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Surveys and Studies on Traditional Pig Raising in Guangxi

Huang Minrui, Lai Zhiqing, Huang Minsheng, Lu Weihe and Liao Chifeng
Guangxi Institute of Animal Sciences, Nanning, 530001, P.R. China

Abstract

Main studies were conducted on traditional pig raising (TPR) fed with local feeds effected on reproductivities of sows and productivities of fattening hogs with the methods of on-the-spot surveys, tests and consulting literatures for backgrounds of agriculture, livestock industry, feed resources and present situations of pig production. Through surveyed on reproductivities of 320 sows and on liveweight gains and feed consumed of 3109 hogs sold, it was shown that on an average, a live litter size of a sow was 10.57 heads with initial weight of 8.45 kg/litter when born and was 9.83 heads with the weight of 110.8 kg /litter when weaned at 57.50 days old. Delivery interval was 180-205 days. Duration of reproduction of the sows was 5-8 years. With TPR, it could save 20-30 percent concentrate stuff but time for slaughtering of hogs was extended to 2-5 months; it could save 50-60 percent concentrate with the sows. By tested on 41 fattening hogs, the experiment groups basically lived on green forages with a diet containing 12.15-18.05 percent crude fiber (CF) per kg dry matter (DM) gained 495 g/head per day and 1.79 kg concentrate, 1.41 kg roughage and 11.95 kg green forages should be consumed to gain one kg liveweight, which had 10.84 Mcal digestible energy (DE) and 480 g crude protein (CP). On the basis of the investigation, the advantages and disadvantages of TPR were pointed out and some options and suggestions on the improvement of TPR were put forward.

Introduction

The problem of grain supplying will be worldwide with increase of population and decrease of arable land. Guangxi belongs to undeveloped region which the grain had per capita was about 300-350 kg. But hogs sold have been increased year by year, which were 28 million (m) heads in 1996. In the countryside, 70 percent families of pig raising had the way of traditional feeding mainly using green forages. It may have some help for us to overcome the shortage of grain and to ease up contradiction of grain consumed between human being and pigs by investigating and summarizing the experiences of grain saving of pig raising. According to the contract signed by Guangxi Institute of Animal Sciences and UNFAO, we conducted the survey on pig production of traditional raising in 8 counties of Quanzhou, Xingan, Jinxiu, Luchan, Bobai, Debao, Jingxi, Duan from January to April, 1997 (Compiling Committee of Guangxi Breed Annals of Animal and Poultry, 1981).

Materials and Methods

Methods of survey with on spot measurement and consulting literatures have been used. Two townships in each county and 40 families in each township have been surveyed with subjects of: a. the background of agriculture and livestock of 8 counties and Guangxi; b. basic situations of animal production of each family; c. productivities of swine using the methods of taking green forages as the basic feed while given some concentrate and roughage. Finally, the data and materials obtained were analyzed.

Results

Background of 8 Counties Investigated and Guangxi:

Nature conditions of Guangxi: Guangxi is located in the south of China which is 20°54'-26° 20' north

latitude, 104°29'-112°04' east longitude with total land of 23675 km² and total population of 45 million. There are big mountain areas and very little flat land. Arable land is only 11 percent as the total land; rivers and reservoirs, 0.94 percent, mountain area, 76.23 percent. It is so called 8 parts of mountain, 1 part of water and one tenth part of paddy field. The climate belongs to subtropical monsoon with the characters of high temperature and high rainfall. It is hot and wet in summer, warm and dry in winter with long summer and short winter. High rainfall, high temperature come at same season.

Basic Situations of Agriculture and Animal Husbandry:

There were 3.67 million (m) ha grain crop areas with total yield of 15.53 m t, having 341 kg grain per capita. 28.58 m heads of fattened hogs were sold and total pork yield was 2.29 m t as 77.58 percent of total meat. Total value of animal husbandry was RMB 34 billion yuan, as 36.4 percent of total agricultural value. Net income of peasants per capita in 1995 was 1446 yuan. Whether net incomes of the peasants or the grains had per capita in 4 counties of Xingan, Quanzhou, Luchuan, Bobai exceeded the average amount of Guangxi, yet net incomes of the peasants per capita in the counties of Jingxi, Dehao, Duan were under 800 yuan and the grain had of the peasants per capita did not reach the average of Guangxi. Among them, the lowest was Duan county, only 600 yuan and 218 kg grain, respectively.

Marketing and Its Circulation: Pig production of Guangxi is effected by grain production, feed prices and the circulation etc. Last year, it was good for pig production. The reasons of it were: Firstly, prices of maize were low at 1.4-1.6 yuan/kg, while the prices of commercial lean type hogs were 10.4-11.2 yuan/kg and the prices of local hybrid hogs

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Table 1: Basic data of agriculture and livestock industry of 8 surveyed counties in 1995

County	Population (000 head)	Cropping area of grain (,000 ha)	area of cashcrop (,000 ha)	Total Yield of grain (,000 T)	Grain had per capita (kg)	Net income famer per capita (Yuan)	Meat Yield * (,000T)	Value of livestock industry (Hundred m Yuan)	% of livestock value in agri- value	No. of hogs slaughtering (,000) *
Guangxi	45430	3662.7	1580	15533.1	341	1446	2947.4	340	36.4	28585.2
Xingan	372	41.0	2.3	211.9	569	2361	107.9	8.11	42.3	957.4
Quanzhou	767	77.7	13.2	404.6	527	1696	90.8	8.70	46.0	1085.0
Jinxiu	143.1	13.8	14.9**	57.4	401	1016	8.3	0.79	30.6	105.9
Luchuan	790.2	54.2	8.169	305.8	386	1650	62.2	7.86	51.7	623.0
Bobai	1318.5	103.8	16.6	519.1	393	1650	90.7	8.5	43.0	1200.0
Debao	341.7	39.7	3.32	99.2	290	765	13.3	0.90	23.6	149.4
Jingxi	561.1	73.0	2.2	192.1	342	719	21.0	2.39	29.46	229.1
Duan	617.2	76.7	11.3	135.1	218	606	26.7	2.47	42.0	315.0

*Numbers of 1996 **Numbers of 1994

Table 2: Basic data of families surveyed

Site	Families surveyed	Population (head)	Herdsman			Kinds of animal raised (head)				
			Male (head)	Female (head)	Average age	Cattle	Horse	Pig	Goat	Poultry
Xingan	81	340	36	45	43.23	29		740		1558
Quanzhou	69	276	23	46	38.08	12		737		1134
Jinxiu	80	396	16	64	48.53	43	9	422		753
Luchuan	81	441	34	47	44.19	14		2792		2556
Bobai	75	398	38	37	46.47	68		1225		1110
Debao	80	402	32	48	43.64	198	22	629	193	2917
Jingxi	80	408	33	47	43.91	105		715		1731
Duan	36	186	15	21	45.37	38	6	260	78	650
Total	582	2847	227	355		507.00	37	7520	271	12409
Mean		4.89			44.17	0.87	0.06	12.92	0.47	21.32

were 8-9.6 yuan. Net profit of lean type hogs sold per head could be the 120-150 yuan in state farms. In the peasant families, the net profit will be much higher since some feeds would be produced by themselves and labor did not account into the cost. General speaking, emthosian of pig raising of the peasants would be high as the rate of exchange of grain: pig was above 5:1. Secondly, the circulation was smoothly. The pugs were mainly sold to Guangdong, Hainan. In 1996, the pigs and piglets sold to the above areas were 8 m and 12 m heads resp. The pig production in Guangxi mainly depends on the peasant families through out Guangxi. In 1996, 28.58 m hogs were sold and 85 percent of them came from the peasant families while the pigs sold from big farms were only 4.3 m heads, as 15 percent of total hogs sold in the region. In recent years, because of low prices of feed, smooth circulation and the government support, the pig raising zeal of the peasants was high.

Feed Resources

Concentrated Feeding Stuff: The total grain yield was 15.53 m t in the region in 1996 including 13.08 m t paddy, 1.55 m t corn, 0.355 m t bean, 0.478 m t sweet potato, 1.2 m t cassava root (mainly for industrial use). The feed stuff used for feeding were 1.56 m t paddy, 0.23 m t corn,

about 0.348 m t sweet potato, 0.36 m t cassava root, 0.16 m t canna root, 0.2 m t broken rice, 0.014 m t bean and 0.035 m t oil meal. It is hard to image with these amounts of feed to raise 45.43 m people and to produce 2.95 mt meat. In Guangxi, the amount of grain per capita was 341 kg in 1996, which was alomost the same as ten years ago but the number of hogs sold was huge. In 1985, 14 mt pigs were sold but in 1996, 28. 59 m heads sold increased by 104.18 percent and slaughtering rate was increased from 76 to 108 percent percent. The main factors of it were to have extended science a technology in pig feeding, especialy with applications of combinated feed, concentrate and feed additives. The product yield of combinated feed was 0.22 m t in 1985 and 2.2 m t in 1996. The raw materials of combinated feed such as maize, bean meal, wheat bran were bought from other provinces (Luo, 1991).

Roughages and Green Forages: In Guangxi, the total yield of green forages and roughages annually was 94.77 mt including 27.8 m t pasture hay, 17.4 m t roughages of agri by -products, 12.83 m t green forages, 36.74 m t fodder tree leaves. At present, the amount of green forages fed each year were as follows: 1 m t sweet potato vine 3.18 m t vegetables (total vegetables were 9.65 m t) such

Table 3: Hogs sold of surveyed families in 1996

Country family	Hogs sold surveyed (head)		Average hogs sold per family (Head)	Price/head (yuan)	Income/family (yuan)
Xingan	81	466	5.75	765.13	4399.50
Quanzhou	62	577	9.31	684.04	6368.41
Jinxiu	80	257	3.21	803.78	2580.13
Luchuan	81	608	9.97	970.27	9673.59
Bobai	38	291	7.66	998.01	7644.76
Debao	80	408	5.10	609.62	3109.06
Jingxi	68	367	5.39	784.99	4231.10
Duan	49	135	2.76	814.48	2247.96
Total	539	3109			
Mean			5.76	803.79	4629.83

Table 4: Live weigh gain and feed consumed in surveyed families in 1996

Country	Families surveyed	Hogs sold (head)	Initial body weight (kg)	Body weight when sold (kg)	Requirement/Hogs till sold (kg)			Requirement/kg LWG		
					Concentrate	Green forage	Roughages	Concentrate	Green forage	Roughages
Xingan	81	466	15.88	99.01	178.22	578.84	179.25	2.17	7.06	2.18
Quanzhou	62	577	15.87	98.32	151.70	321.67	296.36	1.84	3.90	3.59
Jinxiu	80	257	21.00	94.42	137.00	1304.00	287.00	1.87	17.76	3.91
Luchuan	81	608	7.61	124.5	243.83	770.83	181.00	2.09	6.59	1.55
Bobai	38	291	25.59	102.73	190.50	114.00	114.00	2.47	1.48	1.48
Debao	80	408	6.74	88.63	160.59	1770.89	123.56	1.96	21.63	1.51
Jingxi	68	367	11.93	89.65	153.89	941.84	208.29	1.98	12.13	2.68
Duan	49	135	18.56	101.81	156.51	1344.00	92.00	1.88	16.14	1.11
Total	539	3109								
Mean			15.40	99.76	171.53	897.13	185.18	2.03	10.84	2.25

as cabbage, sowthistle, leaf beet, pumpkin, radish leaf, 1.17 m t taro leaf and stem, 0.025 m t paper mulberry, 0.012 m t boehmeria, 7900 t polygonum cymosum, 161 t leucaena. The amount of roughages for pig feed annually were 2.2 m t rice bran, 0.2 m t cassava root pulp, 0.043 mt soybean curd residue, 0.257 m t grain stillage. Meanwhile, some of by-products of light industry, pharmaceutical industry and catering trade could be used as pig feed as well. Duan county has been used hereinbelow as an example to show the peasants how to solve the problem of pig feed. Duan is in the karst area with many people and very limited arable land. The grain ration per capita was only 218 kg, but the pigs raised were 0.6 m heads with 0.315 m heads sold. In such a county of shortage of grain, why did they raise so many pigs percent The main reasons we think were as follows: Firstly, the peasants fed pigs mainly with green forages and had a set of methods of planting, harvesting, processing, storing. The biggest number of forage was sweet potato vines which was planted over 10000 ha, covering 30.2 percent arable land with the vine yield of 64000 t as 60 percent of total amount of the green forages. The other big forage resources was from canna leaf and stem with the yield of 6000 t. According to statistical estimation of County Animal Bureau in 1992, the amount of green forages fed to pigs were 17718 t sweet potato vine

silage, 2634 t canna leaf-stem, 1991.45 t polygonum, 2205.95 t boehmeria, 5743.36 t paper mulberry leaves, 1489.35 t wild vegetables, 3279.45 t leaf beet. Secondly, forage resources in mountains was developed and used (Guo, 1992). A sampling survey was conducted from 1989-90. On an average, each family used 49.3 kg *Mucuna cochinchinensis*, 753.8 kg canna root, 28.5 kg dry cassava leaf meal, 418 kg dry cassava root slices, 741.1 kg paper mulberry leaves.

Livestock Production and Pigs Sold by Families Surveyed in 1996: According to 582 families surveyed, some basic data were shown in Table 1 and 2. The total population was 2847 heads with 4.89 heads per family on the average. The labourers for pig raising were 582 heads aging 44.17 years old (ranging from 20-78 y) including 227 males and 355 females covering 61 percent as total labour. The number of cattle, horses, pigs percent goats and poultry per family were 0.87, 0.06, 12.92, 0.47 and 21.32 heads. On the average, the first four counties with great number of pig raising per family were Luchuan, Bobai, Chuanzhou, Xingan where the pigs raised were 34.47, 16.33, 10.68 and 9.14 heads percent family resp. The peasants in Luchuan and Bobai were like to keep sows to sell piglets. By investigated with 539 pig raising families, each family sold 5.76 pigs with the income of 4629.83 yuan at price of 803.29 yuan per pig in 1996 (Table 3).

Table 5: Feed consumed and use of sow

Country	Families surveyed	Feed needed/sow/year (kg)			Initial mating age (day)	Initial mating body weight (kg)	Years of use (Year)
		Concentrate	Roughages	Green forage			
Xingan	7	183.57	444.29	708.57	150.00	56.67	5-8
Quanzhou	43	182.40	790.00	664.47	170.09	60.73	5-8
Bobai	27	191.61	738.15	590.14	188.52	53.98	5-8
Luchuan	19	213.37	617.58	1792.95	165.00	46.63	5-8
Debao	12	127.96	78.46	1627.29	220.91	42.27	5-8
Jingxi	81	162.10	672.83	1995.95	219.92	61.15	5-7
Duan	8	115.56	582.45	848.99	213.00	46.00	5-8
Total	197	1176.57	3923.76	8228.26	1327.44	367.43	
Mean	28	168.08	560.54	1175.52	189.63	52.49	5-8

Table 6: Reproductivities of sow

Country	No. of sows surveyed	Breed	No. of pregnancy litter	Live litter size (head)	Initial age weight (kg)	Weaning weaning (day)	No. of litter	Weaning interval weight (kg)	Delivery (day)
Xingan	4	Dongshan	3-10	11.00	9.53	60.75	10.57	170.75	189.25
Quanzhou	43	Dongshan	1-10	10.25	8.30	59.30	9.60	152.37	190.40
Jinxiu	10	Dongshan		9.69	7.95	47.00	8.00	43.65	205.00
Luchuan	17	Luchuan	2-8	11.88	7.01	48.00	10.82	82.35	187.47
Bobai	78	Landrace							
		Luchuan	2-4	10.61	13.45	62.76	9.87	174.79	183.20
Debao	33	Debao							
		Black	1-5	9.21	4.61	62.16	8.52	61.97	199.73
Jingxi	81	Guizhou spotted pig	1-6	10.40	8.85	60.00	10.21	121.76	180.200
Duan	54	Guizhou spotted pig	2-6	11.50	7.90	60.00	10.90	79.30	200.00
Total	320			84.54	67.57	459.97	78.67	886.94	
Mean	40			10.57	8.45	57.50	9.83	110.86	180.205

Present Conditions of Pig Production on Surveyed Area.

Breeds: Local breeds were Dongshan Swine, Luchuan Swine, using sires of landrace and yorkshire as male parent and local sows as female parent mated as double or triple crossing. The offsprings were kept as commercial pigs. Spreading rate of the crossbreeding was about 50-80 percent.

Raising Managements: Feeds in most families were mainly green forages, rationing with certain amount of concentrate and roughages. The proportion of the green forages, roughage, concentrate in the diet were 50 -80,10-30 and 10-30 percent respectively. Soybean meal or peanut meal was added to lactating sows and piglets. Some grain and potato, cassava root were given to pigs at fattening period. The green forages were sweet potato vines, cabbage, leaf beet, canna leaf stem, green maize seedling, vegetables and wild forages which were boehmeria leaf, paper mulberry leaf, polygonum, amaranthus, aneilema. Roughages were mainly rice bran and the other agri-by-products. Concentrate grain stuff were corn, rice,

paddy, soybean etc. The potatoes were cassava root, sweet potato. The pigs would be kept for 8-11 months before ready for sale with TPR. With the development of economy and extension of pig raising technology, more and more peasants were willing to buy commercial concentrate for the pigs in order to replenish the shortage of seed producing concentrate to increase the crop rate. But the commercial concentrate was only used to early growing stage (10-20 kg) and to the hogs a month before sold.

Ways of Feeding

Feeding methods: There were two kinds of feeding: feeding raw and feeding boiled stuff. Feeding boiled stuff means the green forages. Concentrate and roughages were cooked together which would be deluted with water when fed, corn, rice were cooked like porridge first and then put into milled roughages and chopped green forages, mixed evenly, added some water when feed. Feeding raw stuff, that is milled concentrate and roughages and chopped green forages were mixed evenly and added some water when fed. Due to lack of special place

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Table 7: Diet composition of finishing hogs

Country	Group **	Diet composition (kg/head/day)						Intake/day/kg DM	Contents of kg DM			
									DE (Mcal)	CP (%)	CF (%)	
Jinxiu	1	Maize, Rice bran, Wheat bran, Cassava root moll, Leaf beet, Vege leaf										
		0.23	0.86	0.14	0.38	1.57	4.7	2.02	2.30	10.18	18.05	
Jingxi	2	Maize, Rice bran, Vege leaf, Soybean										
		0.8	1.0	5.0	0.3			2.38	2.60	13.31	15.70	
Duan	3	Maize, Rice bran, Concentration food, Vege leaf										
		0.6	0.44	0.1		5.0		1.54	2.78	13.53	12.62	
Debao	4	Maize, Rice bran, Cabbage										
		1.0	0.5	7.0				2.05	2.79	10.95	12.15	
	5	Maize, Rice bran, Sweet potato vines										
		0.8	0.7	6.5				2.27	2.38	9.23	16.29	
Quanzhou	6	Rice bra, Paddy, Concentration, sweet potato vines										
		1.15	0.89	0.21		1.41		2.53	3.31	15.18	8.71	
Luchuan	7	Rice, Rice bran, Wheat bran, Cassava root, Soybean mill, Sweet potato										
		0.15	0.70	0.5	0.61	0.16	0.66	2.22	2.38	9.23	16.29	
	8	Rice, Rice bran, Wheat bran, Cassava root, Peanut meal, Vege leaf										
		0.64	0.70	0.5	0.61	0.1	0.65	2.29	3.00	10.60	10.39	
Bobai	9	Cassava root, Rice bran, Sweet potato, Sweet potato vines, Wheat bra, 303 C.F*										
		0.25		1.0	2.5	0.67	0.5	0.5	3.74	2.95	10.80	13.23
	10	Wheat bran, Rice bran, Sweet potato, Cassava root, Fishmeal										
		0.45		0.9	1.0	0.8	0.05	1.66	2.77	10.72	12.46	
Mean								2.27	2.73	11.37	13.59	

*303 Concentrate was commercial feed produced locally for hogs and growers.

** Basic feed: Group 1 - 5 feed with green forage; Group 6-10 feed with concentrate + roughage

Table 8: Results of fattening ability of finishing hogs (per head)

Group	No. of animal	Breed **	Initial body w. (kg)	Final body w. (kg)	Tested days	Daily gain	Intake/kg DM	Requirement/kg gain				
								Conce- ntrate * (kg)	Rough- ages (kg)	Green forage (kg)	DE (Mcal)	CP (g)
1	1	LXD	61	82.5	45	478	90.96	1.60	1.80	8.91	9.72	431
2	3	LXG	37	66.2	40	680	95.36	1.62	1.47	7.35	9.10	467
3	15	G	9.1	77.0	194	350	297.91	2.00	1.25	15.38	12.18	594
4	2	YXDeBao	63	79.0	30	533	61.55	1.88	0.94	13.13	10.72	421
5	4	YXDeBao	62.63	75.63	30	433	68.32	1.85	1.61	15.0	12.5	485
Subtotal mean						495		1.79	1.41	11.95	10.84	480
6	3	LXD	12.5	125	187	602	472.87	1.84	2.49	2.34	13.93	638
7	3	LXLu	42	65.6	45	511	99.74	3.35	1.36	1.33	12.48	500
8	5	LXLu	77	103	40	650	91.67	3.00	0.89	0.99	10.58	374
9	3	BXLu	65	115.43	48	1050	179.79	2.63	0.95	0.63	10.53	385
10	2	LXLu	92.5	112.25	48	411	79.74	3.15	2.19	2.43	11.19	433
Subtotal Mean						645		2.79	1.58	1.52	11.74	466
Total Mean						570		2.29	1.50	6.75	11.29	473

*5 kg fresh sweet potato was converted into 1 kg concentrate **L: Landrace; D:Dongshan; G; Guizhou spotted pig; Y: large yore shire; Lu: Luchuan; B: Berk shire *** Basic feed: Group 1-5 feed with green forage; Group 6-10 fed with concentrate + Roughage

drinking facilities, most of pig raising families fed pig food with water.

Diets in a day: The lactating sows and Piglets under 3 months old were fed three times a day, the others were fed twice a day. The piglets were supplemented 20-30 days after born. Supplement stuff were corn, rice and wheat bran which cooked like porridge and added small

amount of green forages. Some peasants supplemented piglets with some commercial piglet feed.

Survey of productivities.

Liveweight Gain and Feed Consumed of pigs: The results of investigation on live weight gains (LWG) and feed consumption of 3109 hogs sold have shown that there were 171.53 kg concentrate, 897.13 green forages and

185.18 kg roughages needed to reach 99.76 kg body weight/head from the piglet at 15.40 kg body weight. There were 2.03 kg concentrate, 10.84 kg green forages and 2.25 kg roughages needed to gain one kilo liveweight which saved 20-30 percent concentrate, compared to those fed with concentrate feed only. The counties of the least concentrate needed to gain 1 kg liveweight were Jinxiu, Duan and Debate which were 1.87, 1.88 and 1.96 kg concentrate resp, but more green forages were used as 17.76, 16.44 and 21.63 kg respectively and the amount of roughages used was 3.91, 1.11 and 1.51 kg respectively. It is unscientific way using terms of concentrate, roughages and green forages to evaluate the feed nutrition. Here, we only want to follow these terms to roughly classify the feeds used by the peasants (Table 4).

Reproductivities of Sows: According to the results from 197 sow keeping families, replacement gilts were mated initially at age of 150-220.91 days with an average of 189.63 days, at initial mating body weight of 46-61,15 kg with an average of 52.49 kg. The sows can be used for 5-8 years. The amount of concentrate, roughages and green forages needed were 168.08, 560.54 and 1175.52 kg/sow annually respectively (Table 5). Meanwhile, on the grounds of 320 reproductive sows, litter size/sow was 10.57 heads (ranging from 9.69-11.88 heads) with an initial litter weight of 8.49 kg. Runners were weaned at age of 57.5 d (ranging from 47-62.16 d) and weanlings were 9.83 heads/litter (ranging from 8-10.22 heads) with 110.86 kg weaning weight/litter (ranging from 43.65 -174.79 kg). Delivery interval was 180-205 d (Table 6).

Results from Finishing Abilities Test of Store Pigs: These studies not only surveyed the liveweight gains and feed consumption of store hogs, but also tested fattening abilities of 41 hogs in store hog keeping families. There were ration compositions of 10 tested groups in Table 7 which contained 2.3-3.31 Mcal DE/kg DM, 9.23-15.18 percent CP, 8.71-18.05 percent CF. Through above 30 day-trials, the average liveweight gain was 570 g/d (ranging from 350-1050 g/d) with the intake of 2.27 kg DM/d (ranging from 1.54-3.74 kg/d). To gain one kilo liveweight, on an average, 2.29 kg (1.60-3.35 kg) concentrate, 1.50 kg roughages (1.13-2.49 kg), 13.93 kg green forages (0.63-15.38 kg) per day were consumed. There were 11.29 Mcal DE (ranging from 9.10-13.93), 473 g CP (ranging from 374-638 g) needed to get one kilo liveweight gain. It has been shown in Table 7 and 8 that the average LWG was 495 g/d from the experiment groups mainly fed with green forages such as Group 1,2,3,4,5 in which there were 1.79 kg concentrate, 2.41 kg roughages and 11.95 kg green forages consumed to get one kilo LWG, where DE and CP were 10.84 Mcal and 480 g respectively, while LWG was 645 g/d from the control groups such as Group 6, 7, 8, 9, 10 mainly fed with concentrate and roughages in which there were 2.79 kg

concentrate, 1.50 kg roughages and 1.52 kg green forages consumed to get one kilo LWG, where DE and CP were 12.7 Mcal and 494 g resp. However, these trials were not standard because such as breeds, ages, initial body weights, ration compositions were not the same. So, further studies should be undertaken for better judgement.

Discussions

Guangxi lies in subtropical area with warm climate, plenty of rainfall and sunshine and long unfrost period. There are many kinds of terrestrial and aquatic plants and fodder trees. Since ancient times, the TPR has used green juicy, crops, tuber crop, fodder melon crops, vine crops, fodder trees and by-products in the course of grain processing as the main feeds. It does not depend on concentrate (grains) to feed pigs. That is the way of overcoming forage problems in Chinese TPR. In the area of rather poor in country economy and low in grain production level, these methods not only can save lots of grain for human, but can provide the main meat required by human being for the most of area in Guangxi. Since China is a developing country, of course, at present, the way of TPR of the peasants is still an important model of pig raising in China.

There are huge population, very little arable land in Guangxi and the grain had per capita were 341 kg. However, the total meat yield has steadily been up in recent ten years. The total amount of meat per capita was 64,88 kg in 1996, in which pork was 77.57 percent. In Guangxi, 85 percent pigs sold were from thousands of families in the countryside. According to the results of 582 families in 8 counties, on an average, each family kept 12.92 heads. The methods of pig raising of the peasants were the traditional ways of feeding. The TPR is an experience accumulated in a long time practice, according to the character of heterophagia, to fully use the various forage resources. The TPR is the way of raising using the green forages and roughages as main feeds, to go with proper amount of concentrate, Duan County in development of feed resources has the unique way of using green forages and roughages to raise pigs which can be learnt from in the mountain area which are lack of forages.

The local breeds of pigs have adapted the traditional feeding and can grow and reproduce well with a great amount of forages. According to the results of surveys, there were 171.53 kg concentrate, 897.13 kg green forages and 185.18 kg roughages for the growing gilts from 15,40 kg body weight to reach 99.76 kg body weight which can save 20-30 percent concentrate compared with the ones with combined feed. But the time for sale of the finishing hogs was delayed to 2-5 months. On the other hand, according to the measurement of the growing pigs, there was 495g LWG/d on an average on the experiment groups fed mainly with the green forages which contained 2.57 Mcal DE/kg DM, 11.44 percent CP, 12.15-18.05

percent CF in the diet. To get one kilo LWG required 1.79 kg concentrate, 1.41 kg roughages, 11.95 kg green forages and required 10.84 Mcal DE and 480 g CP. From the results of 320 reproductive sows, the average live litter size was 10.57 heads with 8.45 kg initial litter weight. The average weaning litter size and weight were 9.83 heads and 110.86 kg respectively. Time of use per sow was 5-8 years. The sow consumed 160.08 kg concentrate, 560.54 kg roughages, 1175.52 kg green forages annually which saved 50-60 percent concentrate compared to the pigs with concentrate only.

On the nutrition point of view, the TPR has some disadvantages (NRC., 1989). The biggest one is high moisture content in general. Some forages were high in fibre, low in nutritive concentration, large in size. It is hard to meet the demand of pigs to grow and develop. So, the pigs grow and develop slowly and is low in feed conversion rate and longer time for sale.

The TPR has been developed under the historical condition of small scale peasant economy. The most advantage is to save concentrate and to fully use feed resources. The disadvantages are to require too much labor, to longer time for sale (need to raise 8-11 months before ready for sale). The TPR is not good for pig production on a big scale. The TPR continued up to now has changed a little bit, in which the most important changes are for the pigs to adapted feeding raw in stead of feeding boiled stuff and to use several feeds and same concentrate together in stead of feeding single feed. The level of pig production has increased continuously. Nowadays, many peasants have accepted the concept of raising pigs with science and technology and played attention to rationing feeds and pig nutrition. In the breeds, they keep native F1 crossbreeding pigs which can reach 90-100 kg body weight for only 7-8 months old when sold. As long as the way of raising is scarsly, low raising intensity, the traditional scattered raising will continue. So, we must improve the TPR with advanced technologies, of which the most effective ways are to extend the use of concentrate and feed additives to improve pig environment to carry out early weaning of piglets to increase the sow reproductivities and the, slaughtering rate of hogs. In the nutrition of feed, special concentrate, additives and combined feed for the pigs of peasants should be

studied and produced according to insufficient protein, unbalanced amino acids, low calcium content, inadequate trace elements and so on in the diets of TPR. In processing and storage of the green forages and roughages, various small sizes of forage processing machines like chopper, forage paste machine, grinder, agitator and so on should be made for the peasants. We should guide the peasants to make forage silage and to rotate the cropping of green forages to ease the intensity of labor, to create conditions for the production of moderate scale. The overall target is to combine traditional pig raising with modern science and technology in order to fully use the local feed resources.

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