

What to Expect from a Field Swine Nutritionist?



Science-driven solutions®

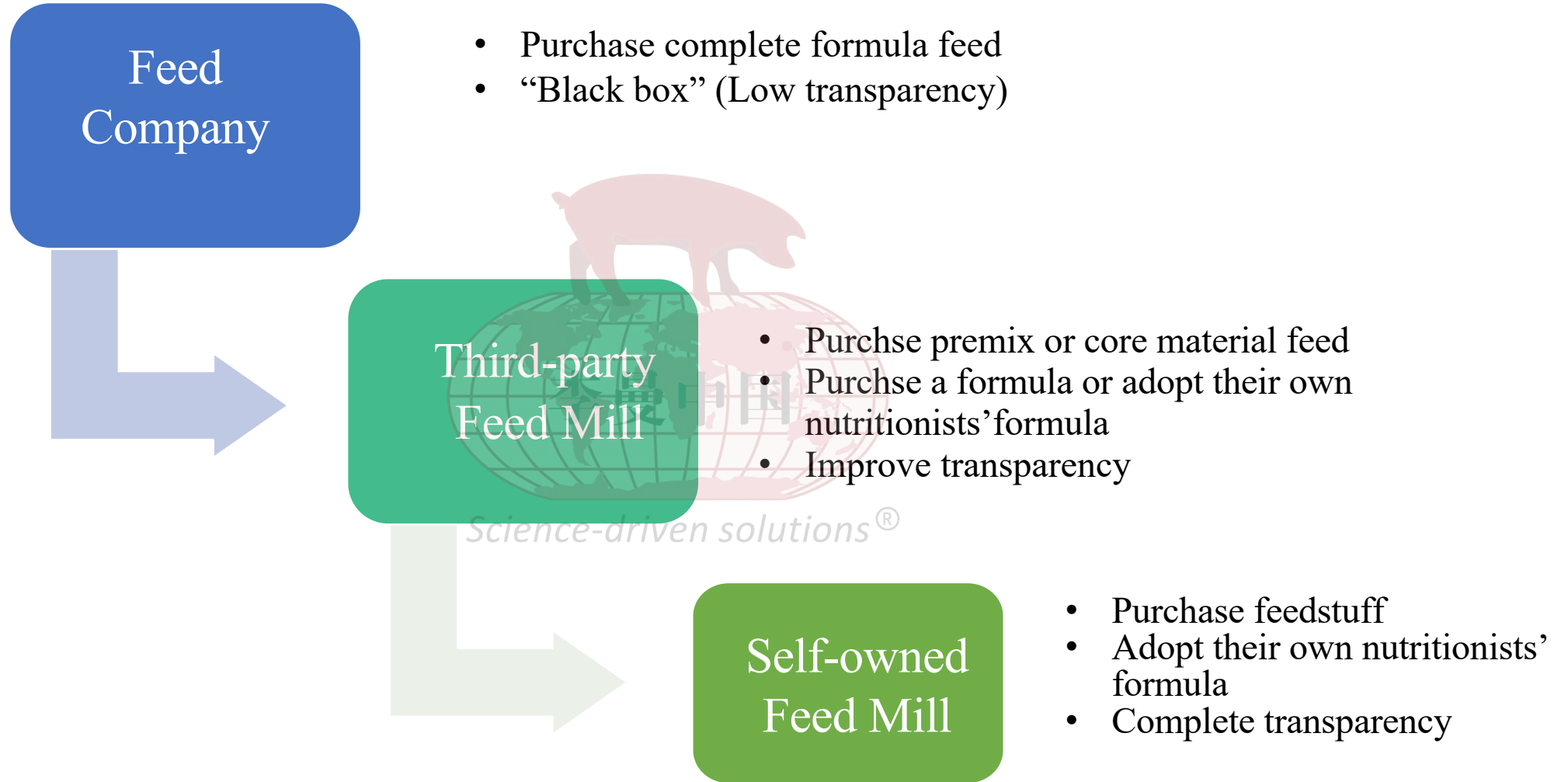
Wu Fangzhou(吴方舟)

2023 Lemanchina



PIPESTONE®

Nutritional patterns will change as pig farming scales up



Transitioning from Feed Mill Nutritionist to Farm Nutritionist



Science-driven solutions[®]

- Intended for people
- Reduce complaints
- Standardized programs

- Intended for pigs
- Maximize economic benefits
- Customized programs

Skill Sets of Swine Nutritionist:

1. Feed formula
2. Feed processing
3. Keeping track of production
4. Conducting experiments
5. Communicating with production team and veterinarians



Science-driven solutions®

Nutrition is more than just running formula software

● Nutritional program design

➤ the number of feed number and feed budget

- . efficiency of feed mill
- . stocking size (pig flow)
- . specification of feed truck
- . mixer capacity

	Ph
1.7.16	1
Feed Budget, Gilt	
Feed Budget, Barrow	
ME (kcal/lb)	
SID Lys (%)	1
SID M+C:Lys	
SID Thr:Lys	

Nursery			Finisher										
GDU1	GDU2		GDU3		GDU4		GDU5		GDU6		GDU7		
栏位1	栏位1	栏位16	栏位1	栏位16	栏位1	栏位16	栏位1	栏位16	栏位1	栏位16	栏位1	栏位16	
栏位2	栏位2	栏位15	栏位2	栏位15	栏位2	栏位15	栏位2	栏位15	栏位2	栏位15	栏位2	栏位15	
栏位3	栏位3	栏位14	栏位3	栏位14	栏位3	栏位14	栏位3	栏位14	栏位3	栏位14	栏位3	栏位14	
栏位4	栏位4	栏位13	栏位4	栏位13	栏位4	栏位13	栏位4	栏位13	栏位4	栏位13	栏位4	栏位13	
栏位5	栏位5	栏位12	栏位5	栏位12	栏位5	栏位12	栏位5	栏位12	栏位5	栏位12	栏位5	栏位12	
栏位6	栏位6	栏位11	栏位6	栏位11	栏位6	栏位11	栏位6	栏位11	栏位6	栏位11	栏位6	栏位11	
栏位7	栏位7	栏位10	栏位7	栏位10	栏位7	栏位10	栏位7	栏位10	栏位7	栏位10	栏位7	栏位10	
栏位8	栏位8	栏位9	栏位8	栏位9	栏位8	栏位9	栏位8	栏位9	栏位8	栏位9	栏位8	栏位9	
wean-day36	day37-day65		day66-enter		day66-enter		day66-enter		day66-enter		day66-enter		
料塔1	料塔3		料塔5		料塔7		料塔9		料塔11		料塔13		
料塔2	料塔4		料塔6		料塔8		料塔10		料塔12		料塔14		
料塔1-4单个容量2吨			料塔5-14单个容量4吨										
1吨畅舒宝 +0.6畅舒贝	1.4吨畅舒贝+2吨002+2 吨003		6吨003+12吨552+18吨 553+ 32吨556HB-1+16 吨556HB-2			同GDU3		同GDU3		同GDU3		同GDU3	
	每次订料数	订料次数											
畅舒宝	1吨	1次											
畅舒贝	2吨	1次											
新好002	2吨	1次											
新好003	4吨	2次											
新好552	6吨	2次											
新好553	6吨	3次											
新好556HB-1	8吨	4次											
新好556HB-2	8吨	2次											

Nutrition is more than just running formula software

- Purchasing/Selecting feedstuff
 - bulk feedstuff market
 - assessment of non-conventional feedstuff
 - assessment of additive products

- Data of Feedstuff composition
 - “Loading is everything” – Wayne Cast
 - What if testing ability is not available?

PEER REVIEWED

PRACTICE TIP

**Fact sheets – Ingredient database management:
Part I, overview and sampling procedures and
Part II, energy**

Márcio A. D. Gonçalves, DVM, PhD; Steve S. Dritz, DVM, PhD; Cassandra K. Jones, MS, PhD; Mike D. Tokach, MS, PhD; Joel M. DeRouchey, MS, PhD; Jason C. Woodworth, MS, PhD; Robert D. Goodband, MS, PhD

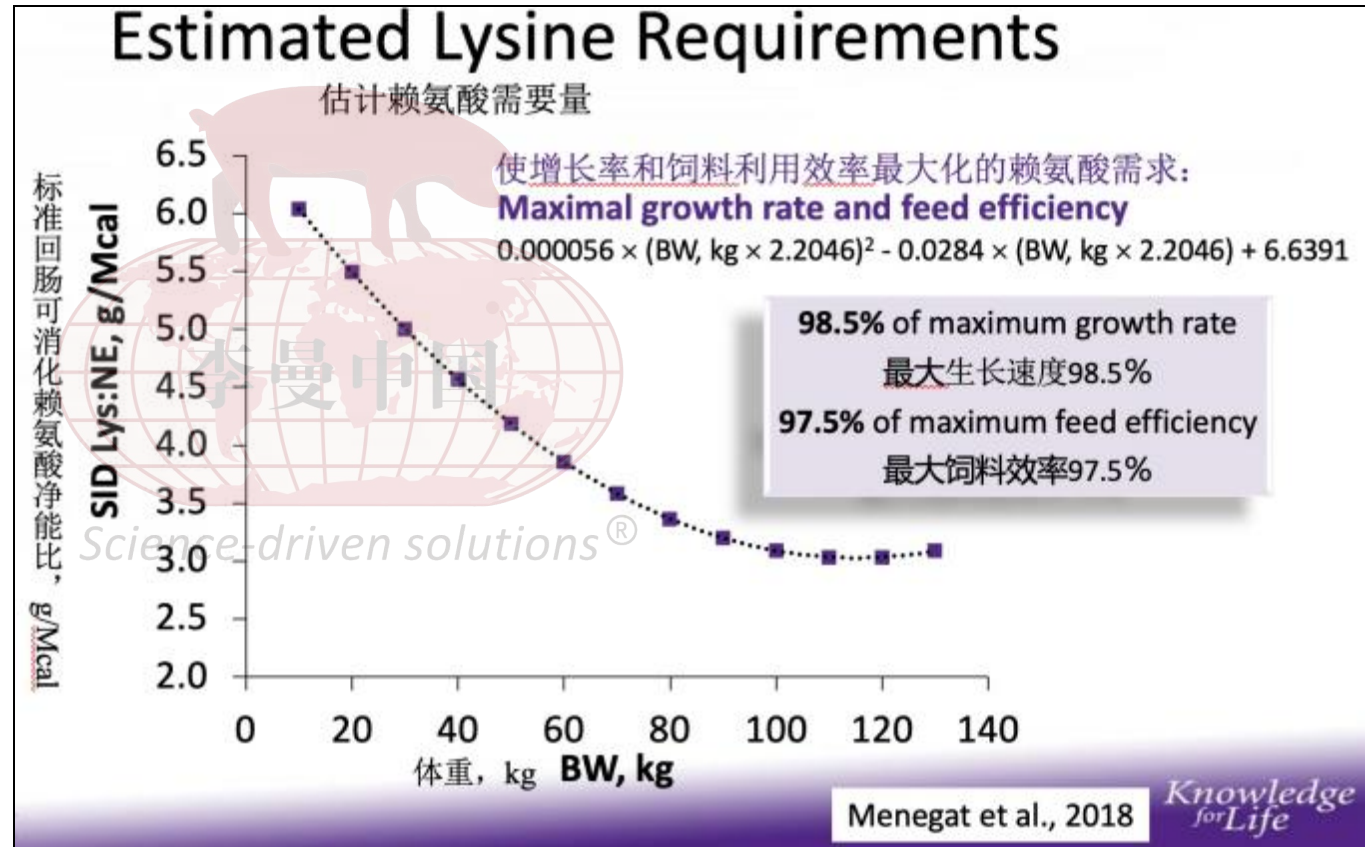
Table 1: Energy value of feed ingredients related to that of corn for growing pigs

Ingredient	NRC ⁸		EvaPig ³	
	ME	NE	ME	NE
Corn	100	100	100	100
Corn DDGS (6%-9% oil)	100	88	101	78
Sorghum (milo)	104	104	100	99
Soybean meal, dehulled	97	78	99	75
Soybean hulls	57	37	56	38
Wheat middlings	87	79	77	69

DDGS = Dried distillers grains with solubles; ME = metabolizable energy; NE = net energy; NRC = National Research Council.


Nutrition is more than just running formula software

- Nutritional requirements
 - energy
 - lysine
 - phosphorus




Nutrition is more than just running formula software

- Nutritional programs to maximize economic benefits
 - ◆ energy mode
 - limited time vs. limited space?
 - winter vs. summer?



Economic model for optimum dietary energy for growing-finishing pigs

生长肥育猪最佳日粮能量经济模型



Section 1. Economics and System performance

1 Live price, \$/lb	0.62
2 Carcass price, \$/lb	0.85
3 Feeder pig cost (50 lb), \$/pig	55.00
4 Facility cost, \$/pig/d	0.11
5 Current ADG, lb	2.10
6 Current Feed efficiency	2.90
7 Current carcass yield, %	73.00
8 Other cost, \$/pig	8.00
* Veterinary supplies, field service personnel, trucking	
Economic evaluation criteria (Live or Carcass)	Carcass
Marketing basis (Fixed weight or fixed time)	Fixed Time
Growth curve (enter own values or use default)	Default

Section 2. Weight by phase and current dietary energy levels

Select number of dietary phases:

Phase	Initial weight, lb	Final weight, lb	Current NE, Kcal/lb	Range NE (Kcal/lb)	
				Min	Max
1	50.0	75.0	1,104	1,083	1,122
2	75.0	125.0	1,122	1,097	1,137
3	125.0	170.0	1,130	1,110	1,153
4	170.0	210.0	1,145	1,119	1,164
5	210.0	250.0	1,150	1,126	1,170
6	250.0	285.0	1,140	1,117	1,159

Section 3. Dietary specifications

Are your diets adequate on SID Lys?

Dietary Phase	Energy Level	NE, Kcal/lb	Cost, \$/Ton	NDF, %
1	Min	1,083	159.71	---
		1,093	168.08	---
	Current	1,104	177.77	---
		1,113	187.83	---
	Max	1,122	204.55	---


Model settings
模型设置

Economics & System Performance
经济与系统性能


Nutritional program
营养方案

Nutrition Is More Than Just Running Formula Software

- Nutritional programs to maximize economic benefits
 - ◆ energy mode
 - limited time vs. limited space?
 - winter vs. summer?
 - ◆ lysine model, tryrophan model, etc.



SID Lysine Economic Tool for PIC Pigs



Economic Calculator for Optimal Tryptophan:Lysine Ratio for Finishing Pigs

Would you like to enter your own diet costs or use default values? Use default values

Current Trp:Lys ratio (select closest ratio) 16.5

Finisher weight gained, lb 230.0
 Finisher ADG, lb 1.90
 Finisher F/G 2.80
 Market price, \$/lb live \$0.60
 Value of pig space, \$/day \$0.11

These cells are not used when using default values

\$/ton

\$260.00
\$265.00
\$270.00
\$275.00
\$280.00

These numbers are needed when using default values.

Mid-finisher diet cost at 21% Trp:Lys, \$/ton \$184.00
 Corn, \$/bushel \$3.60
 L-tryptophan, \$/lb \$5.75

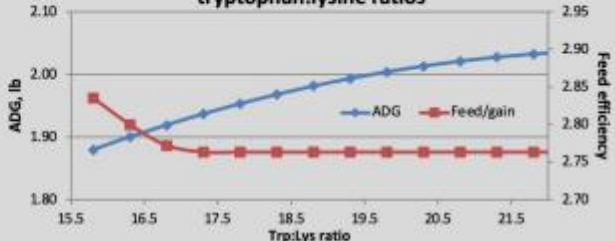
Trp:Lys ratio that provides maximal profit

- Fixed weight basis 17.5
 - Fixed time basis 21.6

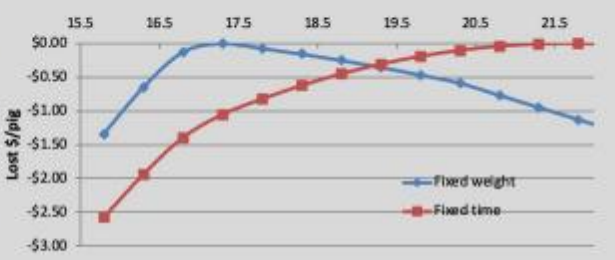
Increase in profit if fed ratio with maximal profit.

- Fixed weight basis, \$/pig \$0.34
 - Fixed time basis, \$/pig \$1.69


Performance expectations at different tryptophan:lysine ratios




Tryptophan:lysine ratio for maximum profit



Item	SID Trp:Lys, %						
	15.5	16.5	17.5	18.5	19.5	20.5	21.5
Fixed weight	-\$1.76	\$0.00	\$0.34	\$0.20	-\$0.03	-\$0.29	-\$0.64
Fixed time	-\$1.44	\$0.00	\$0.73	\$1.15	\$1.43	\$1.61	\$1.69





Nutrition is more than just running formula software

- Nutritional programs to maximize economic benefits

- ◆ energy mode

- limited time vs. limited space?
- winter vs. summer?

- ◆ lysine model, tryrophan model, etc.

- ◆ stocking density model

	Adjustment observation	Input information required (Can do five estimates)					Values from equation develop.		
		1	2	3	4	5	Mean	Min	Max
Initial BW, lbs	230	230	230	230	230	230	108	40	260
Final BW, lbs	280	230	280	280	280	280	231	99	311
Stocking density, pigs/pen	26	26	26	24	22	20			
Floor space/pig, ft ²	6.9	6.9	6.9	7.5	8.2	9.0	7.3	2.3	15.0
Observed ADG, lb	1.87								
Observed ADFI, lb	5.7								
Pen width, ft	10	Pen, sq ft		180					
Pen length, ft	18								
k value	0.0250	0.0286	0.0250	0.0271	0.0296	0.0326	0.0301	0.0164	0.0520
Growth measurement estimates									
ADG, lb/d		1.83	1.87	1.92	1.98	2.04			
ADFI, lb/d		5.32	5.70	5.81	5.93	6.06			
G:F		0.344	0.328	0.331	0.334	0.336			
Feed/gain		2.91	3.05	3.02	3.00	2.97			
ADG % change from Estimate 1		---	2.3%	5.2%	8.3%	11.6%			
% change from previous estimate		---	2.3%	2.8%	3.0%	3.0%			
ADFI % change from Estimate 1		---	7.1%	9.2%	11.5%	14.0%			
% change from previous estimate		---	7.1%	1.9%	2.1%	2.2%			
G:F Percentage change from Estimate 1		---	-4.6%	-3.7%	-2.9%	-2.1%			
% change from previous estimate		---	-4.6%	0.9%	0.9%	0.8%			
F/G Percentage change from Estimate 1		---	-4.8%	-3.9%	-3.0%	-2.2%			
% change from previous estimate		---	-4.8%	0.9%	0.9%	0.8%			



Nutrition is more than just running formula software

● Nutritional programs to maximize economic benefits

◆ energy mode

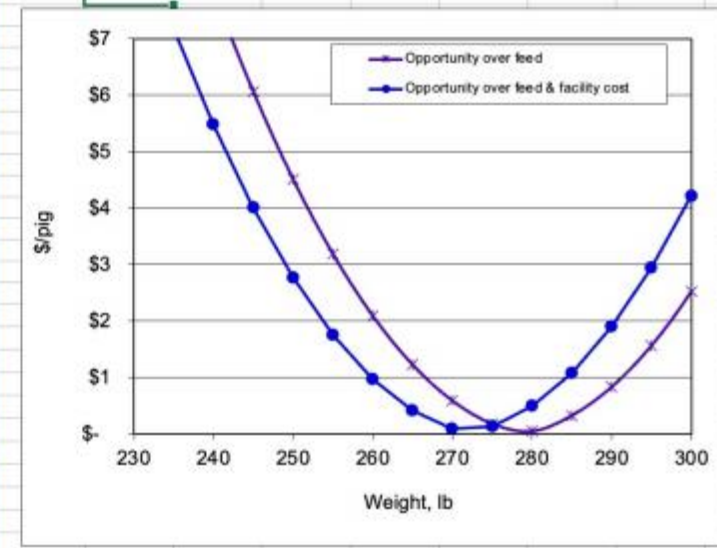
- limited time vs. limited space?
- winter vs. summer?

◆ lysine model, tryrophan model, etc.

◆ stocking density model

◆ market weight model

Market Weight, lb	Base \$/pig	Premium \$/pig	Gross \$/pig	Incremental Feed usage		Carcass base, \$/cwt	Feed cost \$/ton	Est. live base price, \$/cwt
				F/G	Feed, lb	\$ 85.00	\$ 300.00	\$ 63.75
230	\$ 149.19	\$ 7.30	\$ 156.48					
235	\$ 152.43	\$ 8.69	\$ 161.12	3.50	17.5	230		
240	\$ 155.67	\$ 9.88	\$ 165.55	3.54	17.7	235	\$ 9.86	\$ 7.18
245	\$ 158.92	\$ 10.88	\$ 169.79	3.58	17.9	240	\$ 7.85	\$ 5.48
250	\$ 162.16	\$ 11.68	\$ 173.83	3.62	18.1	245	\$ 6.07	\$ 4.01
255	\$ 165.40	\$ 12.28	\$ 177.68	3.67	18.3	250	\$ 4.51	\$ 2.77
260	\$ 168.65	\$ 12.68	\$ 181.33	3.71	18.5	255	\$ 3.19	\$ 1.76
265	\$ 171.89	\$ 12.89	\$ 184.78	3.75	18.8	260	\$ 2.09	\$ 0.98
270	\$ 175.13	\$ 12.90	\$ 188.03	3.79	19.0	265	\$ 1.23	\$ 0.42
275	\$ 178.37	\$ 12.71	\$ 191.09	3.83	19.2	270	\$ 0.59	\$ 0.10
280	\$ 181.62	\$ 12.33	\$ 193.95	3.88	19.4	275	\$ 0.18	\$ 0.13
285	\$ 184.86	\$ 11.75	\$ 196.61	3.92	19.6	280	\$ 0.05	\$ 0.49
290	\$ 188.10	\$ 10.97	\$ 199.08	3.96	19.8	285	\$ 0.33	\$ 1.08
295	\$ 191.35	\$ 10.00	\$ 201.34	4.00	20.0	290	\$ 0.83	\$ 1.90
300	\$ 194.59	\$ 8.83	\$ 203.42	4.04	20.2	295	\$ 1.56	\$ 2.94
305	\$ 197.83	\$ 7.46	\$ 205.29	4.09	20.4	300	\$ 2.52	\$ 4.22
310	\$ 201.08	\$ 5.89	\$ 206.97	4.13	20.7	305	\$ 3.71	\$ 5.72
315	\$ 204.32	\$ 4.13	\$ 208.45	4.17	20.9	310	\$ 5.13	\$ 7.45
320	\$ 207.56	\$ 2.17	\$ 209.73	4.22	21.1	315	\$ 6.78	\$ 9.42
325	\$ 210.81	\$ 0.01	\$ 210.82	4.26	21.3	320	\$ 8.66	\$ 11.61
330	\$ 214.05	\$ (2.34)	\$ 211.71	4.30	21.5	325	\$ 10.77	\$ 14.03
335	\$ 217.29	\$ (4.90)	\$ 212.40	4.34	21.7	330	\$ 13.10	\$ 16.67
340	\$ 220.54	\$ (7.64)	\$ 212.89	4.38	21.9	335	\$ 15.67	\$ 19.55
345	\$ 223.78	\$ (10.59)	\$ 213.19	4.43	22.1	340	\$ 18.46	\$ 22.66
350	\$ 227.02	\$ (13.73)	\$ 213.29	4.47	22.3	345	\$ 21.48	\$ 25.99
355	\$ 230.27	\$ (17.07)	\$ 213.19	4.51	22.6	350	\$ 24.74	\$ 29.55
360	\$ 233.51	\$ (20.61)	\$ 212.90	4.55	22.8	355	\$ 28.21	\$ 33.35
365	\$ 236.75	\$ (24.34)	\$ 212.41	4.60	23.0	360	\$ 31.92	\$ 37.37
370	\$ 239.99	\$ (28.27)	\$ 211.72	4.64	23.2	365	\$ 35.86	\$ 41.62
						370	\$ 40.03	\$ 46.10



Good Formula+Good Feed

- Weighing precision
 - calcium and phosphorus
 - products with small additives
- Feedstuff mobility/losses
- Ratio of powder content
- Granularity of crushing
- Nutrient losses due to pelletizing



Feed Biosecurity

- Feedstuff selection
- Biosecurity design of feed mills
- Processing order of feed number
- Farm pick-up order
- Sampling and testing of feed mill

Pipestone Biosecurity Audits

派斯通饲料厂生物安全审计表

Feed Mill Biosecurity Audit Form

Feed mill name: _____ Location: _____ Person in charge: _____
Inspection Date: _____ Feed mill contact: _____
Inspecting person: _____ On-farm or toll mill: _____

Instructions

- Each question that will receive a score has a corresponding point value in () after the question. Based on the response or observation, place the designated score on the score line to the right of the form. The scores will then be placed in an excel file to calculate the total score.
- The total for the audit is out of 100 points with more severe biosecurity lapses being worth more points. The score for the severity is as follow.
 - **Top 1 most severe is worth 10 points.**
 - **Top 2-6 most severe are equal to 5 total points for each question.**
 - **Top 7-11 most severe are equal to 3 points for each question.**
 - **Top 12-16 most severe are equal to 2 points for each question.**
 - **Remainder questions are equal to 1 point for each question.**

GROW FINISH

Nutritionist of “Leaky Slab Level”

- Good Feed ≠ Good Results
- Sow farm
 - body conditions
 - feed box
 - trough/farrowing bed feeder
 - production process (e.g. feeding time, feed increase between weaning and mating interval, sow after farrowing, grouping by body conditions)

Feed Box Calibration

Calibrate feed box settings **monthly**:

1. Check and calibrate portable electronic scales for proper operation and accuracy.
2. Select 50 standard feed boxes:
 - Avoid getting too close to the feed tower or the feed box at the end of feed line
 - Always use the same feed box for calibration
3. Specify 5 feed boxes scales, with each setting weighing 10 feed boxes:

		Feed box 1-10									
feed box settings	scale	料盒1	料盒2	料盒3	料盒4	料盒5	料盒6	料盒7	料盒8	料盒9	料盒10
fat pig											
normal pig minus 1 scale											
normal pig											
normal pig plus 1 scale											
thin pig											

4. Share the data sheet with the production manager and nutrition team for analysis

Version Feb 2021



PIPESTONE

Nutritionist of “Leaky Slab Level”

● Finishing farms

- feed tower
- trough (opening degree, feed interruption)
- implementation of the feed program

Trough Coverage rate

Reference

Early nursery period, pens for weak pigs, pens for injured and sick pigs: 60-70% coverage

Middle and late nursery period: 50-60% coverage

Late finishing period: 40% coverage

5%



55%



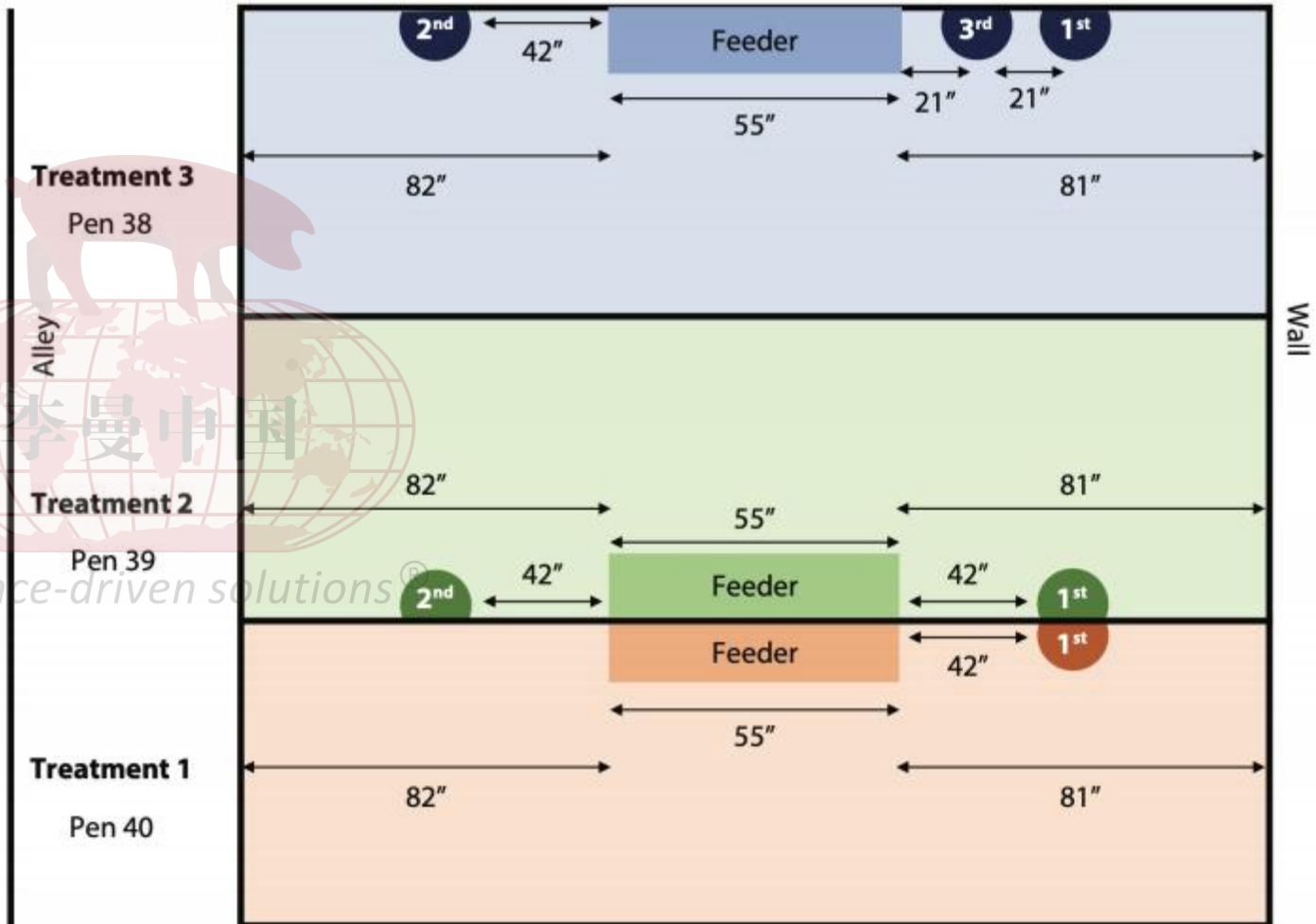
农场	批次号	房间号	转入日期	转入日龄	转入均重	起初存栏	现存栏	当前日龄	Ph1饲料预算 kg	Ph1实际耗用 kg	现存量 kg	差异量 %	Ph2饲料预算 kg	Ph2实际耗用 kg	现存量 kg	差异量 %	Ph3饲料预算 kg	Ph3实际耗用 kg	现存量 kg	差异量 %
伟力育肥4场	S01F04052329	5	7/17/23	20	5.64	2433	2391	73	2,189.70	2040		-7%	8,272.20	8110		-2%	10			
	S01F04062330	6	7/22/23	20	5.80	2448	2406	69	2,203.20	2190		-1%	8,323.20	8130		-2%	11			
	S01F04072330	7	7/27/23	20	5.85	2440	2388	64	2,196.00	1860		-15%	8,296.00	7900		-5%	10			
	S01F04082331	8	8/1/23	20	5.80	2425	2402	60	2,182.50	2120		-3%	8,245.00	8000		-3%	10			
北溪育肥1.2场	S03F05022334	2	8/18/23 21:23	20	5.43	2400	2400	36	2,160.00	2200		2%	8,160.00	6908	1442	2%	10			
	S03F05032335	3	9/1/23 16:01	20	5.10	1357	1357	28	1,221.30	2000		64%	4,613.80	1193	6967	77%	6			
	S03F05042334	4	8/18/23 21:21	20	6.13	2400	2400	44	2,160.00	2320		7%	8,160.00	8200		0%	10			
	S03F06062333	6	8/13/23 23:36		23.58	4123	4096	113		0					0					
	S03F06072330	7	7/23/23 22:40		26.75	2150	2122	120		0					0					
	S03F06082331	8	8/1/23 13:10		29.95	2150	2116	123		0					0					

Nutritionist of “Leaky Slab Level”

● Finishing Farms

◆ Water is the most easily forgotten nutrient!

- Amount
- Location
- Height
- Water pressure



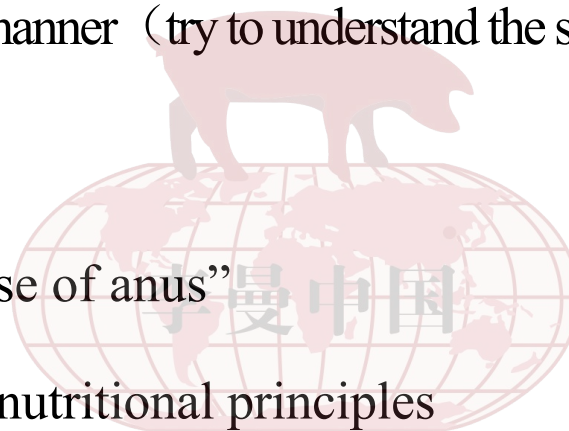
Utilize the research abilities aquired during graduate studies

- Experiment data is the basis for good nutrition !
- Experiment design
 - field experiment
 - testing site
- Statistics



Serve the Production Team!

- Reach out and communicate actively (e.g. feed changes, pig purchase and introduction/sales plans)
- Respond to farm feedback in a timely manner (try to understand the sore points of the production team)
 - “diarrhea”
 - “tail and ear biting”
 - “uterine exfoliation and prolapse of anus”
- Train production teams with basic nutritional principles



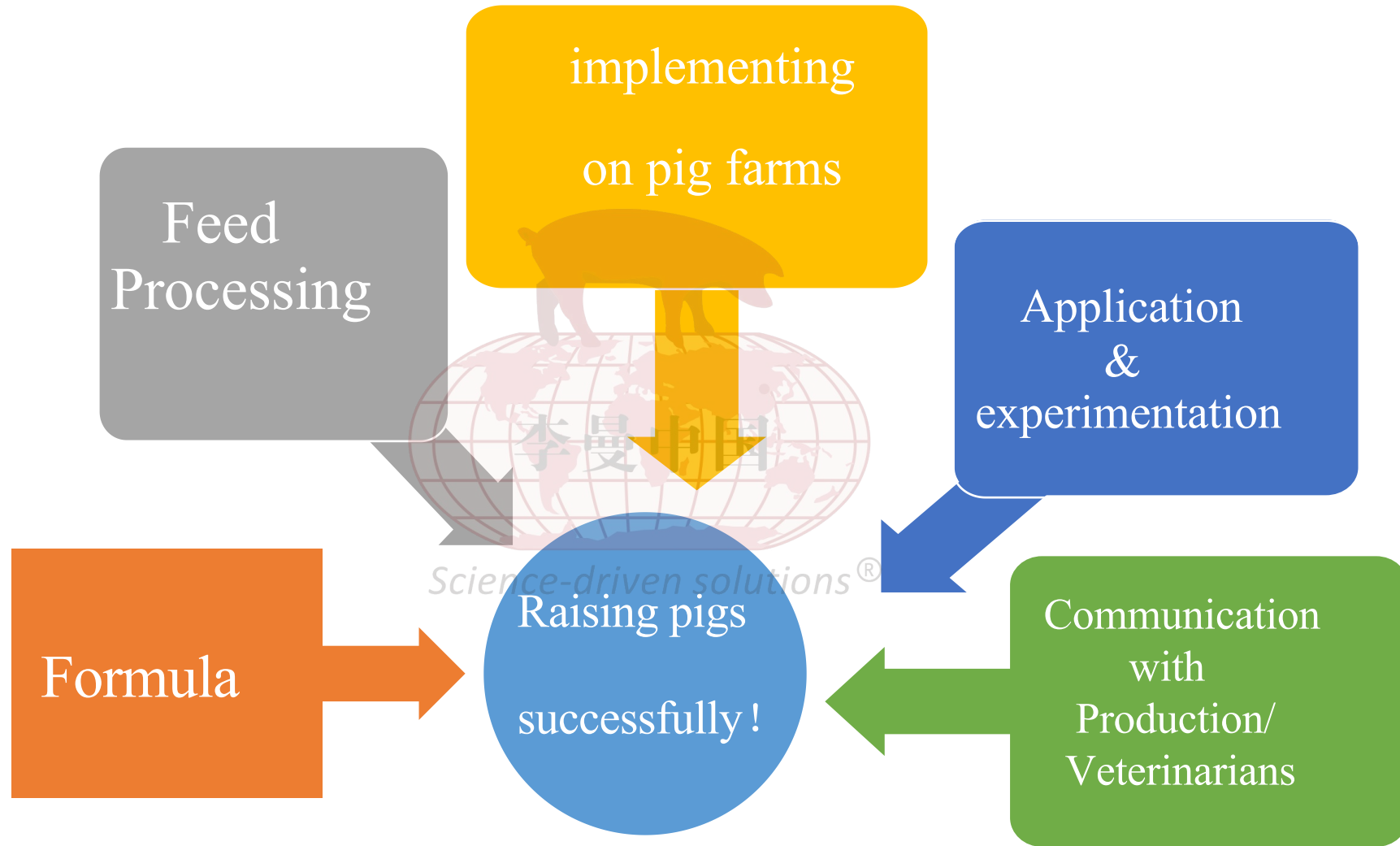
Science-driven solutions®

Effective communication with your Veterinarian can reduce a lot of worries

- Adjust nutritional programs according to changes in health level (e.g. PRRS, diarrhea)
- Cooperate with quality control testing actively (e.g. toxins, trace elements)



Conclusion



Thank you!



arkin.wu@pipestone.com

Science-driven solutions®

