泌乳期 **LACTATION**

最大限度增加采食量

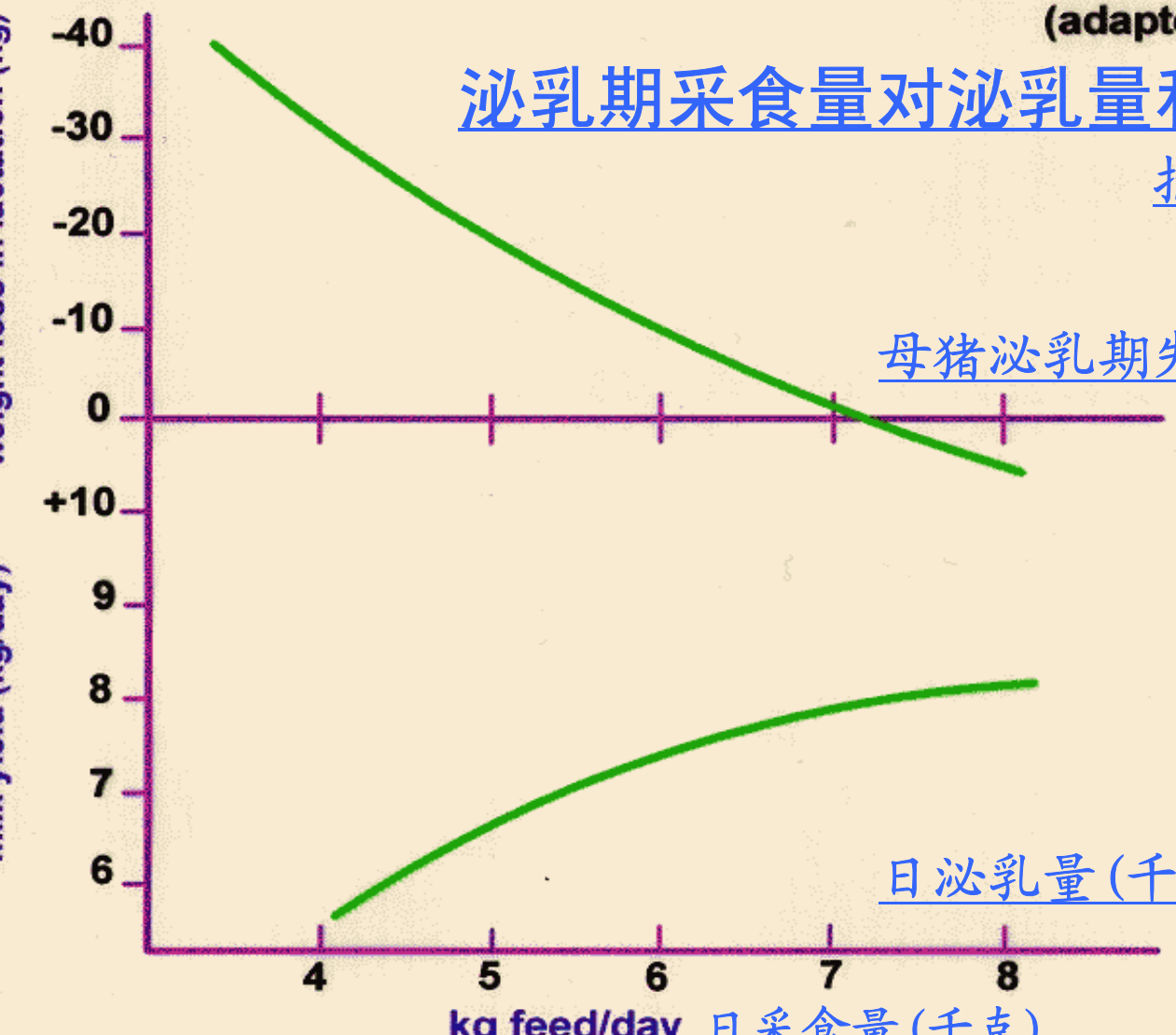
maximize feed intakes

THE EFFECTS OF FEED INTAKE IN LACTATION ON MILK YIELD AND SOW LIVE-WEIGHT LOSS

(adapted from Whittemore, 1984

泌乳期采食量对泌乳量和母猪失重的影响

摘自： Whittemore,198



母猪泌乳期失重(千克)

日泌乳量(千克)

Alberta
AGRICULTURE, FOOD AN
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许多母猪都不能摄入足够的能量和养分以满足自身的需要

Many sows do not consume sufficient energy and/or nutrients to meet their requirements

- 后果 **Consequence**
  - 失重过多会导致泌乳量和繁殖性能降低,并提早被淘汰。

    Excessive weight loss, which may lead to reduced milk yield, poor reproductive performance and early culling from the herd.

泌乳期失重过多的后果

Consequences of Excessive Weight Loss in Lactation

- ✓ **Lower percentage of sows return to heat**
  断奶后发情比例降低
- ✓ **Sows take longer (3-5 days) to return to heat**
  断奶到发情间隔延长**3-5**天
- ✓ **No effect on ovulation rate**
  对排卵率无影响
- ✓ **Reduced pregnancy rate**
  妊娠率降低
- ✓ **Increased embryo mortality**
  胚胎死亡率增高

泌乳期采食量对繁殖性能的影响
Effect of feed intake during lactation on reproductive performance

	Ad Libitum 自由采食	Restricted 限饲	SEM 标准误
Sows 母猪数	93	92	
Days to Estrus 断奶到发情天数	5.1	9.0	1.8
Pregnancy Rate % 妊娠率(%)	84.5	65.5	4.2
Ovulation Rate 排卵率	16.4	17.2	0.9
Embryo Survival 胚胎存活率	81.4	67.2	2.9

University of Alberta, 1990 加拿大Alberta大学

泌乳期采食量对母猪生产率的影响

Effects of lactation feed intake on sow productivity

Feed intake (kg/d) 日采食 (千克)	Wean to estrus (d) 断奶到发情 天数	Litter weaning wt (kg) 断奶窝重 (千克)	Subsequent litter size 其后 窝产仔数
3	6.7	50.0	10.85
4	6.4	51.3	10.80
5	6.1	51.8	11.00
6	5.9	53.0	11.03
>6	5.9	54.4	11.17

Dial (1997)

Nutrition can have significant effects on the reproductive performance of the sow without having any observable effects on sow weight or body condition.

营养可对母猪体重和体况在无任何可见影响的情况下对其繁殖性能产生显著影响

在泌乳期的任何一周限制养分都会显著影响母猪的繁殖力

Nutrient restriction in any week of lactation will significantly influence sow fertility.

Effect of lactation feed intake on subsequent fertility in the sow

母猪泌乳期采食量对其后繁殖力的影响

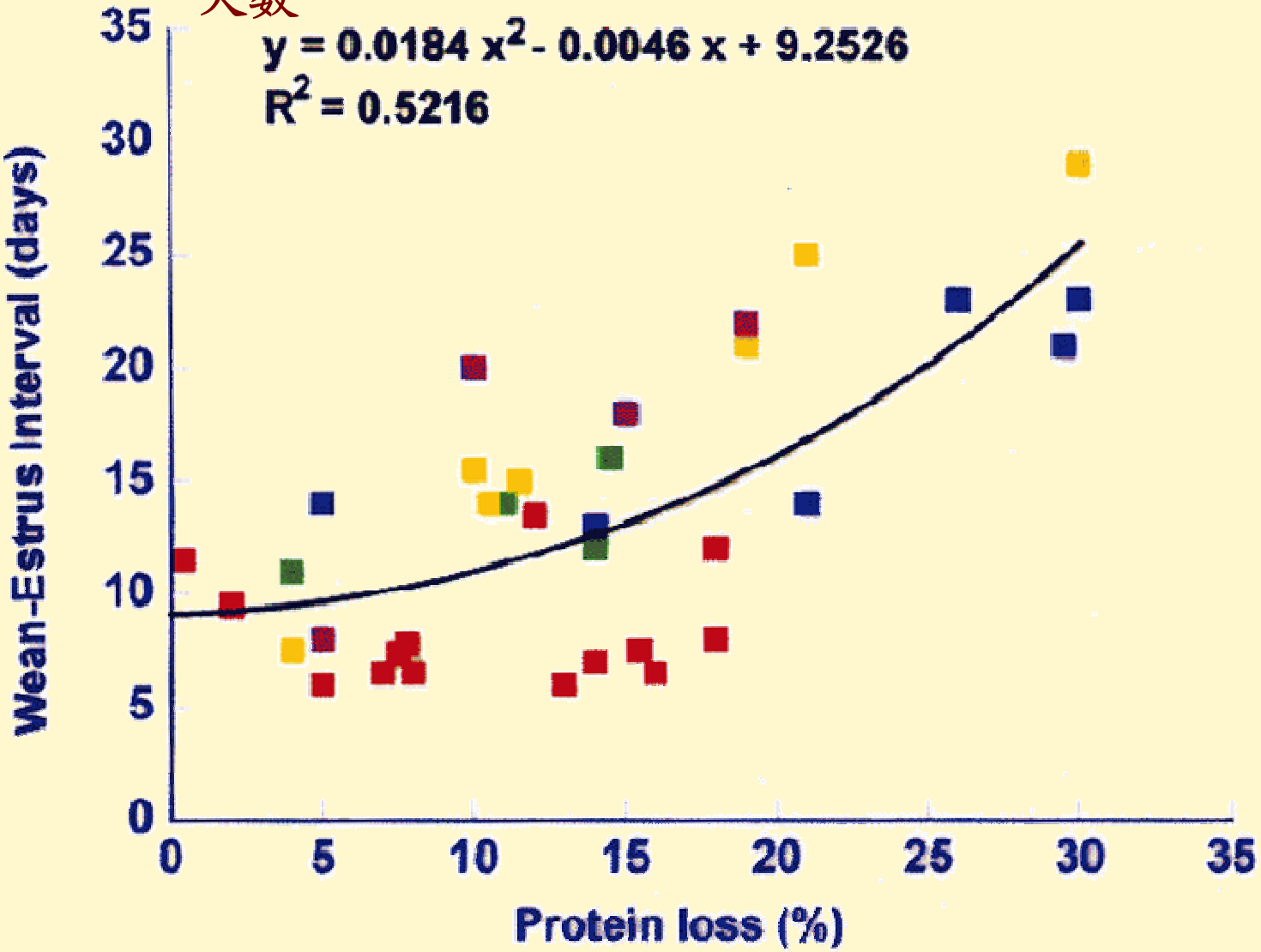
	Lactational Feed Intake 泌乳期采食量			
	To appetite 自由采食	Restrict from d21 自21天限饲	To appetite from d21 自21天自由采食	SEM 标准误
Lactation FI (kg/d) 泌乳期日采食(千克)	4.7[a]	4.0[b]	3.1[c]	0.19
Wean-Estrus (d) 断奶到发情天数	3.5	4.7	4.4	1.03
CL (#) 黄体数量	20.3[d]	13.5[e]	14.7[e]	1.37
Embryo (#) 胚胎数量	16.8[b]	8.9[a]	12.6[ab]	1.22
Embryo survival (%) 胚胎存活率(%)	87.6	64.9	89.3	6.73

A-c rows with different superscript letters differ (P<.002) 上标不同字母的数值间差异显著;
D-e rows with different superscript letters differ (P<.05) a - c P < 0.002; d - e P < 0.05
Litter size = 6 pigs/sow 窝产仔数 = 6
Chapman et al. 1994 摘自: Chapman等 1994

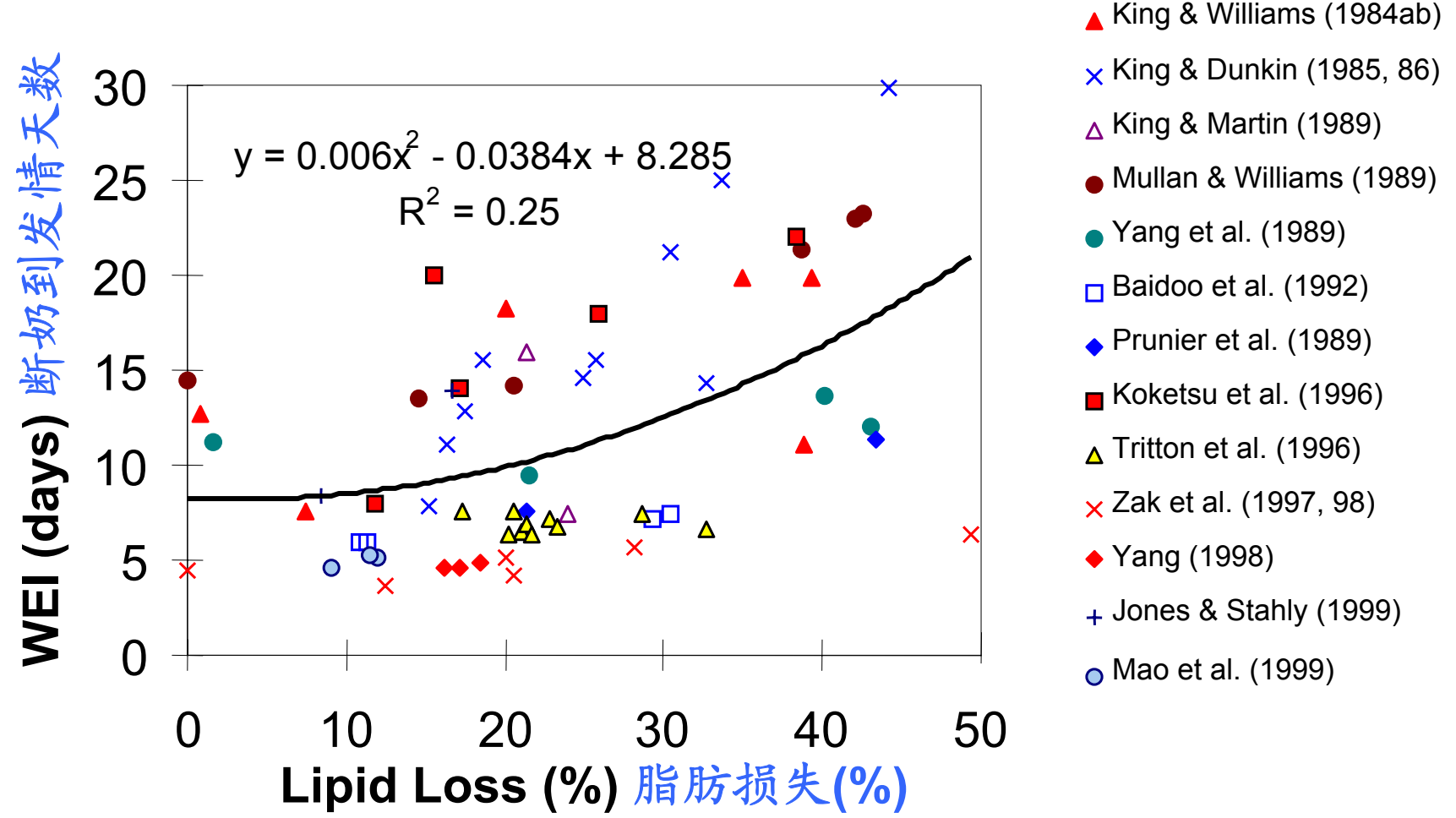
We speculate that loss of maternal protein reserves, rather than loss of maternal lipid reserves, drives lactational performance and subsequent reproductive efficiency.

我们认为，是母体蛋白质储备的损失而非母体脂肪储备的损失危害了母猪的泌乳期性能和其后的繁殖性能。

断奶到发情的间隔天数



蛋白质损失(%)

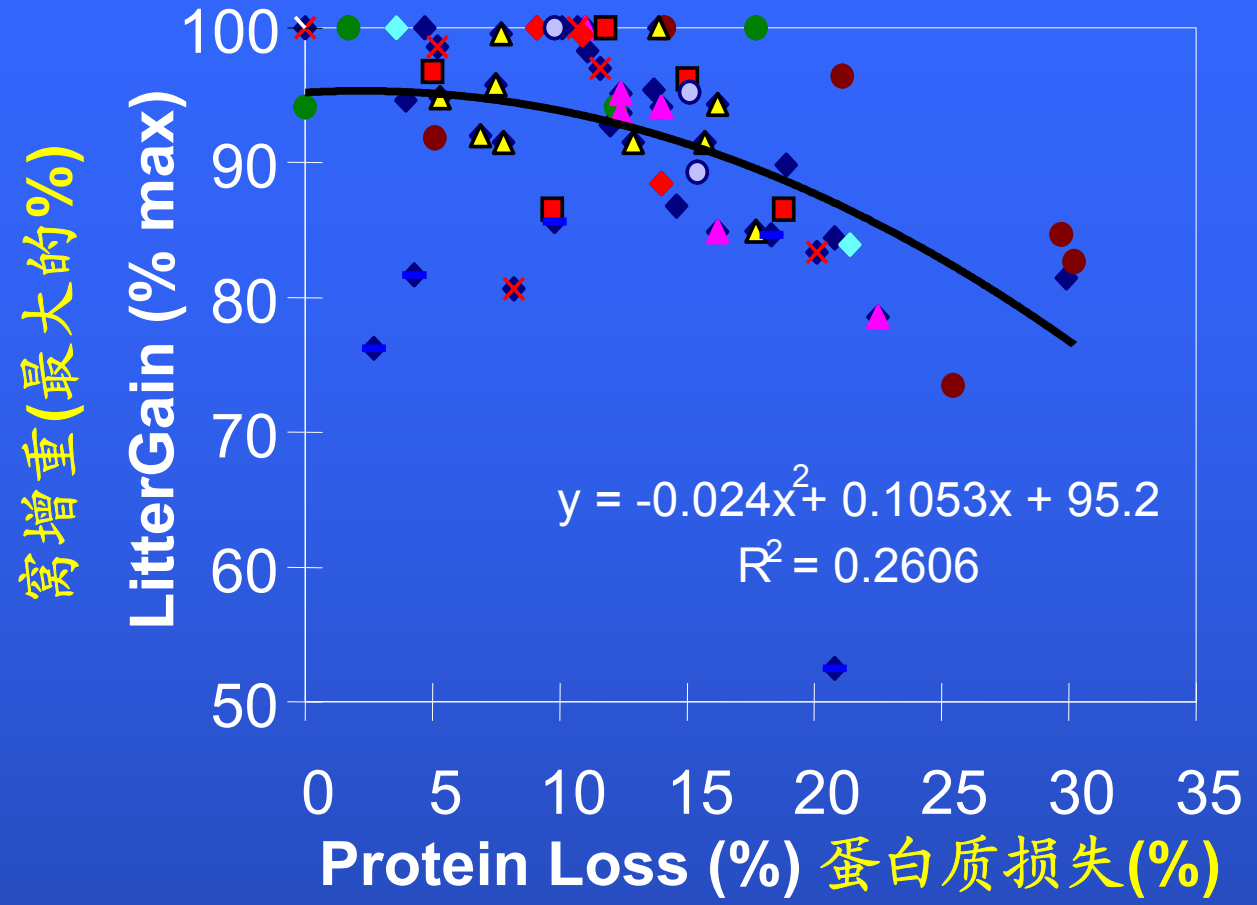


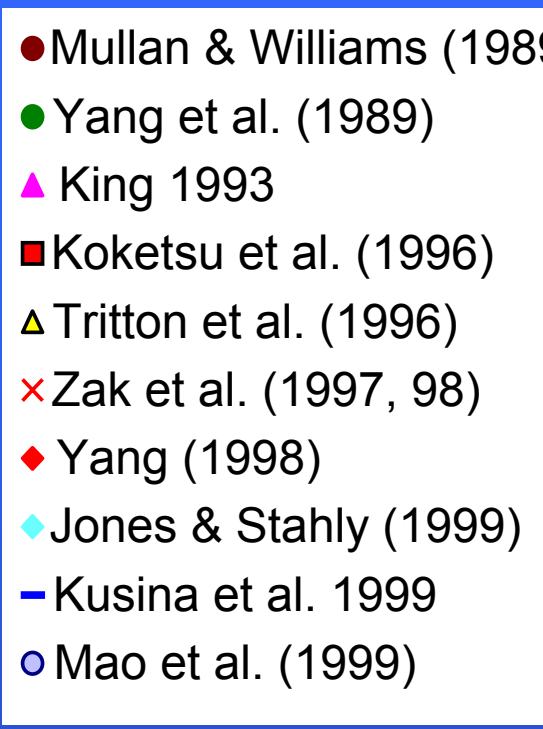
*脂肪损失量计算值(表示为分娩时母体脂肪总量的%)；根据Whittemore和Yang (1989)公式

E. Clowes (未发表数据)

* Calculated lipid loss as a percentage of maternal lipid mass at farrowing, based on the equations of Whittemore and Yang (1989).

E. Clowes (unpublished)





蛋白质损失计算值(表示为分娩时机体蛋白质总量的%),
根据Whittemore and Yang (1989)的公式

E. Clowes (未发表资料) *

Calculated protein loss, as a percentage of body protein mass at farrowing, based on the equationsor Whittemore and Yang (1989) E. Clowes (unpublished)

头胎泌乳母猪蛋白质损失和卵巢功能的关系

Relationship between protein loss and ovarian functio in lactating first-litter sows

Lactation Diets 泌乳期日粮	高蛋白 High Protein	中蛋白 Medium Protein	低蛋白 Low Protein	P P值
Wt loss, kg 体重减轻(千克)	12.7	17.0	28.2	.002
Backfat loss, mm 背膘厚减少(毫米)	0.96	1.44	1.71	NS
Protein loss, % (of farrow) 蛋白质损失(分娩时的%)	6.9	9.4	15.1	.008
Number of follicles 4-6 mm 直径4-6毫米卵泡的数量	24.7	23.7	7.6	.02

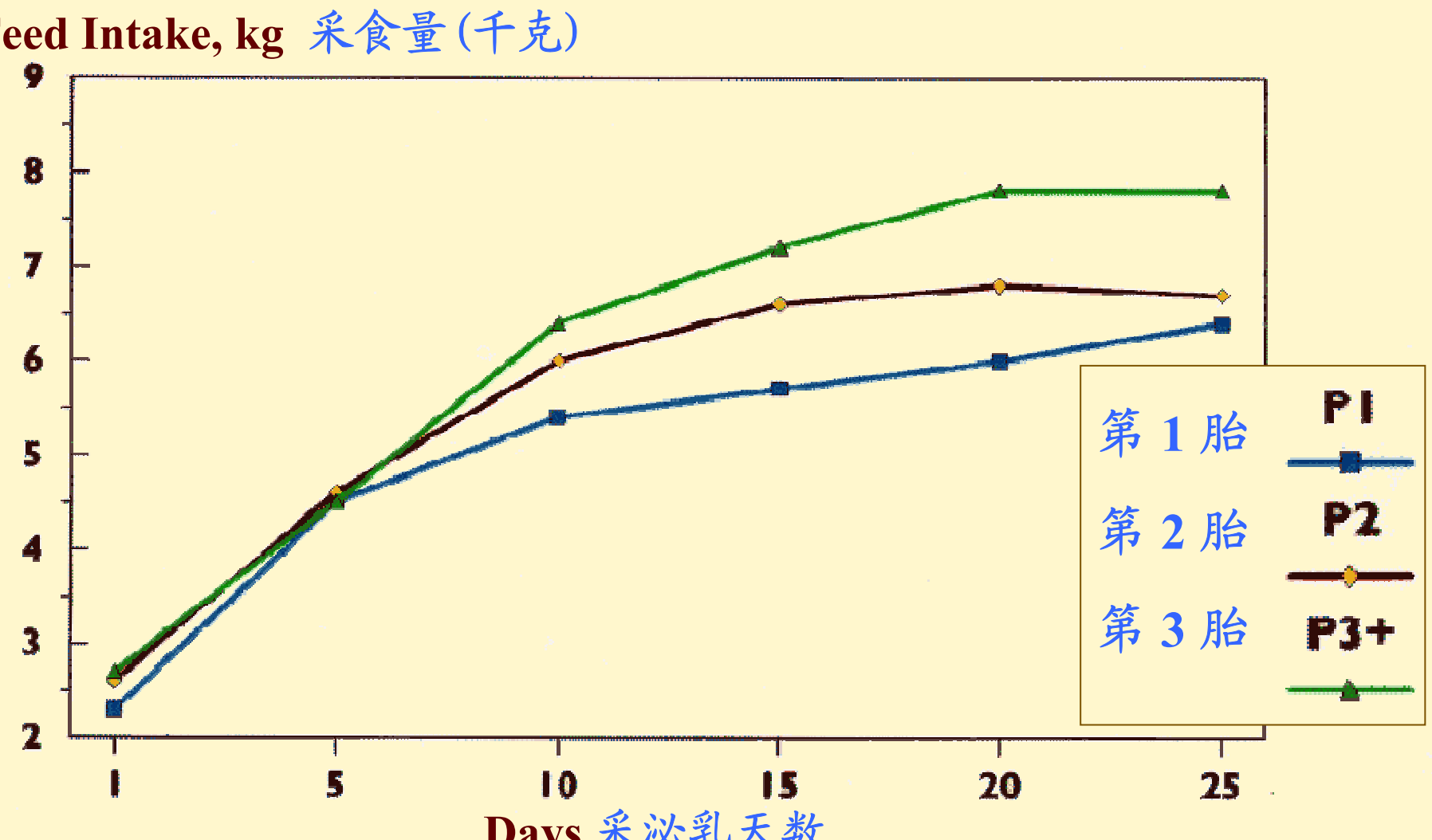
Clowes and Aherne 1999

由于母猪泌乳期体重损失中既损失了蛋白质，也损失了脂肪，
所以脂肪损失和以后繁殖性能之间的强相关可能明确地反映了蛋白质损失到了阈值以下。

Because sow weight loss in lactation usually consists of both protein and fat, a strong correlation between fat loss and subsequent reproductive performance may simply reflect the loss of protein below her threshold

Daily Lactation Feed Intake in Sows of Parity 1, 2 and 3

第1、2 和 3 胎母猪的泌乳期采食量



泌乳早期采食量的重要性
Importance of early lactation feed intake

- 采食量低或高的母猪在泌乳第一周的差别最大

  Difference between poor and high consuming sows greater during first week of lactation

- 猪群繁殖性能会因泌乳早期个体间的巨大差异而出现巨大差别。

  Herd's variation in reproductive performance due to higher sow to sow variation in early lactation feed intake

AVERAGE DAILY FEED INTAKE (KG) DURING EACH WEEK OF A THREE-WEEK LACTATION (11,700 SOWS ON 30 FARMS)

3周泌乳期中每周的平均日采食量(千克)

Week 周	Avg. 平均	Bottom 10% 最差的10%	Top 10% 最好的10%
1	3.6	2.1	5.5
2	6.1	4.2	8.0
3	6.3	4.2	8.5
Avg. 平均	5.2	3.6	6.9

(30个猪场，共11,700头母猪)

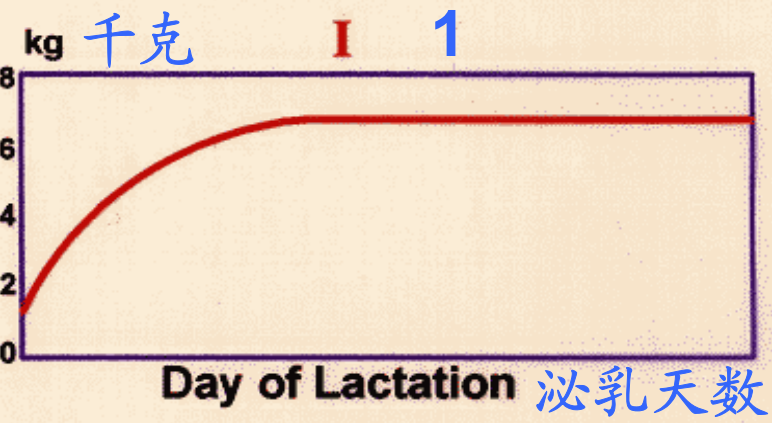
Dial and Koketsu, 1995.

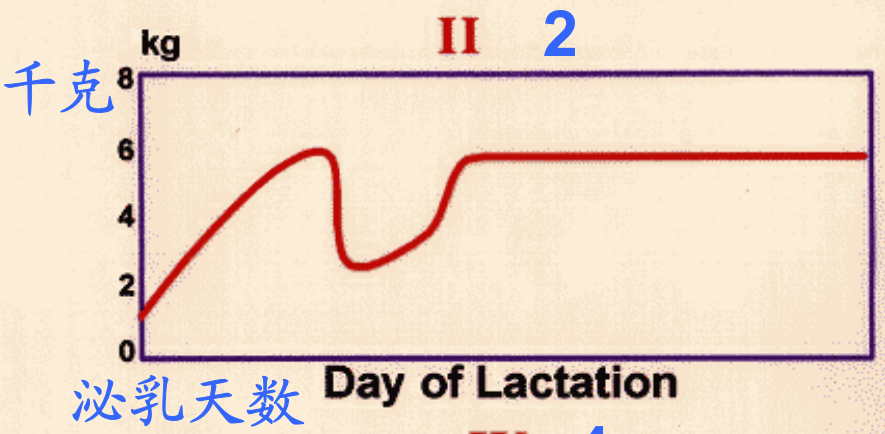
Dial和Koketsu, 1995

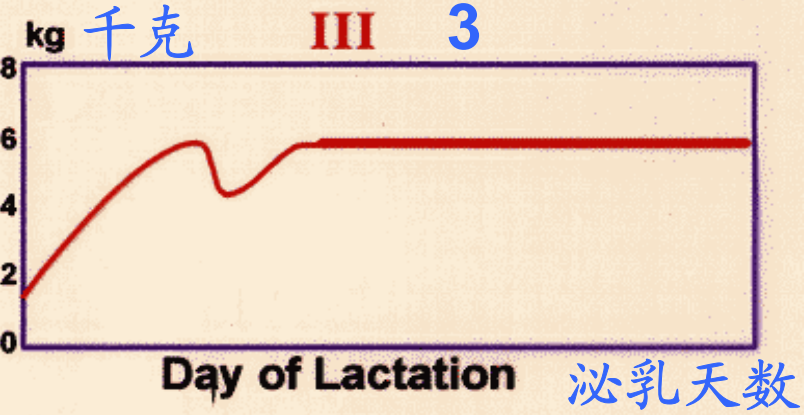
PATTERN OF SOW FEED INTAKE DURING LACTATION

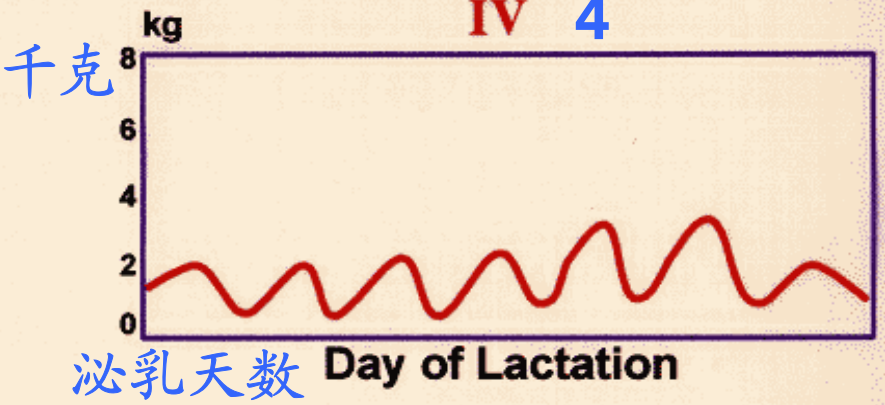
母猪泌乳期采食量变化模式

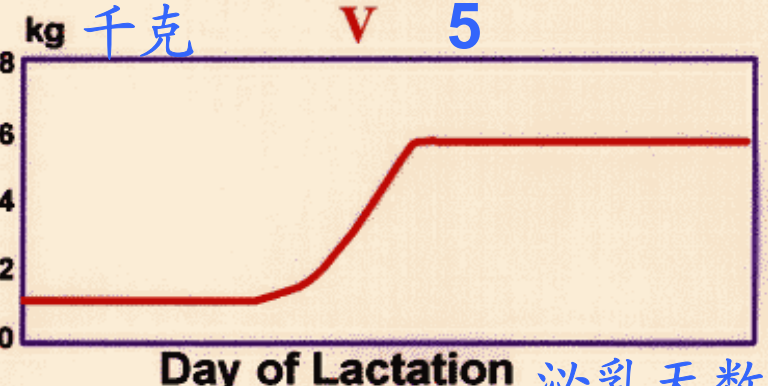
Koketsu, 199

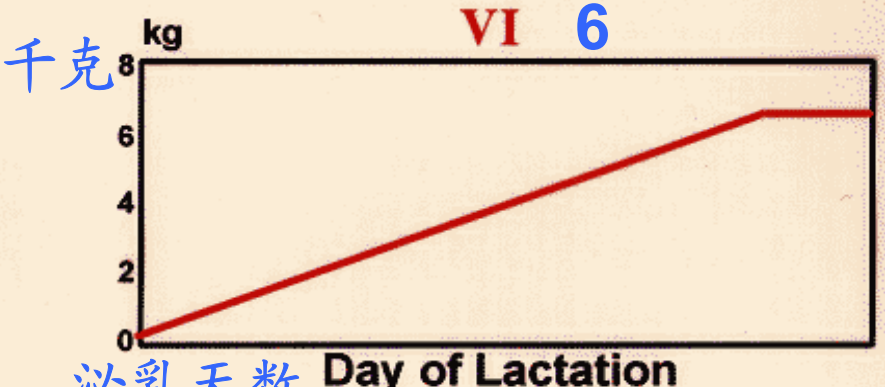












泌乳期的饲喂方式

Pattern of Feeding During Lactation

	Kg feed/day 日采食(千克)
Day of Farrowing (d 0) 分娩后天数(第 0 天)	1.5 to 2.0
Day 1 and 2 第 1 和第 2 天	2.5
Day 3 – 7 第3 - 7 天	增加日采食量,以达到泌乳第7天的目标. Increase feed intake daily to meet minimum target by day 7 of lactation
Day 8 - 12 第 8 - 12 天	保持最低目标水平 Hold at minimum target level.
Day 12 to Weaning 第12天到断奶	逐渐增加采食量到满足母猪的食欲，这可能需要每天饲喂三次。 Increase feed intake gradually to sow's appetite. This may require going to 3 meals/day.

Reasons for gradual increase in sow feed intake

缓慢增加泌乳母猪采食量的理由

- Sow constipation 母猪便秘
- Agalactia 无乳
- Mastitis 乳房炎
- Milk scours in the litter 乳猪下痢
- Sows going off feed later in lactation
  泌乳后期采食量下降

泌乳母猪的能量和营养需要量

Energy and nutrient requirements of lactating sows

Sow wt, kg 母猪体重(千克)	175	175	175	175	175	175
Pig growth, g/d 仔猪日增重(克)	150	200	250	150	200	250
Sow wt loss, kg 母猪失重(千克)	0	0	0	10	10	10
Feed/day, kg 母猪日采食(千克)	4.31	5.35	6.40	3.56	4.61	5.66
ME intake, Mcal/day* 兆卡代谢能/天	14.1	17.5	20.9	11.6	15.1	18.5
Protein, % 蛋白质(%)	16.3	17.5	18.4	17.2	18.5	19.2
Protein, g/day 蛋白质(克/天)	703	936	1178	612	883	1087
Lysine, % 赖氨酸(%)	0.82	0.91	0.97	0.89	0.97	1.03
Lysine, g/day 赖氨酸(克/天)	35.3	48.6	61.9	31.6	44.9	58.2

NRC 1998* diet contains 3.27 Mcal ME/kg 每千克日粮含代谢能3.27兆卡

合成乳汁所需要的理想蛋白质组成
Ideal protein ratios for milk synthesis

Lysine 赖氨酸	100
Me + Cyst. 蛋+胱氨酸	45
Thr 苏氨酸	58
Try 色氨酸	18
Val 缬氨酸	85
Isoleuc 异亮氨酸	55

高瘦肉型泌乳母猪饲喂指南
HIGH-LEAN SOWS LACTATION FEED GUIDELINES

- 玉米-豆粕基础日粮（去皮）
  -不添加麸皮或添加量最高不超过5%
  CORN-SOYBEAN MEAL (DEHULLED)
  -NO WHEAT BRAN OR MAXIMUM 5 %
- 自由采食-猪能吃多少喂多少
  FULL FEED TO APPETITE – AS MUCH AS SOW WILL EAT
- **18%**粗蛋白 **18 % CRUDE PROTEIN**
- **0.95-1%**赖氨酸-全价蛋白质(豆粕, 膨化全脂大豆), 非合成氨基酸
  0.95 - 1.0 % LYSINE – COMPLETE PROTEIN (SBM, Extruded Full Fat SBM), NOT SYNTHETIC AMINO ACIDS
  -(夏天需要高水平的日粮以补偿采食量的降低)
  -(HIGHER LEVELS MAY BE NEEDED IN SUMMER TO COMPENSATE REDUCED FEED INTAKE)
- **3-5%** 豆油 **3-5 % SOY OIL**

泌乳母猪的实用饲喂方案

A Practical Feeding Program for Lactating Sows

最低标准

Minimum Target

维持需要1.5千克，加上每哺乳一头仔猪增加0.5千克

1.5 kg for sow maintenance plus
0.5 kg for each pig in the litter

所有的交叉寄养都应该在第一天内完成

All cross fostering completed by Day 1

影响泌乳期采食量的因素

Factors Affecting Feed Intake During Lactation

✓妊娠期采食量

Feed intake during gestation

✓圈舍气温

Barn temperature

✓每天饲喂次数

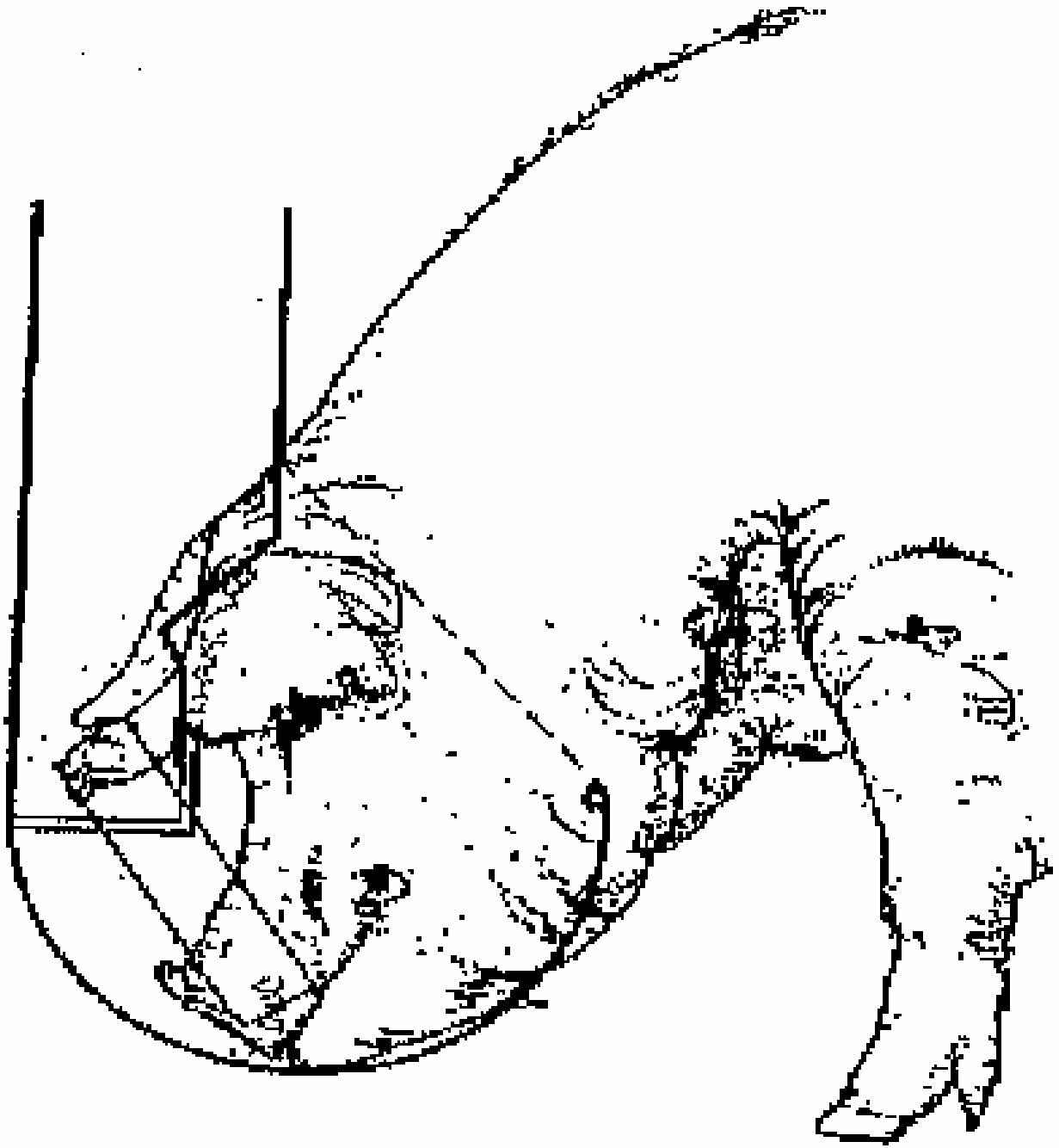
Frequency of feeding

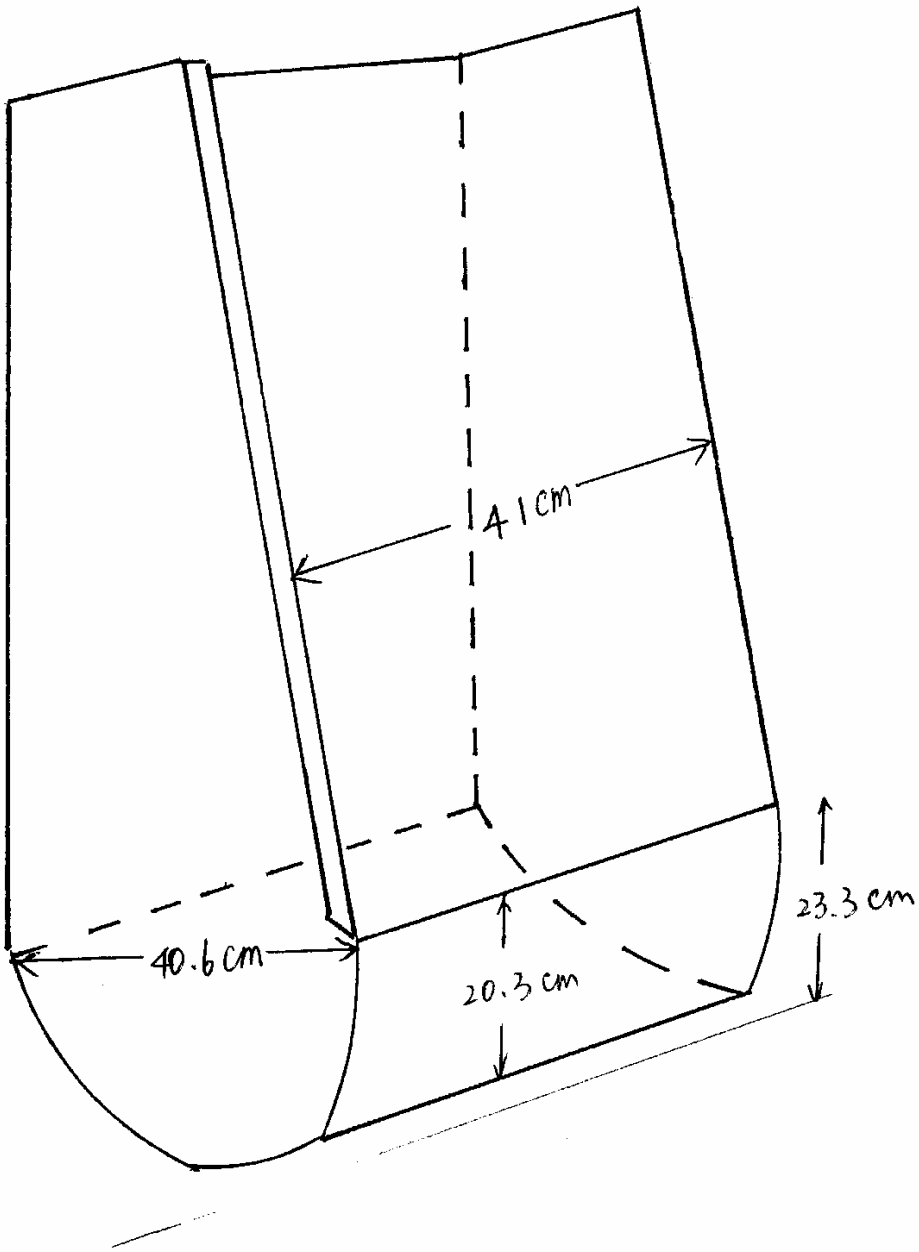
✓饲喂水平

Level of feeding

✓饮水供应量

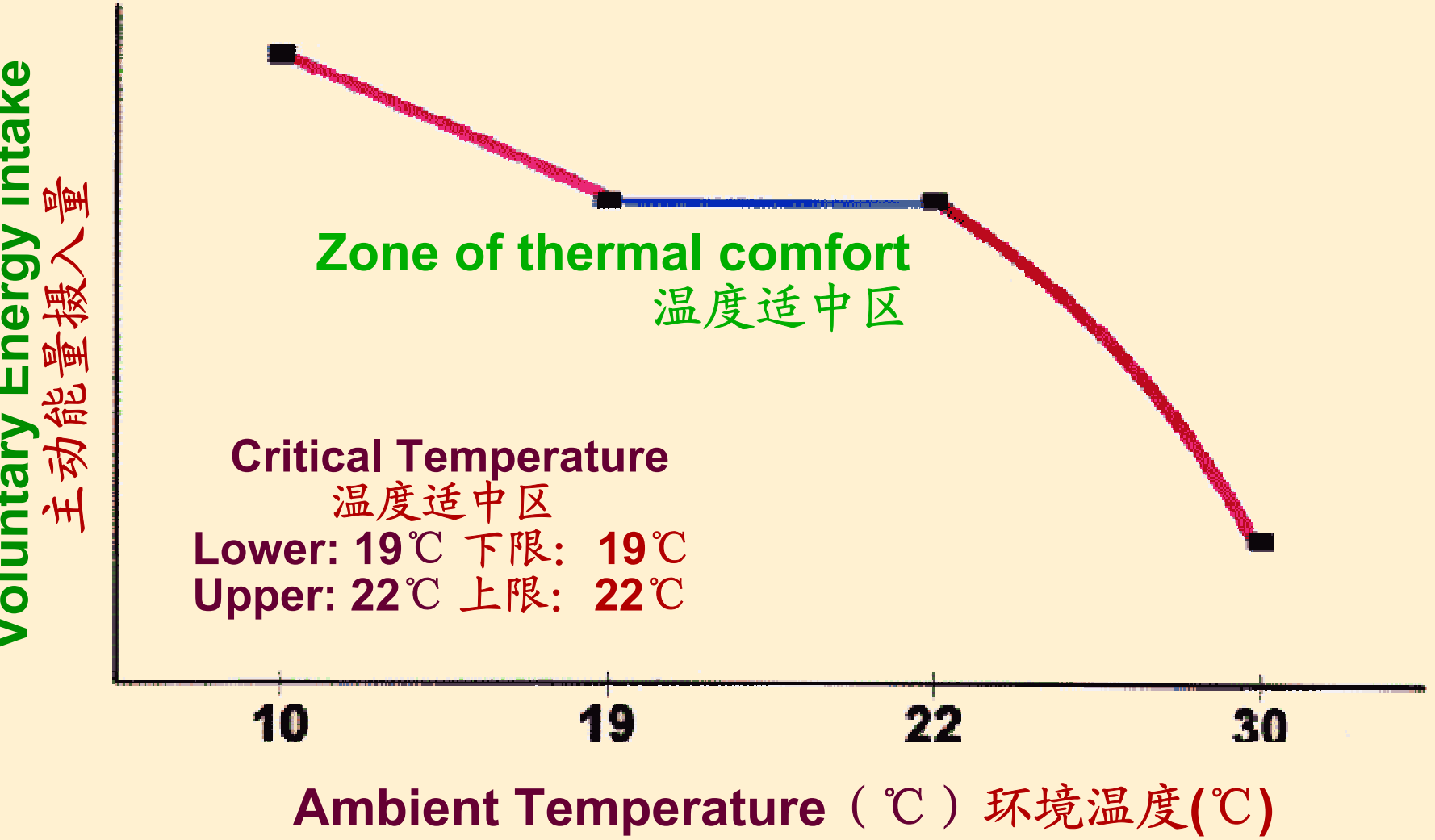
Water availability




41 cm
40.6 cm
20.3 cm
23.3 cm

Effect of ambient temperature on energy intake of lactating sows

环境温度对泌乳母猪能量摄入量的影响



滴水降温的效果Effect of Drip Cooling

	Drip 滴水降温	Control 对照
Feed/day, kg 日采食量(千克)	5.8	4.8
Sow Wt Loss, kg 母猪失重(千克)	3.8	17.5
Litter Weaning Wt, kg 断奶窝重(千克)	56	51

Nichols et al. 1983

饮水供应量

Water Availability

乳头状饮水器的流量应为每分钟2升

Nipple drinker should allow a flow of 2 liters per minute