	p39			19, 20
E. coli								
O157								45, 48
Prevalence			p14	p18		p7,25; V		
E. coll Enteritis			<b>3</b> 11					
Cost								2
Mortality rates								2
Prevalence			p14	p18		p7,25		
Serology Vaccination	p26; C	p12		p26-27; l	p39			0.4
Exudative Epidermitis (see Greasy Pig)	p26, C	p12			p39			31
Facilities (see Housing)								
Farrowing (act of parturition)			N. 12 1					
Behavior								
Disorders								47
Facilities (see also Housing)  Association with baby pig mortality		p8-9						
Association with baby pig monality  Idle between farrowings	p30							. 21
Management and other characteristics	p28-29							
Types used	p28, 35; F	p8-9			p25-26			
Induction	p36	ро			p2020			
Morbidity (incidence) of problems	p12							47
Mortality (of sows)	p12							
Oxytocin	p36							
Pig flow (AI/AO; continuous)	p35	p8		p21	p27-28			
Performance rates								
Average number of sows/gilts farrowed	p37	-2		-40.44	- 4.4		-	
Per-litter productivity Sow management	p5-6, 37; A	р3		p10-11	p14		p6	
Assisted manually during farrowing	p36							
Observed during farrowing	p36							
Washed before farrowing	p36	*						
Water	P							
Effects of nitrate						***	*	26
Sources sows drink from	p29			,				

			D	escriptive Repo	rts			Other
	1990	1995-1	1995-II	1995-111	2000-1	2000-11	2000-111	References
Farrowing Crate								
Utilization								12, 14
Systems								
Farms using them and types of crates	p28; F							
Feed/Feeding (see also Nutrition)						40 54 54		
Antibiotics Creep prestarter			p6			p42,51-54		39, 44
Farms feeding supplemental milk, creep prestarter	p36							
Piglets fed supplemental mild, creep prestarter	p36							
Delivery frequency (see Transportation-Feed)	p21					7		
Equipment								
Feeders Cleaning feeders								
Method filled			p5 <b>p4-5</b>					
Fish meal			PT-0			p59		
Food waste, feeding of			p7			p59		
Grower/finisher pigs						•		
Number of diets fed (phase feeding)			p3	. L	7.85	100		
Mixing of diets Split sex feeding			p3 <b>p4</b>	L, P				
Spill sex reeding Intake			P4	0		p56		
In lactating sows								
Meat and bone meal						p59		
On-farm manufacture					,			
Salmonella				Р	*****	p59		27
Storage			p5				p13,16-17,19	
Feed Efficiency			p16				p12	
Feeder Pigs								
Co-mingling of Isolation and quarantine	p17; E	p16	p13	p27; H	p33			
Days new arrivals separated	p17; E	PIV		PZ/,11				
Health testing new arrivals	p17	p16		p27; H				
Source for grower/finisher phase			p12	***************************************	p31-33			
Fenbendazole						p56; S		
Feral Pigs (see Wild Pigs)								
Finisher Pigs (see Grower/Finisher Pigs)			1					
Flavomycin (see Bambermycin)								
Flies			#131 E			44		
Control					•			
Floor	16 T							
Farrowing crates	p28-29; F							
Finishing floor			- p8					
Florfenicol						p46-47		
Flunixin Meglumine						***	7.0	

	Descriptive Reports							
	1990	1995-1	1995-II	1995-III	2000-1	2000-11	2000-111	References
Use in sows								47
Food Safety (see also Pork Quality) Prevalence of food-borne pathogens							p22	45, 46
Salmonella			1000				484	35, 36, 37, 43, -45
Source of information  Fumonisin				Þ			p22	
Gastric Ulcer Sows		-				p4		
Market swine			p15-16			p28		
Gastrointestinal (see also Enteric) Condition/problems						p7-9,11		
Cost Genetics	.,							1
Breed type Commercial Breeding Co.	p <b>36, 37</b> p32							
Feed efficiency Sow replacement rate	p31							
Gentamicin Prevention of diarrhea Susceptibility of Salmonella								2
Use in grower/finishers Use in sows						p46		36, 37 47
Gestation Nutrition							`	4,
Facilities (see also Housing) Gilts					p25-26			
Acclimatization Age at first service	p42				p13; U			
Age separated from market hogs Isolation and quarantine	p42 p17; E	p16 *-		p27; H	p10-13	p22		
Days new arrivals separated Health testing new arrivals	p17; E <b>p17</b>	p16		p27; H	p11; U p12; U			
Management  Contact before breeding with boars	p42					p21-23; U		
Contact before breeding with sows  Average days exposed prior to breeding with boars	p42 <b>p42</b>							
Average days exposed prior to breeding with sows  Nutrition  Source of purchased breeding females	p42 p32-33					p23; U		
Goats Distance of swine farm-to-farm with goats	p32-33 p23					p23; U		
On swine premises Within 1 or 3 miles of premises	p23 p18 p22	9	· ·				p20	

			De	escriptive Repo	rts			Other
	1990	1995-l	1995-II	1995-111	2000-l	2000-11	2000-111	References
Greasy Plg	**	4				**		
Prevalence						p7,25-26; V		
Grower/Finisher Pigs				100				
Average age leaving (days to market)	p39	p6		p24	p23-24			
Co-mingling		·	p13	N	p33			
Culling							16	
Rate			p15				p10	
Reasons			p15					
Facilities Flooring			p8					
Types used		<b>p</b> 9	ро		p25-26			
Managing sick pigs		PV	p13, 15		P=0 =0			
Marketing			<b>P</b> 10 1 10					
Method sold			p15, 18-19		М			
Distance to slaughter plant			p19		2.77			
Mortality								
Rate	p40	p6	p15	p16	p21		p10	
Reasons	p40	p6	p16	p16	p22		p11	42
Risk factors								42
Nutrition						•		
Number diets fed	-20		p3		<b>W</b> p27-28			
Pig flow (Al/AO; continuous)	p39	p12			p37-38			
Preventive practices Productivity (ADG; FE)		piz	p16		p31-30		p12	
Source (type and number)			p12-13	N	p31-33		PIZ	
Wean to finish building			P.2. 10	,,	<b>P</b> 0.00	p57-58		
Weight at market	р39					P		
Growth Promotants (see also Antibiotics and Probiotics)	•					Т		
Cost								- 2
Haemophilus Parasuis (Glasser's disease)			•					
Cost								2
Mortality rate					•			2
Prevalence	p23					p4-5,25-26,28		_
Heating (see under Housing)	•							
Heat Stress			-					
Cost								2
Hemorrhagic Bowel Syndrome						p28-30		~
						F		
Herd Health Program Preventive antibiotics/growth promotants			p6	K				
Preventive antibiotics/growth promotants  Preventive practices			μo	Γ,			*	
Baby pigs	p11, 27; C	p12		p22	p37-38			
Boars	p27; C	p12		p20	p37-38			
Market swine	p2., 0	p12			p37-38			
Sows and/or gilts	p13, 27; C	p12	***************************************	p20	p37-38			

			De	escriptive Repo	rts	<del></del>	-, <del></del>	Other
	1990	1995-1	1995-II	1995-111	2000-1	2000-11	2000-111	References
Hormones						,		
Horses								
On swine premises	p18				*	p20		
Housing								
Bedding, in farrowing	p31							
Breeding/gestationfacility type	•		***************************************		p26			
Cleaning methods	p30							
Cooling method used	p30; F							
Environment		p8					•	
Exclusion of other animals							p14-15	
Farrowing								64
Effect on preweaning mortality	~~				-05.00			21
Facility type	<b>p28</b> p30; F	p9			p25-26			
Coolingtypes  Heatingtypes	p30; r <b>p30</b>							
пеациу-пуреs. All-in, All-out	p35	p8			p27-28			
Feeder design	<b>000</b>	ро			p27-20			
Management								
General building design		p9						
Grower/finisher		-	**					
All-in, Ali-out		p8			p27-28			
Facility type		p9			p25-26			
Stocking density								
Wean-to-finish						p57-58		
Idle time	p30; F							
Nursery								
All-in, All-out					p27-28			
Facility type		p9			p25-26			
Remodeling	-20					. p58		
Ventilation (see also Ventilation)	p29 p29							
Fans Waste management	hza							
Vaste management  Lagoon design and management							p25-30	
Waste disposal		***	p10		•		PEO GO	1
Types of systems	p29	: p10	p10 p9				p23-24	
Veterinary consultation	p28; D	F	<b>F</b> •				F	
Hygiene								
Cleaning								
Floor								
Truck cleaning					p43			
Hygromycin B					1.56			
Use in grower/finishers						p56		
Identification								
Operation Identification of slaughter pigs			p20					
Identification of treated pigs			P=0			p19,44		
recommend of a datad pigo					ll	P 10177		Barrier and the second

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-11	1995-III	2000-l	2000-11	2000-III	References
Ileitis (see Proliferative Enteritis)	·							
Iron Feed								2
Oral Injectable	<b>p27; C</b> p11, 27	<b>p12</b> p12		<b>p22</b> p22	<b>p37-38;</b> T p37-38; T			
Serology Water	p14-16							<b>2</b> 4, 6, 17
Isowean (see Segregated Weaning)						p55-56; S	. 75%	
Lactation Dexamethasone						<b>p</b>		
Failure Length								
Nutrition Lagoon								
Age Design							<b>p29</b> p27	
Freeboard Management							<b>p27</b> <b>p25-26</b> p25-30	
Lameness Incidence							μ20 00 *	
Morbidity  Mortality	<b>p7-8; B</b> p9-12; B							
Prevalence/reason for death loss Baby pigs	p37-38							
Nursery pigs Grower/finisher pigs	<b>p39</b> p40	p6	p16	p16	p22		p11	
Breeding females Reasons for culling								
Boars Market swine	> p42		p15					
Sows Lawsonia Intracellularis (see also Proliferative Enteritis)	p41	p7	-2		p8-9	p28		•81:007-
Risk factors Serology				•		437		<b>34</b> 34
Leptospirosis Prevalence						p4		
Serology . Vaccination	p26; C	p12		p26-27; l	p39			2 19, 20
Levamisole Lice	Service Service					p55-56; S	100	
Amitraz Control	p11, 13, 27; C	p12		p20, 22	p37-38; S			51
Cost								

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-II	1995-III	2000-1	2000-11	2000-111	References
Prevalence	p25							
Lincomycin								
Prevention of diarrhea Use in grower/finishers			p6			p46-54		2
Use in nursery pigs			po			p46-54 p42		39, 44
Use in sows						p , 2		47
Litter Size					p14		p6	
Magnesium								
Serology								2
Water Mange	p14-16	*						6, 17
Control	p11, 13, 27; C	p12		p20, 22	p37-38			
Prevalence	p11, 13, 27, 0	PIZ		- pzv, zz	p3/-36			
Manure (see Waste)	F							
Manure testing of nutrient content		p17	p23	J	p46			
Disposal			p10-11	<b>J</b> : 2'		p33-35	p30-32	
Waste managementtypes  Marketing	p29; F	p10	p9	p21; J	p34-36	p23-29		
Basic strategies	p34	p21		p25; M	p49			
Contracts	p35	p21		p25, IVI	p49			
Distance to slaughter plant	-		p19					
Method sold			p15, 18-19	M				
Mastitis				M. (178)				
Gost Incidence	p12							1, 2
Mortality rate	p12							2
Treatment	·							47
Medicated Early Weaning (see Segregated Weaning)								
To control Mycoplasma						p32-33		
Milk to the control of the control o			*					4
Replacers Farms feeding supplemental milk, creep prestarter	p36							
Piglets fed supplemental milk, creep prestarter	p36							
Multiple Site Production (see also Early or Segregated Weaning).	P							
Separate nursery site		p11	p12	N	p29-30			
Separate finisher site		p11		, N	p29-30			
Muscle								
Muscle, bone, or joint problems within last 12 months	p25							
Mycoplasma Hyopneumoniae Control						p32-33		
			##			p32-33 p4,5,25,26,		
Prevalence						28,29; V		
				1,494	347			2
Vaccination					p39	p9-11,33-34		

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-11	1995-111	2000-1	2000-11	2000-III	References
Mycotoxin								
Feed				Р				2
Neomycin								
Use in grower/finishers						p48-54		
Use in nursery				***		p42		
Nervous System								
Incidence							1	
Morbidity	p7-8; B							
Mortality	p9-11							
Prevalence/reason for death loss  Baby pigs	p25 p37-38; B							
Nursery pigs	p37-38; 5 p39							
Grower/finisher pigs	p39							
Nitrates/Nitrites	P10							
Effects on performance of farrowing swine								26
Water	p14-17; G							4, 6, 7, 17
Nursery Pig	p14-17, 0							4, 0, 7, 17
Age leaving the nursery	p38	p5		p23	p20; V			
Facility type	poo	p9		μZO	p25-26; V			
Mortality		F			P-0-01, 1			
Rate	p38	p5		p14	p18; V		p8,9	
Reason	p39	р5		p15	p18-19; V		p8,9	
Pig flow (AI/AO; continuous)	p38	p8		p23	p27-28; V			
Weight leaving the nursery	p38							
Nutrition (see also Feed)								
Antibiotics .								39, 44
Creep feeding			e e				1.0	
Farms feeding supplemental milk, creep prestarter	p36							
Piglets fed supplemental milk, creep prestarter Feed cost	p36							
Feed processing								
On-farm mixing								
Growing/finishing		p3						
Mixing of grower/finisher diets		P	p3					
Number rations fed			p3		W			
Split sex feeding			p4			p56		
Vitamin and mineral					1.5			
Iron (see Iron)								
Blood products								
Fat Plasma protein					W			
Protein	1			T <sub>E</sub>	141			
Sequencing of rations					W			
Veterinary consultation	p28; D	p13	p3	p28	p41			
Odor	p20, D	рю		p20	P <del>4</del> I			
Oddi								

			De	escriptive Repo	rts			Other
	1990	1995-l	1995-II	1995-III	2000-1	2000-11	2000-111	References
Complaints							p37	
Control (use of reducing strategies)							p38-44	
Oesophagostomum Fecal load								2
Olaquindox								-
Organophosphates								
Water								4
Oxytetracycline								
Use in grower/finishers			p6			p46-54; T		
Use in nursery pigs						p42; T		<b>39, 44</b> 47
Use in sows	·							47
Oxytocin Given oxytocin during farrowing	p36							47
Parasites and Anthelminthics	poo							
Cost								1
Deworming	p11, 13, 27; C	p12		p20, 22	p37-38	p55,56; S		_
Fecal load	-44 40 00							2
Lice (see Lice)	p11,13,23, 27; C	p12		p20,22	p37-38; S			
Elico (abba Lived)	p11,13,23,	P		P=0,==	<b>, p</b> 0. 00, 0			
Mange (see Mange)	27; C	p12		p20,22	p37-38; S		***************************************	
	-05			15.25	2	p4,5,7,25,26, 28,29; S		
Prevalence Whipworm (see also Trichuris Suis)	p25					20,29, 3		2
Parity	ρ6; A							
Parvovirus	,							
Prevalence						p4-5		
Serology								2
Vaccination	p26; C	p12		p26-27; I	p39			19, 20
Pasteurella Multocida (see a/so Atrophic Rhinitis) Mortality rate								2
Prevalence	p23,25					p28		-
Vaccination	p26; C			,	p39			
Penicillin								
Prevention of diarrhea						40.51.7		2
Use in grower/finishers						p46-54; T p42; T		39, 44
Use in nursery pigs Use in sows						י ישירט		47
Pesticides		ş.						51
Phosphorus								
Serology								, 2
Water	p14-16							4, 6, 17
Phytate (use of Phytase and low-Phytate corn)							p39-40	

			D	escriptive Repo	rts			Other
	1990	1995-I	1995-II	1995-111	2000-1	2000-11	2000-111	References
Piglet Mortality (see Baby Pig)								
Piperazine						p55		
Pneumonia, respiratory disease (see also Respiratory Tract)						ì		
Condemnation rate				p32				
Cost								1, 2
Fatality rate								2
Prevalence	p25		p14					
Porcine Reproductive & Respiratory Syndrome (PRRS)			1	1			1 (1)	
Control				Q		p14,36		
Prévalence			p14			p4,5,7,25,26, 28,29; V		
Serology			p14	p17; Q, R		20,29, V		18
Vaccination		p12		p26-27; I	p39	p11-14,34-35		10
Pork Industry		F			Poo	F		
Demographics								
Global								
Trends								
Pork Quality							p22	
Assurance								
Postweaning Multisystemic Wasting Syndrome (see also Circo	virus)							
Prevalence						p25,28	7	
Poultry								
Distance of swine farm-to-farm with poultry	p23							
On swine premises	p18						p20	
Within 1 or 3 miles of premises	p22							
Preweaning Mortality (see also Baby Pig, mortality)								
Cost Due to diarrhea	·						-7	12, 14
Incidence	p5-6						p7	23, 24 <b>15</b>
Prevalence	p37; A	р3		p10-11	p14		р6	10
Reasons and risk factors	p37-38; A	р3		p12	p15		p7	15, 21, 32
Proliferative Enteritis		*		•				
Lawsonia intracellularis						p28-29		
Fatality rate								2
Prevalence/reasons for death loss		p14	p16			p28-29		
Pseudorabies								
Cost								2
Fatality rate			_			4.00	out.	2
Prevalence Serology	p23		p14		,	p4,28		2
Vaccination	p26; C							2 <b>2</b> 0
Pyrantel Tartrate	V					p56		LU
Ractopamine						p42,52-54		
Izaerokamina						p42,02-04	L	

			De	escriptive Repo	rts			Other
	1990	1995-1	1995-II	1995-III	2000-1	2000-11	2000-111	References
Use in grower/finishers						p52-54		
Use in nursery pigs						p42		
Records								
Breeding herd					p48	p19		
Bureau service	p35	p20		p26				
Grow/finish						p44		
Information returned to producers Method used	p35	p20	p23	p26	-40			
Method used Rectal Prolapse	paa	pzu		pzo	p48			
								_
Mortality rate Prevalence	p25							- 4
Rectal Stricture	μzσ							
Prevalence	p25							
Reproduction (see also Breeding)	pzo							
Gilt management						p21-23		
Measures of performance						pz 1-23		
Average number of sows/gilts farrowed per farm	p5-6, 37							
Per-litter productivity	p5-6, 37	p3		p10-11	p14		p6	
Parity	p6; A						F-	
Prevalence of reproductive problems	p25							
Return to estrus	p5							
Weaning to breeding interval	p5, 25							7
Reproductive Failure (see also Reproduction)					p8-9			
Age of onset						p31		
Infectious								
Noninfectious	p25 .							
Respiratory Tract Infections (see also Pneumonia)								
Age of onset						p31		
Cost Incidence								1,29
Morbidity	p7-8; B							
Mortality	p9-12							
Prevalence/reason for death loss	p25							·
Baby pigs	p37-38; B				p15		p7	
Nursery pigs	p39	p5		p15	p18-19		p8,9	
Grower/finisher pigs	p40	p6	p16	p16	22		p11	
Breeding females								
Reasons for culling								
Market swine			p15					••
Risk factors for mortality Treatment						n40.42		42
Rodents						p40,43		
Access to facilities							-44.47	•
Control methods used by farms	p19	p15		≈20+ U	p45		p14-17	
Frequency seen in facilities	p19 p19	pio		; раз; п	p45			
requeries seen in lacilities	Pia	L		<u> </u>	II	L		L

			De	escriptive Repo	rts			Other
	1990	1995-1	1995-II	1995-III	2000-1	2000-II	2000-III	References
Placement of bait stations							p18-19	
Rotavirus								
Prevalence	p26; C					p7		40.00
Vaccination								19, 20
Roundworms (see Ascaris Suum)								
Salmonella						p59		
Control (intervention strategies)	•					pəa -		2
Feed isolates				Р				27
Grower/finisher pigs				0				
Mortality rate								2
Prevalence			p14	p18 <u>,</u> 33		p4,25,26,28,29		
Risk factors				0				35, 43
Serology Serotypes				p33; O				
Shedding			p14	0				35, 36
Sensitivity			ρ, ι					36. 37
Vaccination			p17			***************************************		
Segregated Weaning (see also Weaning and Multiple Site Production	7)							
Weaned at 20 days or less, removed to separate site		p11			p29-30; V		***************************************	
Selenium				,				
Feed								2
Serology								2
Water								4
Semen (see also Artificial Insemination)					p7			
Source Veterinary consultation on collection	p28				p/			
Sheep	<b>P-</b> 0							
Distance of swine farm-to-farm with sheep	p23							
On swine premises	p18						p20	
Within 1 or 3 miles of premises	p22				***			74.5
Slaughter Checks	p28; D	p13		p28	p41			
Slaughter Plants							4.5	
Condemnation rates			p23	p32				
Distance hogs shipped to slaughter			p19 *	M				
Information returned to producers Sodium			p23					
Feed								
Serology		*						2
Water	p14-16							4, 6, 17
Sows and Gilts								., ., .,
Age gilts separated from market hogs	p42					p22-23		
Body condition								
Culling						т тот при		

			Do	escriptive Repo	rts			Other
	1990	1995-I	1995-II	1995-111	2000-1	2000-11	2000-111	References
Average age at culling	p42							
Average days from last weaning	p42				***************************************			
Rate	p12, 31	p <u>7</u>		p14	p8-9		p5	
Reasons Feeding	p41	p7			p8-9			
Isolation and quarantine	p17; E	p16		p27; H	p10-13			
Days new arrivals separated	p17; E	pio		μ21, Π	p10-13			
Health testing new arrivals	p17	p16		p27; H	p12			
Longevity				,				
Average age at culling	p42							
Management						100		
Assisted manually during farrowing	p36							
Observed during farrowing	p36							
Retained at weaning for nursing other pigs  Washed before farrowing	p36 <b>p36</b>							
Mating (see Breeding)	μωσ							
Morbidity	p12							
Mortality	p12				p8		p5	
Preventive practices				p20	p37-38		,	
Reason for culling								
Reproductive Performance	p41	-p7			p8-9			
Source of purchased breeding females	p32-33					p23		
Water sources sows drink from	p14, 29							*
Spectinomycin								
Use in grower/finishers Prevention of diarrhea						p46-48,50		
Split Sex Feeding								2
Split sex reeding			p4			p56		
Stillbirths			p4			p30		
Cost								1, 2
Rate	p5, 6, 25; A	р3		11-01a	p14		p6	1, 2
Staphylococcus Hyicus (see Greasy Pig)		F		F	F		P	
Stocking Density								
Streptococcus Suis								
Mortality rate								
Prevalence			p14, 16			p7,25,26; V		4
Vaccination	p26; C		F : 1, 10			p.,,,		
Sulfamethazine	, , , , , , , , , , , , , , , , , , ,							
Prevention of diarrhea								2
Use in feed			р6			p42,51-54		39, 44
Use in grower/finishers						p48-54		
Use in nursery pigs						p42		
Sulfate					1.	·*		
Association with diarrhea								16
Water	p14-16					l ·		4, 6, 7, 16, 17

			D	escriptive Repo	rts			Other
	1990	1995-1	1995-II	1995-III	2000-1	2000-11	2000-III	References
Swine Dysentery								
Cost								2
Mortality rates Prevalence	p23		_			-40500		2
Serology	p23		p14			p4,25,28		2, 9, 10
Swine Influenza								2, 3, 10
Mortality rate								2
						p4,5,25,26,		
Prevalence Serology	<b>p23</b> p13		p14			28,29		2.7.40
Vaccination	різ				p39	p15-18,37-39		2, 7, 49
Teeth Clipping	p11, 27; C							
Terramycin								
Use in grower/finishers						p51-54		
Use In nursery pigs						p42		
Tetracyclines (see also Chloratetracyline, Oxytetracycline)								
Susceptibility of Salmonella Disease prevention								<b>36, 37</b> 2
Use in grower/finishers						p46-54		2
Use in nursery pigs						p42		39, 44
Use in sows								47
Tiamulin								
Use in grower/finishers Use in nursery pigs						<b>p48-54</b> p42; T		
Tilimicosin						μ42, ι		
Use in grower/finishers				•		p51-54		
Use in nursery pigs						p42		
Toxoplasma Gondii								
Prevalence								
Risk factors Serology								38 <b>3, 30, 45</b>
Transmissible Gastroenteritis (TGE)			•		*			0, 00, 10
Cost								
Epidemiology								22
Mortality rate Prevalence	-00		-44	-10		4705		2
Risk factors	p23		p14	p18		p4,7,25		22
Serology	p13					*		2, 7, 22
Vaccination	p26; C							19, 20
Transportation			A 27 (2 3 3 4 4 4 5 5 5 5 5 6 4 4 4 4 4 4 4 4 4 4 4		Acres 31: 44:4000 (2000)	**************************************		
Feed delivery frequency (per month)	p21							
Gastric emptying Livestock hauling					p43			
Cleaning (see under Biosecurity)					PNO			
Croaming (COO diluter Diosecurity)	L	I	l	L	l		L	L

			D	escriptive Repo	rts			Other
	1990	1995-I	1995-11	1995-III	2000-I	2000-11	2000-111	References
Distance to slaughter plant			p19					
Employee training Frequency	p21, 31		p21 <b>p22</b>					
Method used	pzi, 31 p31		<b>p</b> ∠∠ p22					
Trichinae Spiralis (Trichinella)	poi		P22					
Control								
Serology						4.7		45, 46
Trichuris Suis								
Fecal load								2
Tylosin Prevention of diarrhea								•
Use in feed								<b>2</b> 39, 44
Use in grower/finishers			p6			p46-54; I		39, 44
Use in nursery pigs			p6			p42		
Use in sows								47
Urogenital system								
Vaccination (see also specific pathogens)								
Vaccinations practices				p26-27; I	p39	p10,11,13,14, 17,18,33-35,39		
Boars	p26	p12		p20-27,1	poa	17,10,33-33,39		
Market hogs		p12	p17			p32-39		
Piglets	p11, 26	p12						
Sows and/or gilts	p13, 26; C	p12			p13	p9-18		
Veterinary consultation  Vaccines	<b>p</b> 28; D	p13		p28; l	.p41			
Vaccines						p9,11,12,15,		
Autogenous	p26		p17			16.34-38		-
Efficacy			•			•		19
Partial budget analysis				4.7			3.7	31
Vaccines used regularly by operations Actinobacillus pleuropneumonia (APP)	p26; C							
Actinobacinus pieuroprieutiforia (AFF)  Atrophic rhinitis (Bordetella)	p26; C							19, 20
Clostridium	p26; C							19, 20
Erysipelas	p26; C	p12		p26-27; I	p39			19, 20
E. coli scours	p26; C	p12		p26-27; I	p39			19, 20, 31
Leptospirosis Mycoplasma	p26; C	p12		p26-27; I	p39 p <b>39</b>	p9-11,32-34		19, 20
Parvovirus	p26; C	p12		p26-27; I	p39 p39	ρυ-11,32-34		19, 20
Pastuerella	p26; C	F12		pro Er, i	p39			19, 20
Porcine reproductive and respiratory syndrome		p12		p26-27; I, Q, R	p39	p11-14,34-36		
Psuedorables (PRV)	p26; C							
Rotavirus Salmonella	p26; C		17 מ		-			19, 20
Streptococcus	p26; C		p1/		j.			
Swine influenza (SIV)	p=0, 0				p39	p15-18,37-39		

			De	escriptive Repo	rts			Other
	1990	1995-I	1995-11	1995-III	2000-1	2000-11	2000-111	References
TGE	p26; C							19, 20
Vancomycin								
Ventilation (see also Housing)							***************************************	
Dust								
Fans								
Mechanical								
Natural								
Ventilation-types	p29; F							
Veterinary Practice/Veterinary Consultants								
Farm personnel Opinion of vet								
Recruiting /training								
Employee training			p21		p41			
Farm management options								
Frequency used by producers	p28; D	p13		p28	p40			
Services used by producers	p28; D	p13		p28	p41		100	
Virginiamycin								
Use in feed.			p6		100	p42,51-54		39, 44
Use in grower/finishers						p51-54		
Use in nursery pigs						p42		
Vitamins								
Vomitoxin		9.44		P				2
Waste Management								
Composting	p18-19			p29	p47-48			
Dead pig disposaltime and method	p24	p18-19		p29	p47-48			
Lagoon design and management Manure disposal			p10-11				<b>p25-29</b> p33-35	
Nutrient content of manure, testing		p17	p10-11	J	p46		p33-35	
Nutrient management		<b>P.</b>	PEG		pag		p30-32	
Soil fertility testing							p36	
Solid-liquid separation			p9-10			•		
Storage systems			. p9	,			* * * * * * * * * * * * * * * * * * * *	11.5
Types of systems used	p29; F	p10	p9	p21; J	p34-36		p23,24	
Water	7.4					•		
Assessing quality		p17	p23		p46			
Delivery A Sows	-00 F							
Distance from swine facilities (in miles)	p29; F							
To nearest lake/pond not on farm	p25							
To nearest waterway not on farm	p25							
Effect of nitrates on farrowing swine	F TT							26
Farm use			- 4					
Frequency producers test ground water quality	p14-17	p17	p23		p46			
Sample results	p14-17; G							4, 6, 17, 26
Source	G	l	L		l		l	4, 17

	Descriptive Reports							Other
	1990	1995-I	1995-II	1995-111	2000-1	2000-II	2000-111	References
Lake/pond on farm and swine access to	p24							
Water sources sows drink from	p14, 29							
Waterways present on farm and swine access to	p24	7. 15. 15.						
Well characterisitics	p15-16; G							4, 17
Wean-to-Finish Building						p57-58		
Weaning								
Age								
Average	p5-6, 36	p3 <b>p4</b>		p22	p16			
Weaning categories		p4			p17			
Early								
Weaned at 20 days or less, removed to separate site		p11			p29-30			
Nursing sows	p36	p11						
Performance	5 0 0 T			40.44	4.4			
Per-litter productivity	p5-6, 37	р3		p10-11	p14		p6	
Weight	p5-6, 36							
Wildlife				•				
Frequency sighted within 1 mile of farm	p20							
Wild Pigs		p14		н		i	p21	
Yersinia Enterocolitica		4						
Prevalence								
Zearalenone			P					2
Zinc	***							
Feed			p6					2
Serology								2
Water was the fill of the state	p14-16							4, 6, 17

# **Descriptive Reports**

1990: Morbidity/Mortality and Health Management of Swine in the U.S.

1995-I: Reference of 1995 Swine Management Practices

1995-II: Reference of 1995 U.S. Grower/Finisher Health & Management Practices

1995-III: Changes in the U.S. Pork Industry 1990-1995

2000-I: Reference of Swine Health and Management in the United States, 2000

2000-II: Reference of Swine Health and Health Management in the United State, 2000

2000-III: Reference of Swine Health & Environmental Management in the United States, 2000

### **NAHMS Info Sheets**

# 1990 NSS

- A--Sow productivity
- B--Preweaning morbidity and mortality
- C--Preventive practices
- D--Consulants provide variety of services
- E--Biosecurity measures
- F--Total confinement farrowing facilities
- G--Results of water testing

### Swine '95

- H--Trends in biosecurity measures
- I--Trends in vaccination practices
- J--Environmental practices/management
- K--Antibiotic usage in premarket swine
- L--Feed management
- M--Marketing finisher pigs
- N--Sources of pigs entering the grower/finisher phase
- O--Shedding of Salmonella by finisher hogs
- P--Presence of mycotoxins and Salmonella in Swine finisher diets
- Q--PRRS
- R--Prevalence of PRRS virus

# Swine '00

- S--Preventive practices in swine: parasite treatment
- T--Preventive practices in swine: administration of iron and antibiotics
- U--Gilt management
- V--Swine nursery management
- W--Feed management
- X--Vaccination practices
- Y--Biosecurity

# **Other References:**

- 1 Miller GY, Dorn CR. Costs of swine diseases to producers in Ohio. Preventive Veterinary Medicine. 1990; 8:183-190.
- 2 Owen, WJ. Food animal disease monitoring. Iowa State University.1990; booklet.
- 3 Zimmerman JJ, Dreesen DW, Owen WJ, Beran GW. Prevalence of toxoplasmosis in swine in Iowa. Journal American Veterinary Medical Association. 1990; 196(2):266.
- 4 Stoltenow, CL.. Water quality results from NAHMS lowa rounds 2 and 3. USDA:APHIS:VS, Animal Health Insight, Fort Collins, CO. 1990; 1-2, 4.
- 5 Meyer VM, Bundy DS. Farrowing building air quality survey. American Society Agricultural Engineers International Summer Meeting, Albuquerque, NM. 1991.
- 6 Alexander J, Ross F. National swine survey water tests results. USDA:APHIS:VS, Animal Health Insight, Fort Collins, CO. Summer 1991; 7-9.
- Alexander J, Dargatz DA. Preliminary results of the NAHMS national swine survey's biological and environmental sampling component. USDA:APHIS:VS, Animal Health Insight, Fort Collins, CO. Fall 1991; 1-5.
- 8 Zimmerman JJ, Owen WJ, Hill HT, Beran GW. Seroprevalence of antibodies against encephalomyocarditis virus in swine of Iowa. Journal American Veterinary Medical Association. 1991; 199(12):1737-1741.
- 9 Mopother ME. An estimate of the prevalence of swine dysentery in the US swine herds during 1989-91. 1992.
- Mopother ME. Evaluation of the ELISA for the detection of serum antibodies to Serpulina (Treponema) hyodysenteriae. Livestock Conservation Institute Annual Meeting, Peoria, IL. 1992.
- 11 Frey ML. Observations on the serology of encephalomyocarditis of swine. USDA:APHIS:VS, Animal Health Insight, Fort Collins,
- 12 Crooks AC, Hurd HS, Dargatz DA, Hill GW. Economic cost of piglet mortality in the farrowing to weaning phase: a report of the NAHMS national swine survey. USDA:APHIS:VS, Animal Health Insight, Fort Collins, CO. Fall 1992; 9-14.
- 13 USDA. Morbidity/mortality and health management of swine in the United States. USDA:APHIS:VS, Fort Collins, CO. 1992; 43 p.
- 14 Crooks AC, Hurd HS, Dargatz DA, Hill GW. Economic cost of piglet mortality: a report of the NAHMS national swine survey. Swine Health and Production. 1993; 1(3):15-21.
- 15 Tubbs RC, Hurd HS, Dargatz DA, Hill GW. Preweaning morbidity and mortality in the United States swine herd. Swine Health and Production. 1993; 1(1):21-28.
- Veenhuizen MF. Association between water sulfate and diarrhea in swine on Ohio farms. Journal American Veterinary Medical Association. 1993; 202(8):1255-1260.
- Hurd HS. An analysis of methods used to report water quality results from a national sample. USDA:APHIS:VS, Animal Health Insight, Fort Collins, CO. 1993; 1-4.
- Bautista EM, Morrison RB, Goyal SM, Collins JE, Annelli JF. Seroprevalence of PRRS virus in the United States. Swine Health and Production. 1993; 1(6):4-8.
- 19 Straw BE. Vaccination of swine. Nebraska Center for Continuing Education, George A. Young Swine Conference, Lincoln, NE. 1994; 58 p.

- Ott SL. Influence of herd size on swine vaccination practices. USDA:APHIS:VS, Animal Health Insight, Fort Collins, CO. 1994; 14-17.
- Yeske P, Ott SL, Hurd HS. Facility effects on preweaning mortality: a report of the NAHMS national swine survey. Swine Health and Production. 1994; 2(5):11-18.
- Yanga ST, Gardner IA, Hurd HS, Eernisse KA, Willeberg P. Management and demographic factors associated with seropositivity to TGE virus in US swine herds, 1989-1990. Preventive Veterinary Medicine. 1995; 24:213-228.
- Dewey CE, Wittum TE, Hud HS, Dargatz DA, Hill GW. Herd and litter level factors associated with the incidence of diarrhea morbidity and mortality in piglets 4 to 14 days of age. Swine Health and Production. 1995; 3(3):105-112.
- Wittum TE, Dewey CE, Hurd HS, Dargatz DA, Hill GW. Herd and litter level factors associated with the incidence of diarrhea morbidity and mortality in piglets 1 to 3 days of age. Swine Health and Production. 1995; 3(3):99-104.
- 25 USDA. Swine '95 Part I: Reference of 1995 swine management practices. N186.995. USDA: APHIS: VS. Fort Collins, CO. 1995.
- Bruning-Fann C, Kaneene JB, Lloyd JW, Stein AD, Thacker BJ, Hurd H. Associations between drinking-water nitrate and the productivity and health of farrowing swine. Preventive Veterinary Medicine. 1996; 26:33-46.
- 27 Fedorka-Cray PJ, Bush EJ, Thomas LA. Results of the NAHMS Swine '95 grower/finisher survey--feed. US Animal Health Association. 1996.
- Hurley T, Chaudhary S, Kliebenstein JB, McKean JD. Costs of pig scours. Iowa State University 1995 Swine Research Report. 1996. 1995:152.
- Hurley T, Chaudhary S, Kliebenstein JB, McKean JD. Costs of respiratory disease. Iowa State University 1995 Swine Research Report. 1996. 1995:154.
- Patton S, Zimmerman JJ, Roberts T, Faulkner CT, Diderrich VR, Assadi-Rad A, Davies PR, Kliebenstein JB. Seroprevalence of Toxoplasma gondii in hogs in the NAHMS. Journal Eukaryotic Microbiology. October 1996; 121S.
- Wittum TE, Dewey CE. Partial budget analysis of sow Escherichia coli vaccination. Swine Health and Production. 1996; 4(1):9-14.
- Bowman G, Ott SL, Bush EJ. Management effects on preweaning mortality: a report of the NAHMS 1990 National Swine Survey. Swine Health and Production. 1996; 4(1):25-32.
- 33 USDA. Swine '95 Part II: Reference of 1995 US grower/finisher health & management practices. N201.696. USDA:APHIS:VS, Fort Collins, CO. 1996.
- Bane DP, Norby B, Gardner IA, Roof MB, Knittel JP, Bush EJ. Prevalence and management risk factors associated with Lawsonia intracellularis seropositivity in the US swine herd. University of Minnsota Allen D. Leman Swine Conference, St. Paul, MN. 1997; 19.
- Bush EJ, Fedorka-Cray PJ. Risk factors associated with shedding of Salmonella by US finishing hogs. American Association of Swine Practitioners. 28th Annual Meeting, Quebec City. 1997; 433-436.
- Fedorka-Cray PJ, Holcomb HL, Bush EJ, Dargatz DA, Tollefson LK. Resistance and sensitivity patterns of Salmonella isolates. University of Minnesota Allen D. Leman Swine Conference, St. Paul, MN. 1997; booklet.
- Holcomb HL, Fedorka-Cray PJ, Bush EJ, Dargatz DA, Tollefson LK. Anitmicrobial susceptibility of Salmonella isolates from swine. Proceedings of the 2nd International Symposium on the Control of Salmonella, Copenhagen. 1997.

- 38 Kliebenstein JB, Patton S, Zimmerman JJ, Hu X, Hallam A, Roberts T, Bush EJ. Toxoplasma gondii in United States swine operations: an assessment of management factors. AEEMA, Epidemiologie et Sante Animale VIII, Paris. 1997; 05.26.1.
- Dewey C, Cox BD, Straw BE, Bush EJ, Hurd HS. Associations between off-label feed additives and farm size, veterinary consultant use, and animal age. Preventive Veterinary Medicine. 1997; 31(1-2):133-146.
- 40 USDA. Swine '95 Part III: Changes in the US pork industry 1990-1995. N248.1097. USDA: APHIS: VS, Fort Collins, CO. 1997.
- Losinger WC, Bush EJ, Smith MA, Corso BA. An analysis of mortality in the grower/finisher phase of swine production in the United States. Preventive Veterinary Medicine. 1998; 33(1-4):121-145.
- Losinger WC, Bush EJ, Smith MA, Corso BA. Mortality attributed to respiratory problems among finisher pigs in the United States. Preventive Veterinary Medicine. 1998; 37(1-4):21-31.
- Bush EJ, Wagner BA, Fedorka-Cray PJ. Risk factors associated with shedding of salmonella by US finishing hogs. Proceedings of the 3rd International Symposium on the Epidemiology and Control of Salmonella in Pork, Washington, DC. 1999; 106-108.
- Dewey CE, Cox BD, Straw BE, Bush EJ, Hurd HS. Use of antimicrobials in swine feeds in the United States. Swine Health and Production. 1999; 7(1):19-25.
- Wells SJ, Bush EJ, Blaha T. What do we know about food-borne pathogens in pigs and slaughterhouses? University of Minnesota Allen D. Leman Swine Conference, St. Paul, MN. 1999; 228.
- 46 Gamble HR, Bush EJ. Seroprevalence of Trichinella infection in domestic swine based on the National Animal Health Monitoring System's 1990 and 1995 swine surveys. Veterinary Parasitology. 1999; 80(4):303-310.
- 47 Straw BE, Bush EJ, Dewey CE. Types and doses of injectable medications given to periparturient sows. Journal American Veterinary Medical Association. 2000; 216(4):510-515.
- 48 Bush EJ, Stanton N. Highlights from the past two NAHMS national swine studies. Swine Health and Production. 2000; 8(2):97-98.
- Swenson SL, Johnson E, Eernisse KA, Hofer C. Landolt G, Karasin A, Olsen CW, Bush EJ. Swine Influenza surveillance in the United States. Tracking and Managing SIV, University of Minnesota Allen D. Leman Swine Conference, Minneapolis, MN. 2001; 11-12.
- 50 USDA. Part I: Reference of swine health and management in the United States, 2000. USDA: APHIS: VS, Fort Collins, CO. 2001.
- 51 USDA-NASS Estimates Division. Agricultural chemical usage: 1999 swine and swine facilities. 2000.

For more information, contact:

USDA:APHIS:VS:CEAH
NRRC Building B., M.S. 2E7
2150 Centre Avenue
Fort Collins, CO 80526-8117
970.494.7243

E-mail: NAHMSweb@aphis.usda.gov www.aphis.usda.gov/vs/ceah/cahm