



Recent Trends in Global Pig Nutrition

養豬營養學的新趨勢

BPA Seminar, Tainan, 2005

英國養豬育種技術研討會 - 台南 - 2005年

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SCA Nutrition

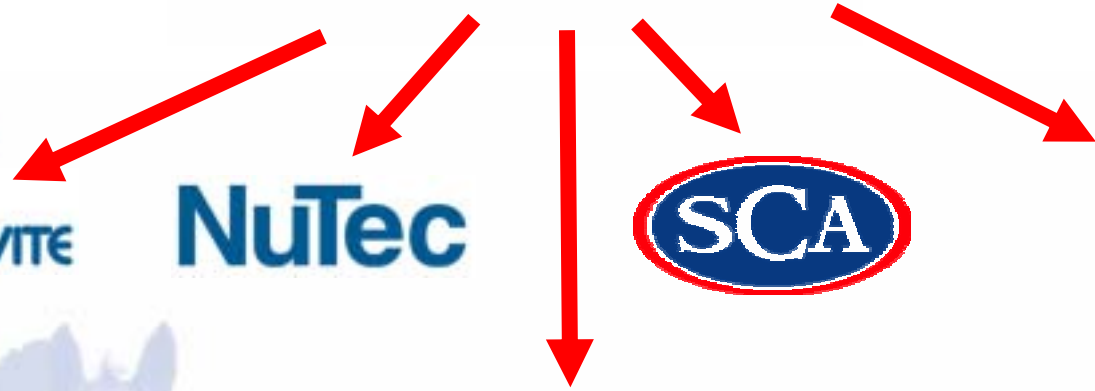
SCA營養公司





Provimi Ltd in the UK

Provimi集團英國成員



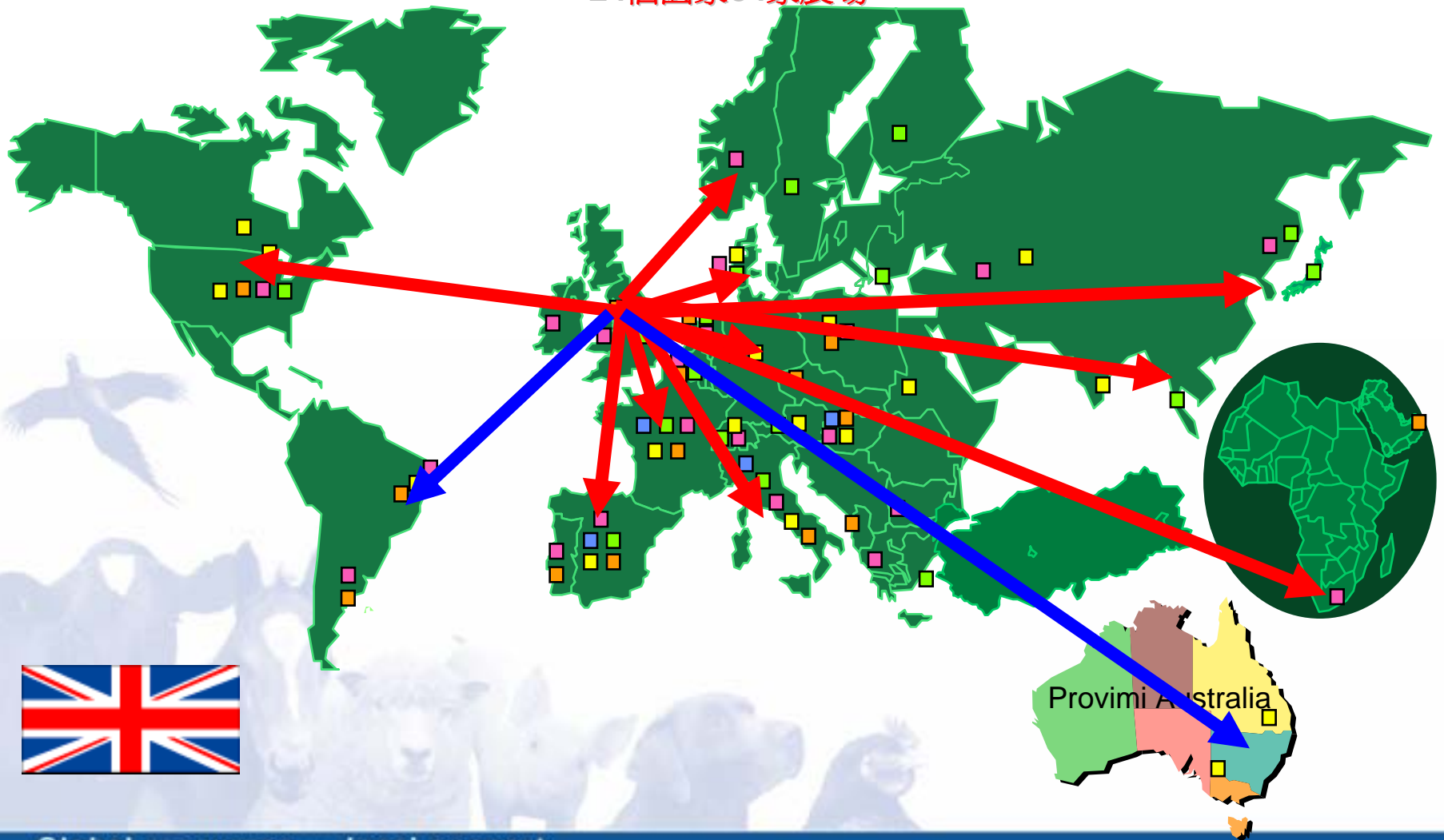
SCA Exports Worldwide



SCA外銷全世界

84 plants in 24 countries

24個國家84家農場



Research & Development

研發

- **At the heart of our progress**
我們進展的中心思維
- **Keeping us ahead of the game**
使得我們在競爭中始終保持領先



The UK has excellence in Pig Science and Research



英國在養豬科學與研究方面擁有卓越成就

Rowett Institute

羅威特研究所

Leeds University

利茲大學

Bristol University

布里斯托大學

London University

倫敦大學

Glasgow University

格拉斯哥大學

Roslin Institute

羅斯林研究所



ADAS, MLC, Royal Agricultural Society

英國農業發展諮詢服務中心、肉畜協會、皇家農業協會

Nottingham University

諾丁安大學

Newcastle University

新堡大學

Plymouth University

普利茅斯大學

Aberdeen University

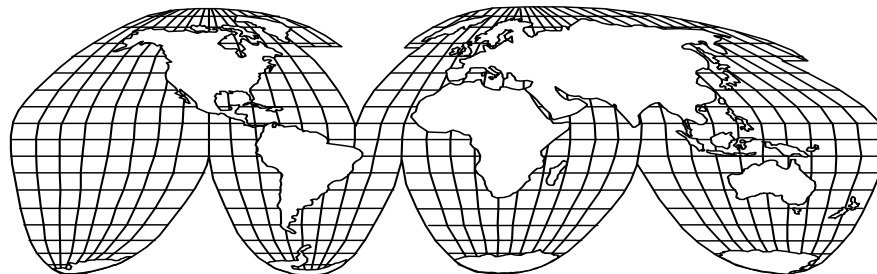
亞伯丁大學

Edinburgh University

愛丁堡大學

Pigs : Global Trends

養豬業：全球趨勢



- Individual farms getting very large
個人農場的規模變得非常大
- Corporate farming well established
企業農場經營健全
- Backyard farming disappearing – in developing world
後院農場經營消失中 – 在開發中世界
- Intensive production methodology
密集生產方法
- Health status – worsening (??)
健康狀況 – 惡化 (??)
- More complex feeding strategies based on technology solutions
以技術解決方案為基礎之更複雜飼養策略

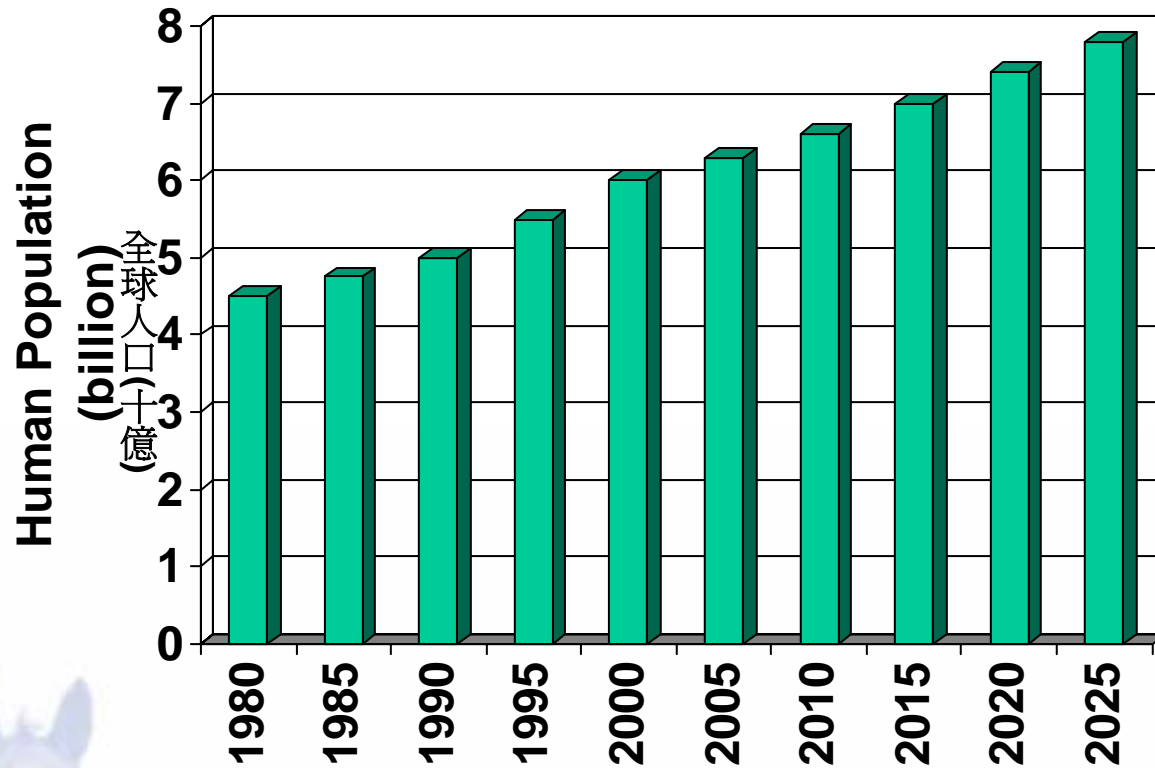


The Good News For Pig Producers !



養豬業者的好消息！

Global Human Population Forecasts 全球人口預測



World pork consumption will rise by 5% annually

全球豬肉消耗量每年將增加5%

Source: US Census Bureau

資料來源：美國人口統計局

Pig Production in Asia

亞洲養豬業

Asia – 60% of world's population
and they mostly love pork!

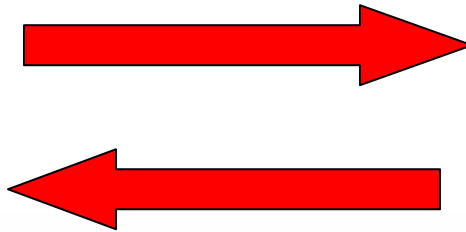
亞洲 – 佔全球人口60%；多數愛吃
豬肉



The North American / European Axis



北美/歐洲軸線



Very Early Weaning 斷奶很早

Low Cost Production 低成本生產

Low Performance 低表現

Low Welfare 低福祉

Later Weaning 斷奶較晚

Minimal Medicines 極少用藥

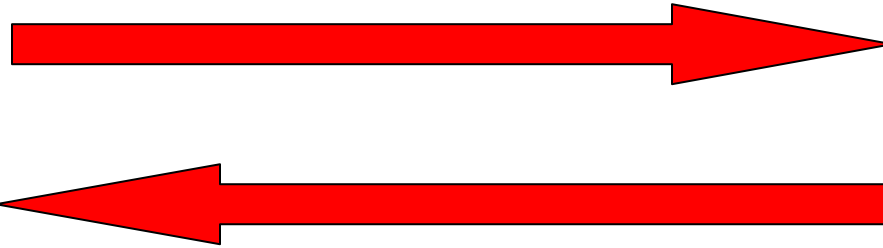
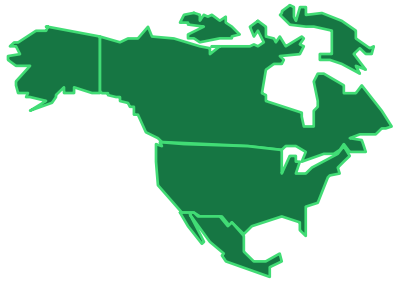
High Welfare 高福祉

High Performance 高表現

The North American / European Axis



北美/歐洲軸線



Maize 玉蜀黍

Soya 大豆

Wheat 小麥

Antibiotics 抗生素

Nutrition

營養



Wheat, Barley 小麥、大麥

Soya, Peas, Beans 大豆、豌豆、菜豆

Co-Products – Dairy, Brewing, Distillery, Human

聯產品 – 乳製、釀造、蒸餾、人爲

Fish Meals 魚食

Milk Powders 奶粉

Piglet Nutrition



仔豬營養

The Objectives 目標

- Maximum Weaning Weight 最重的斷奶時重量
- Maximum Post Weaning Gain 最多的斷奶後增重
- Maximum Health Status 最佳的健康狀況
- Maximum Survival 最高的存活率
- Maximum Lifetime Performance 最佳的終身表現

Green Hill Farm

Piglet Nutrition



仔豬營養

The Problems 問題

- Weaned at an immature stage 在未成熟階段斷奶
- Feed intake is compromised 飼料進食量減少
- Enzyme system is not mature 酶系統未成熟
- Reduced ability to produce gastric acid 胃酸產生能力減弱
- Immunologically immature 免疫能力不全

Green Hill Farm

Key Areas

關鍵領域

- **Gut health** – nutrition interactions
胃腸健康 – 營養反應
- Importance of '**Size Matters**' – Start of a Lifetime concept
'大小有關係'的重要性 – 終身概念開始
- **Quality of nutrition** and raw materials and quality control
營養和原料品質與品管
- **Research & Development**
研發

Gut Health

胃腸健康

- **Piglets are weaned at an immature stage**
仔豬在未成熟階段即被斷奶
- **They have poor enzyme development**
它們的酶系統發育不佳
- **They have poor immunological development**
它們的免疫系統發育不佳
- **They will get diarrhoea and die if the nutrition is wrong**
如果營養不對，它們可能腹瀉甚至死亡。
- **They have poor dry feed intake characteristics**
它們的乾飼料進食狀況不佳

Weaning effects on villi



斷奶對絨毛的影響

Less Gut Damage After Weaning

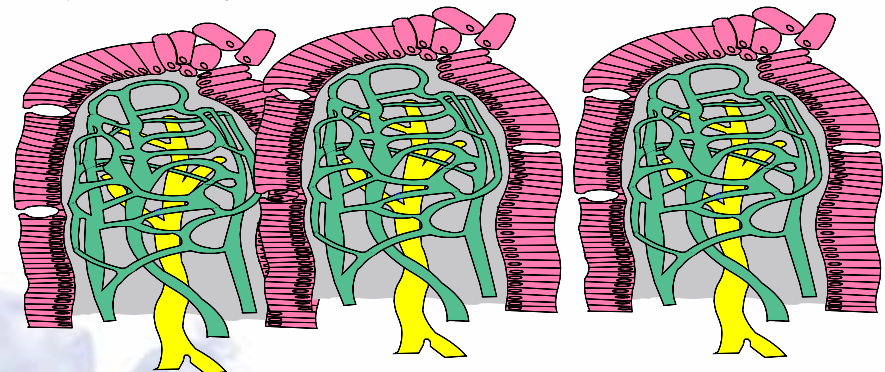
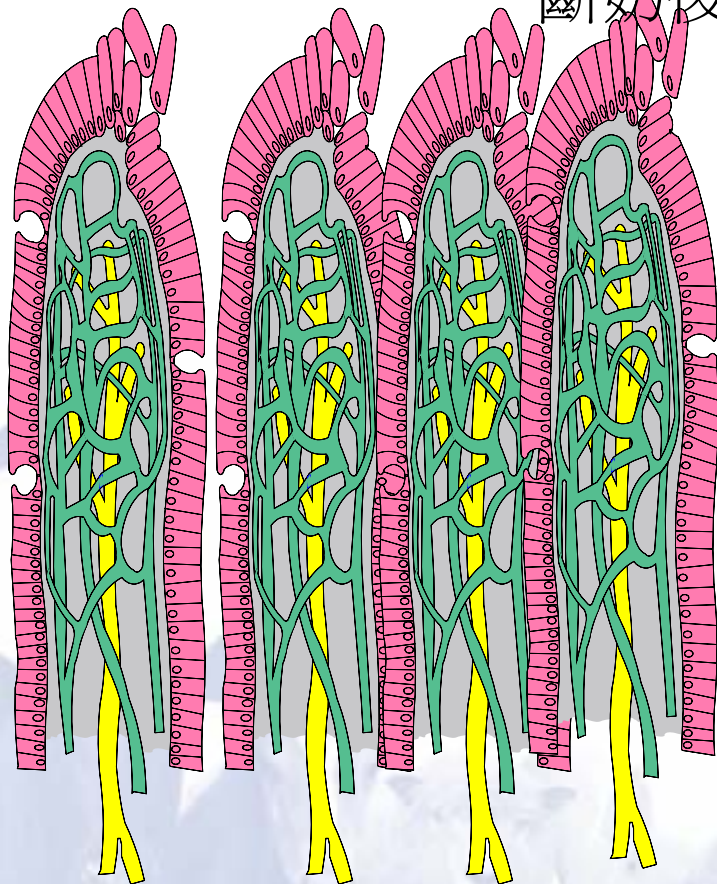
斷奶後胃腸損害較少

← **Before Weaning**

斷奶前

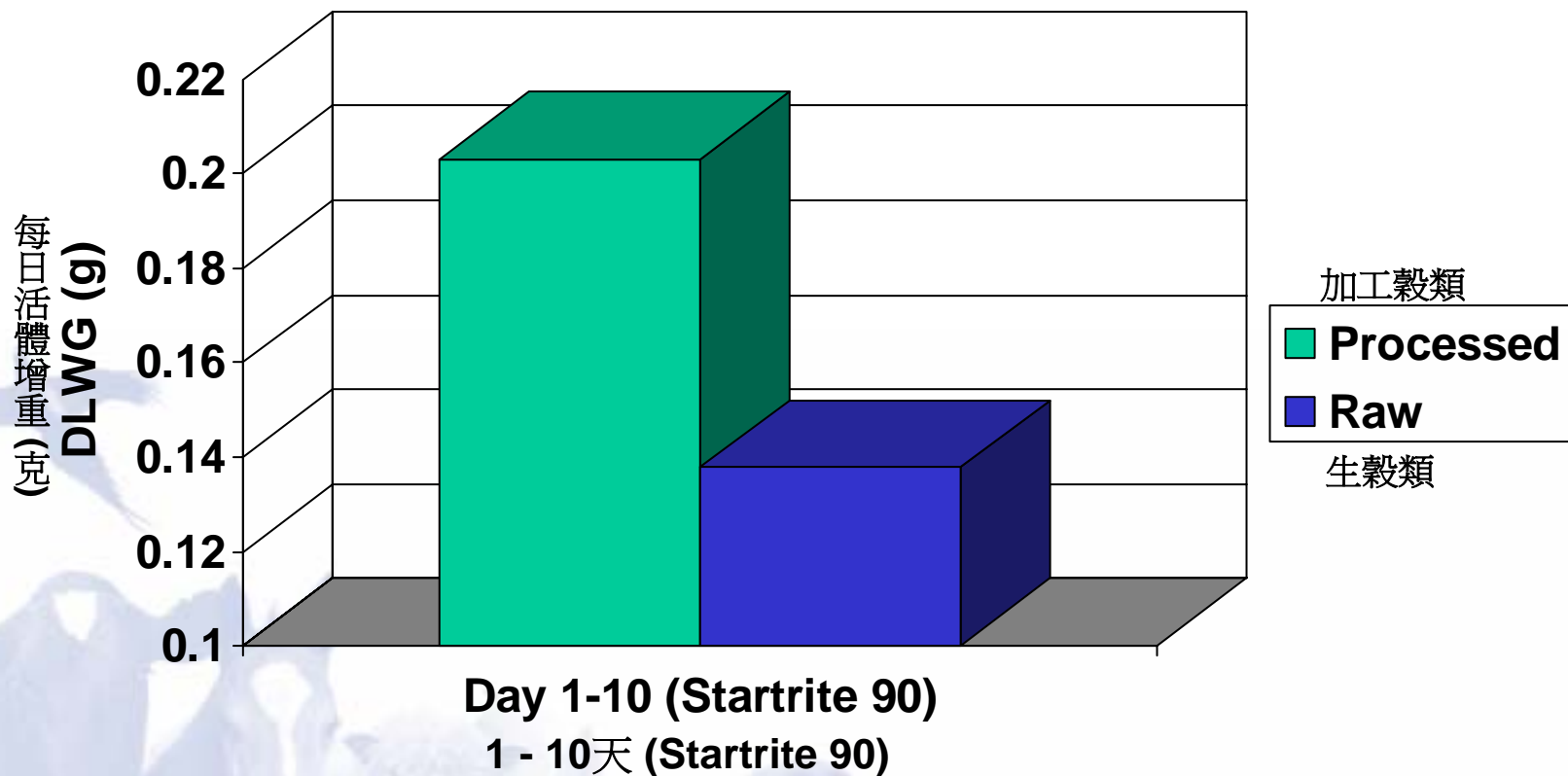
After Weaning

斷奶後



Processing Cereals Improves Pig Growth

加工穀類改善豬隻發育



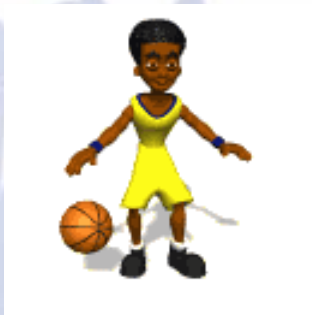
Green Hill Farm 1998
綠山農場 1998

From Birth to Bacon

從出生到培根

Size Matters !

大小有關係 !

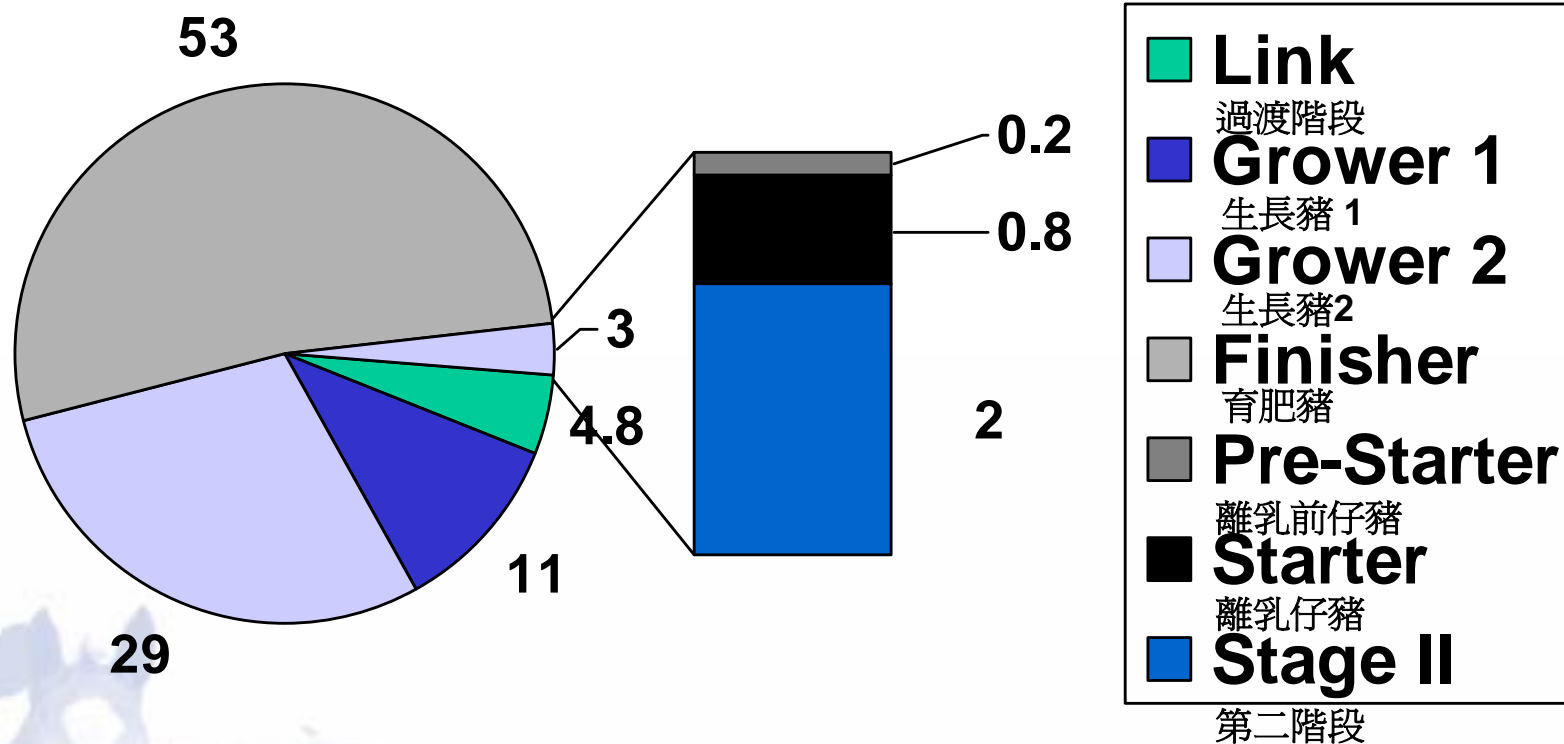


Green Hill Farm

綠山農場

Starter feeds are a small proportion of overall feed inputs

仔豬飼料僅佔整體飼料輸入一小部份

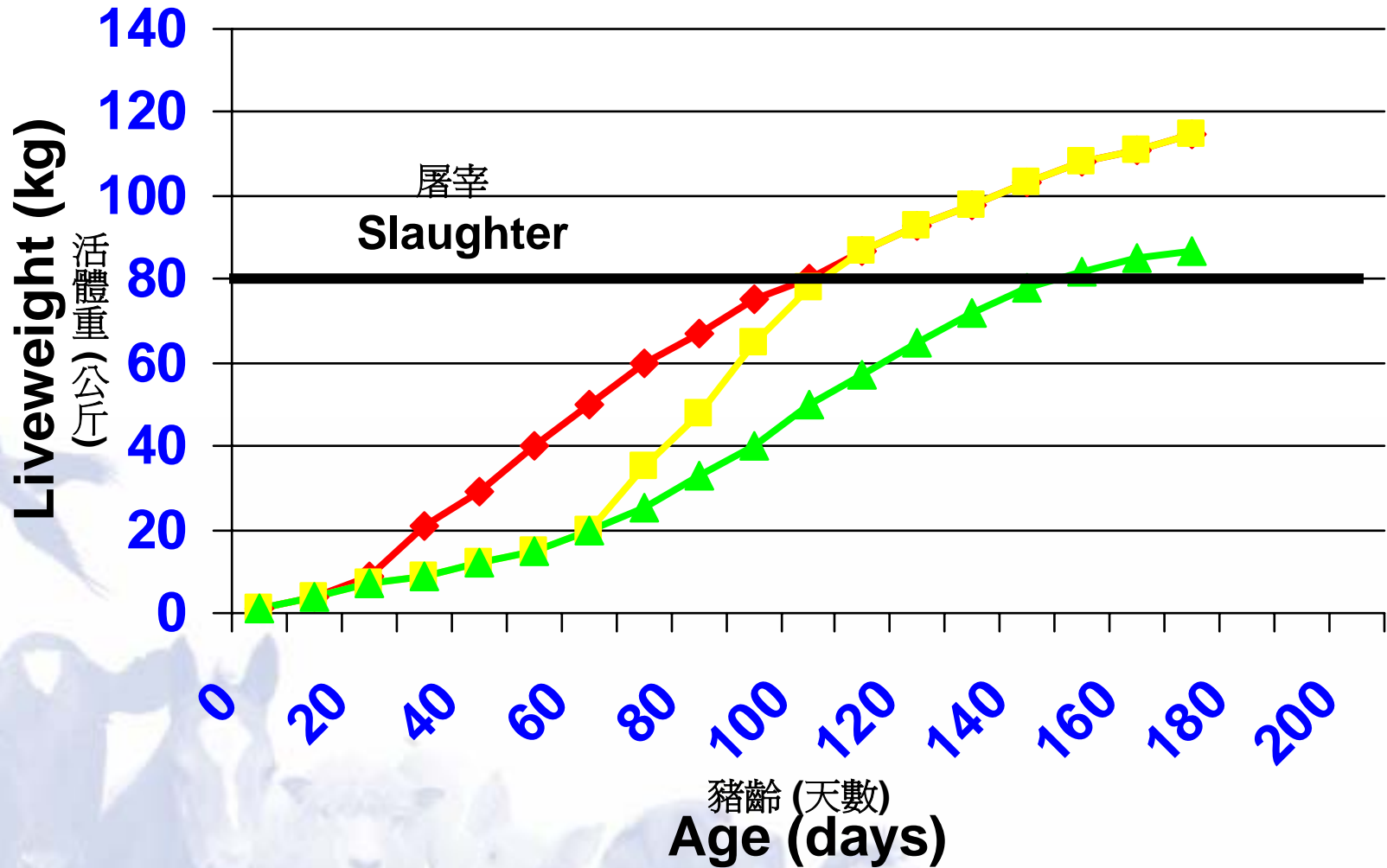


But – determines 30% of the variation in growth to slaughter

但 – 卻決定著從生長到屠宰期間30%的變化

There is no Compensatory Growth in Pigs

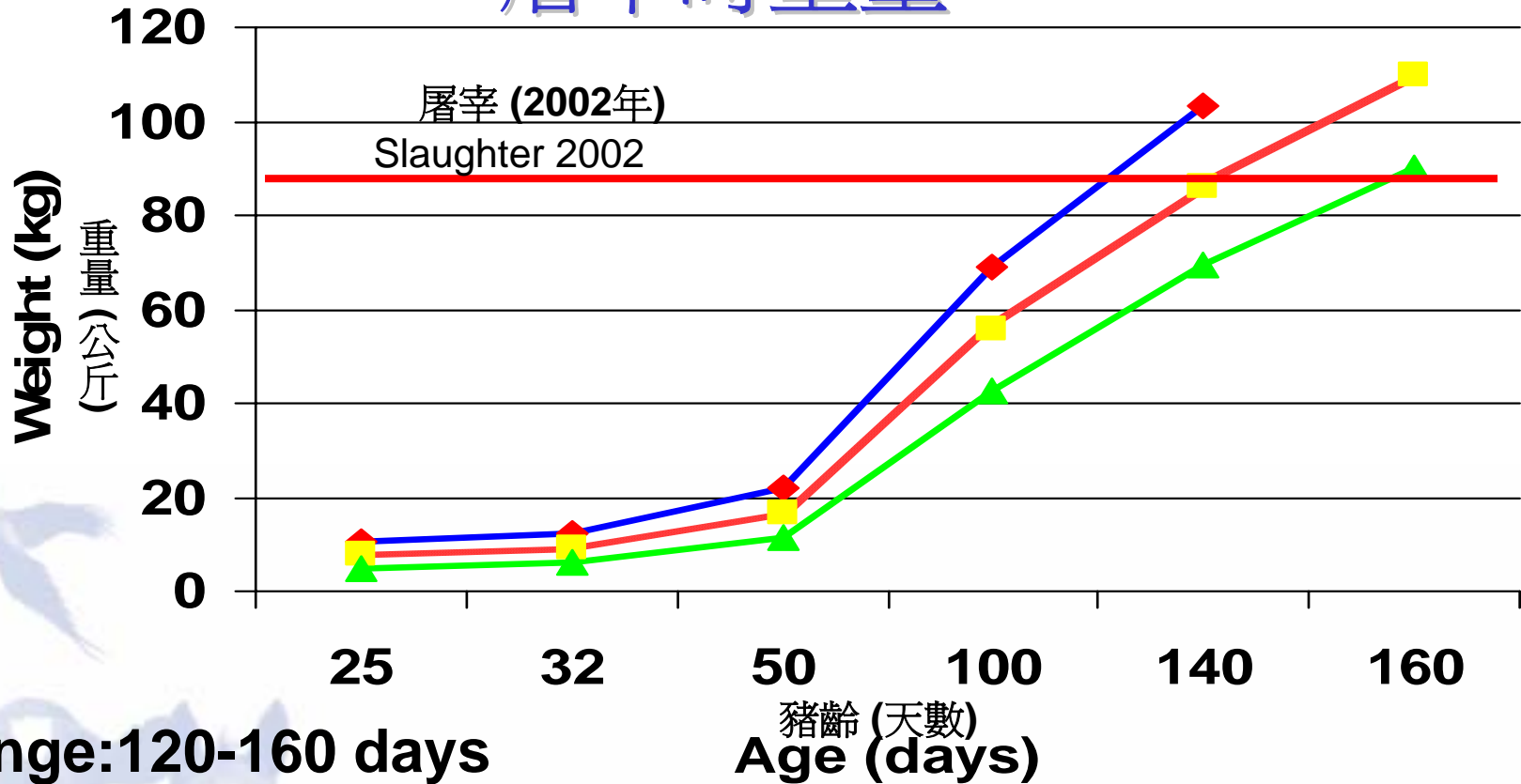
豬隻發育沒有補償性成長



Weights to Slaughter



屠宰時重量



Range: 120-160 days

範圍：120 - 160天

5000 pigs individually weighed

5,000頭豬個別稱重

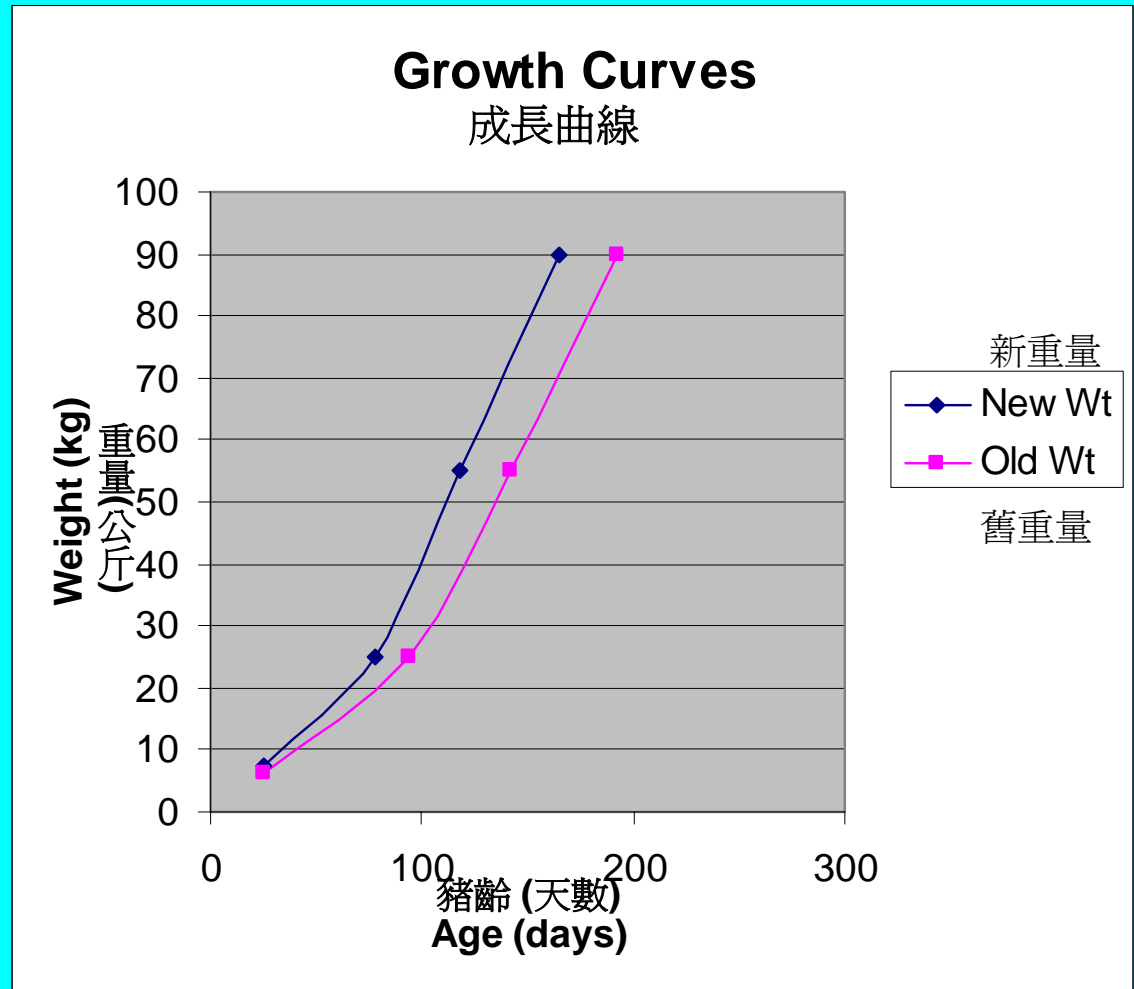
Green Hill Farm

綠山農場



舊斷奶時重量(公斤)
Old Weaning Wt (kg) **6.3 kg**
 新斷奶時重量(公斤)
New Weaning Wt (kg) **7.5 kg**

Days to Bacon **192.28** OLD 舊
至培根天數
Days to Bacon **165.10** NEW 新
Feed Costs **£28.37** OLD 舊
飼料成本
Feed Costs **£26.25** NEW 新
Fixed Costs **£56.51** OLD 舊
固定成本
Fixed Costs **£48.52** NEW 新
Total Costs **£84.87** OLD 舊
總成本
Total Costs **£74.77** NEW 新



每頭豬成本優勢：**10.10**英鎊
COST ADVANTAGE PER PIG £10.10

每頭豬節省台幣**580**元成本
COST SAVING \$NT 580 per pig

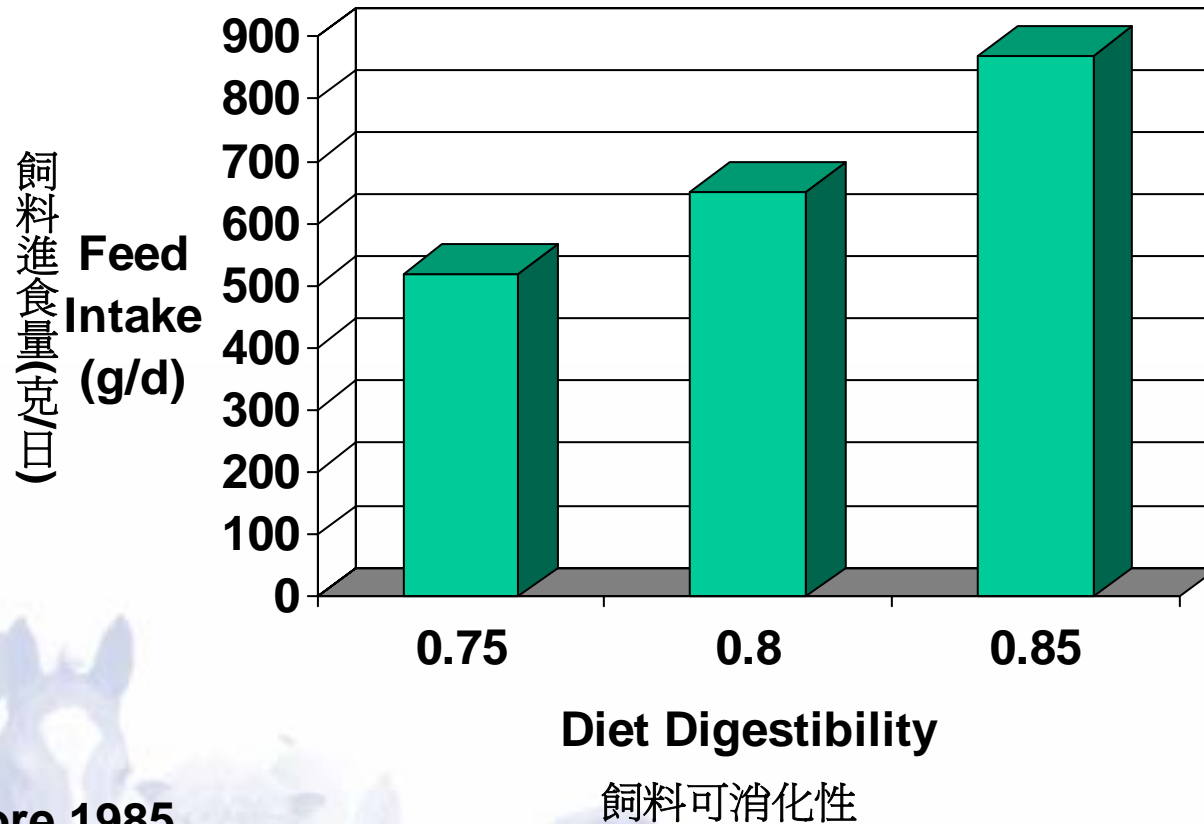
Feed Intake

飼料進食量

- **A principal key to success**
成功之主要關鍵
- **Interacts with Gut Health**
與腸胃健康互為因果
- **If they don't eat they don't grow !!**
豬隻吃不下自然長不大！

Diet digestibility and food intake after weaning

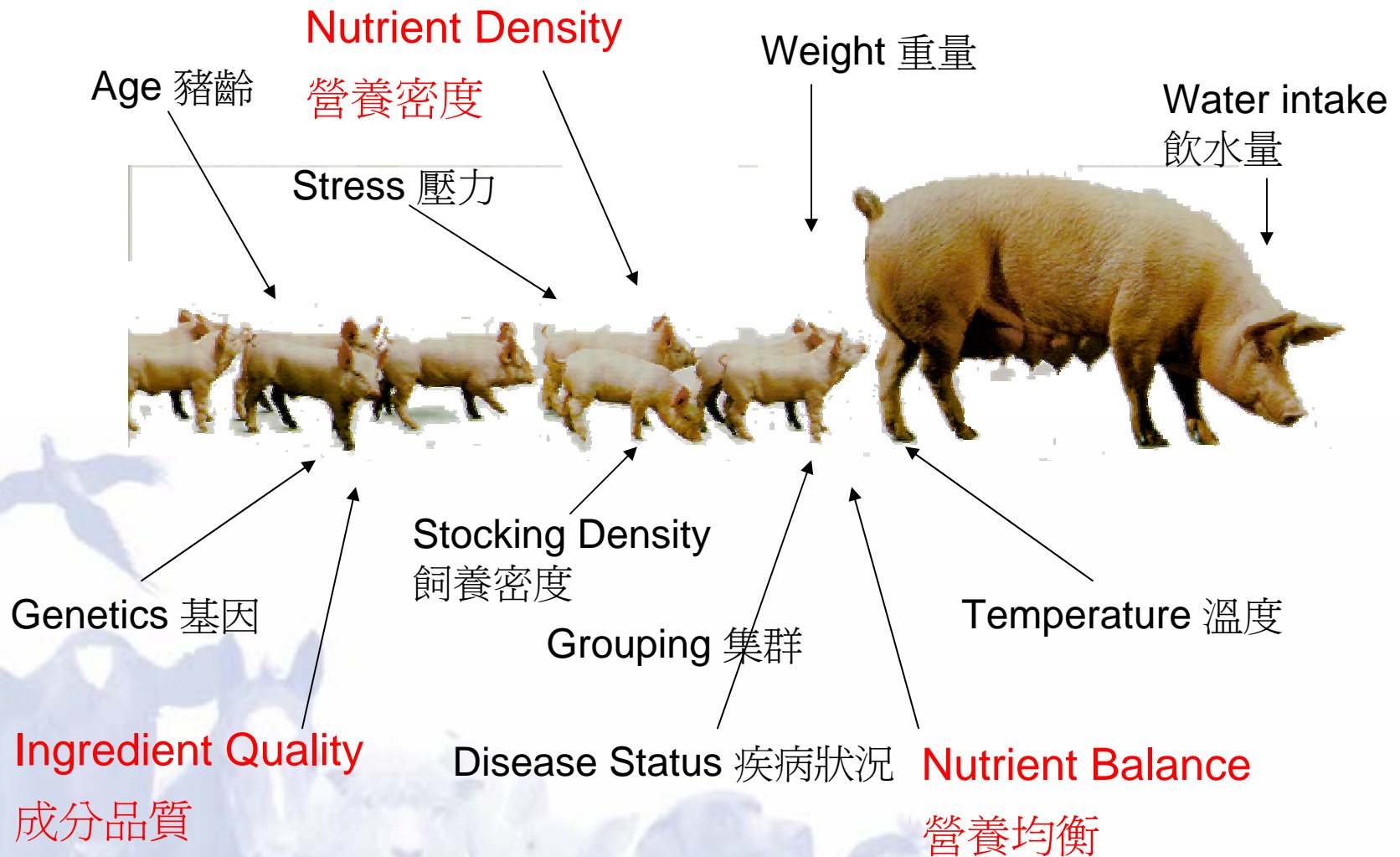
斷奶後之飲食可消化性與飼料進食量



Whittemore 1985

Many Factors Affect Voluntary Feed intake

許多因素影響豬隻主動飼料進食量



We must understand

我們必須了解

Feeding Regimes !

餵飼方法！

Effect of DE (conc.) on Voluntary Energy Intake Model (based on INRA & Australian data)

飼料能量(含量)對主動能量攝取模式之影響(根據INRA & 澳洲資料)

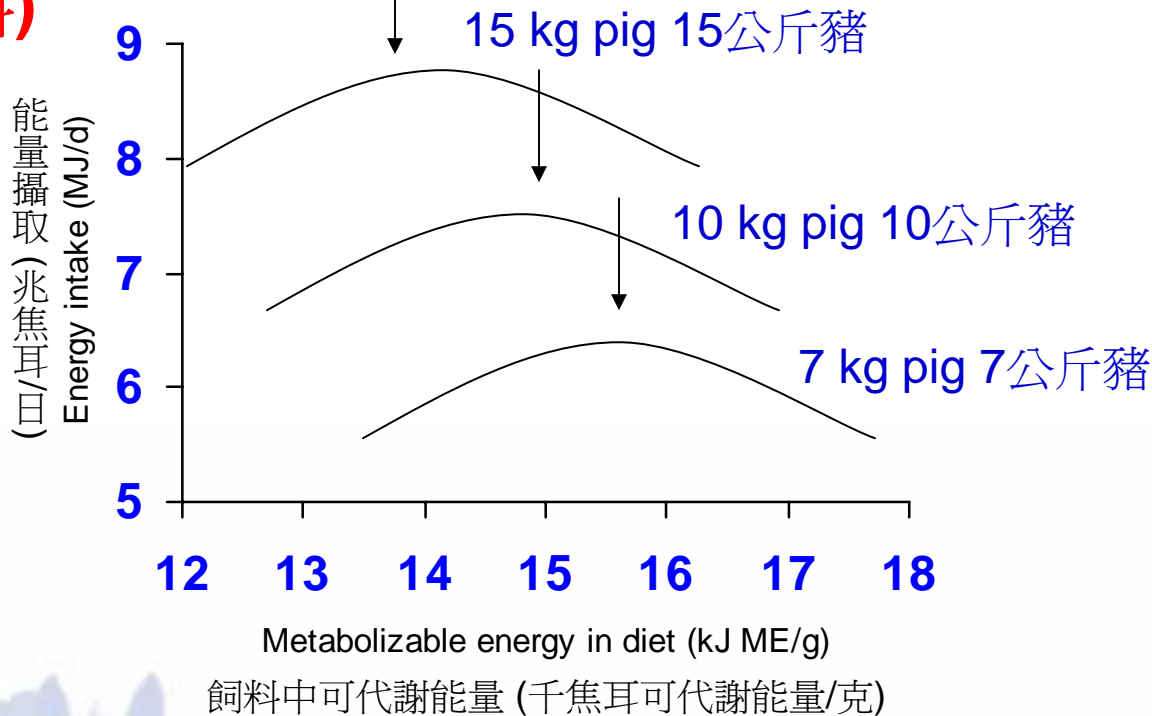


Figure 5 . Effect of dietary energy concentration on voluntary energy intake in weaned piglets

圖5. 飼料能量含量對斷奶仔豬主動能量攝取之影響

Choosing The Right Feed Programme



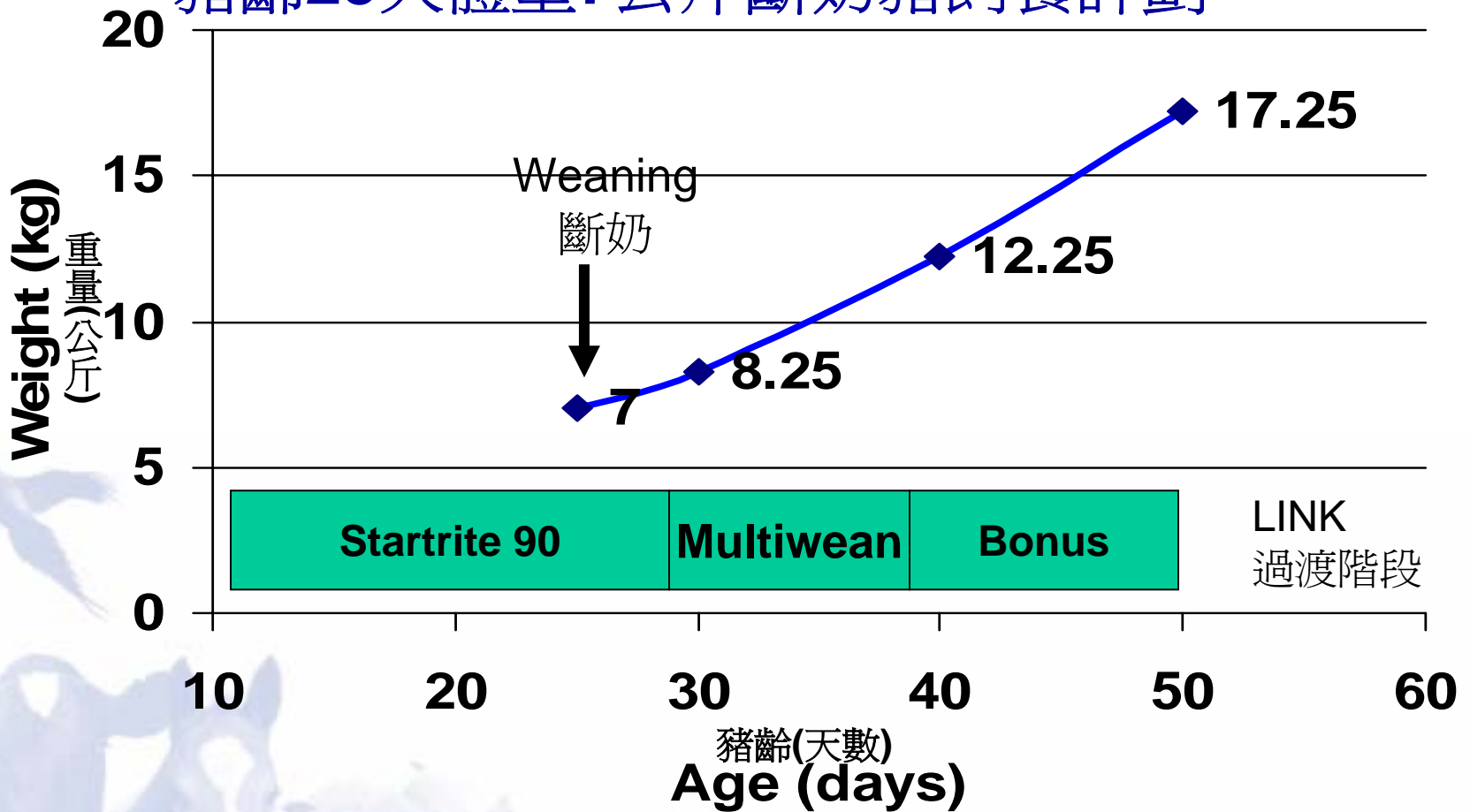
選擇適當的餵飼計劃

- **Pig Weaning Weights** 仔豬斷奶時重量
- **Weaning Age** 斷奶年齡
- **Health Status** 健康狀況
- **Group Size** 集群大小
- **Stocking Density** 飼養密度
- **Genotype** 基因型
- **Weight Variations, Herd Knowledge, Objectives etc.**
重量變化、畜群知識、目標...等



Programme for a 7 kg weaner at 25 days

豬齡25天體重7公斤斷奶豬飼養計劃



Pre-Starter

Starter Feeds

Stage II

Links



離乳前仔豬

離乳仔豬飼料

第2階段

過渡階段

Primistart

Thrive

Startrite 100

Startrite 88

Bonus

Startrite 90

Multiwean

Vigour

Startrite 88

Weaning 斷奶

20 kg (公斤)

Linkrite 75

Linkrite 80



Feeding Regimes

餵飼方法



New Innovations !

創新方法 !



健康狀況

| HEALTH STATUS 管理狀況 MANAGEMENT STATUS | HIGH 優異 | GOOD 良好 | MEDIUM 普通 | LOW 不佳 |
|--|---|---|---|---|
| Excellent 優異 |  | ACID BLEND 混合酸 | ACID BLEND 混合酸 | 混合酸+精油 ACID BLEND + ESSENTIAL OIL |
| Good 良好 | ACID BLEND 混合酸 | ACID BLEND 混合酸 | ACID BLEND + ESSENTIAL OIL 混合酸+精油 | ACID BLEND + ESSENTIAL OIL + 混合酸+精油 |
| Medium 普通 | ACID BLEND 混合酸 | 混合酸+精油 ACID BLEND + ESSENTIAL OIL | 混合酸+精油 ACID BLEND + ESSENTIAL OIL + | PRESCRIPTION 處方 |
| Poor 不佳 | ACID BLEND + ESSENTIAL OIL | ACID BLEND + ESSENTIAL OIL + | PRESCRIPTION 處方 | PRESCRIPTION 處方 |

混合酸+精油

混合酸+精油



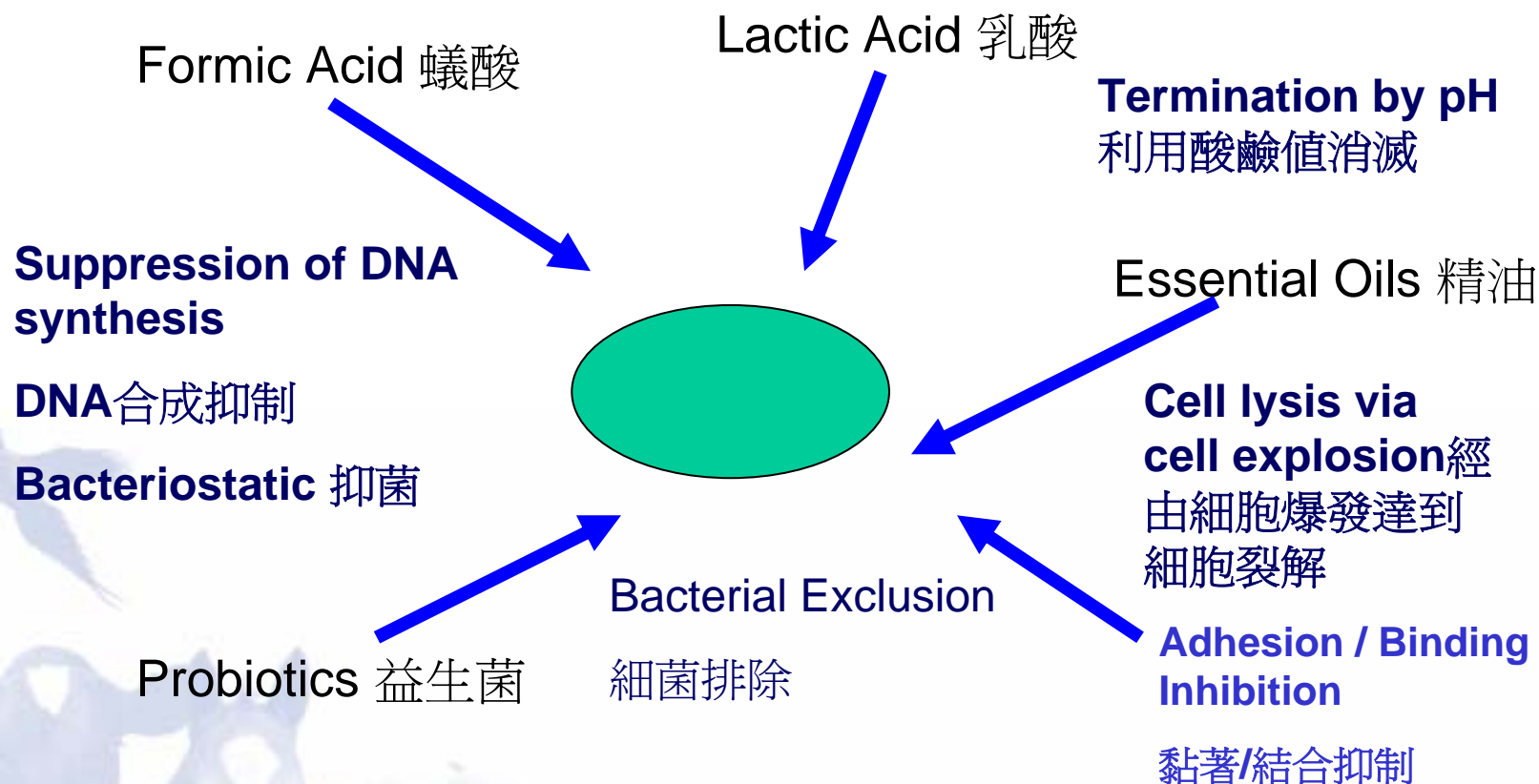
Starter Pig

Programme

斷奶仔豬餵飼計劃

Modes of Bacterial Manipulation

細菌控制方式

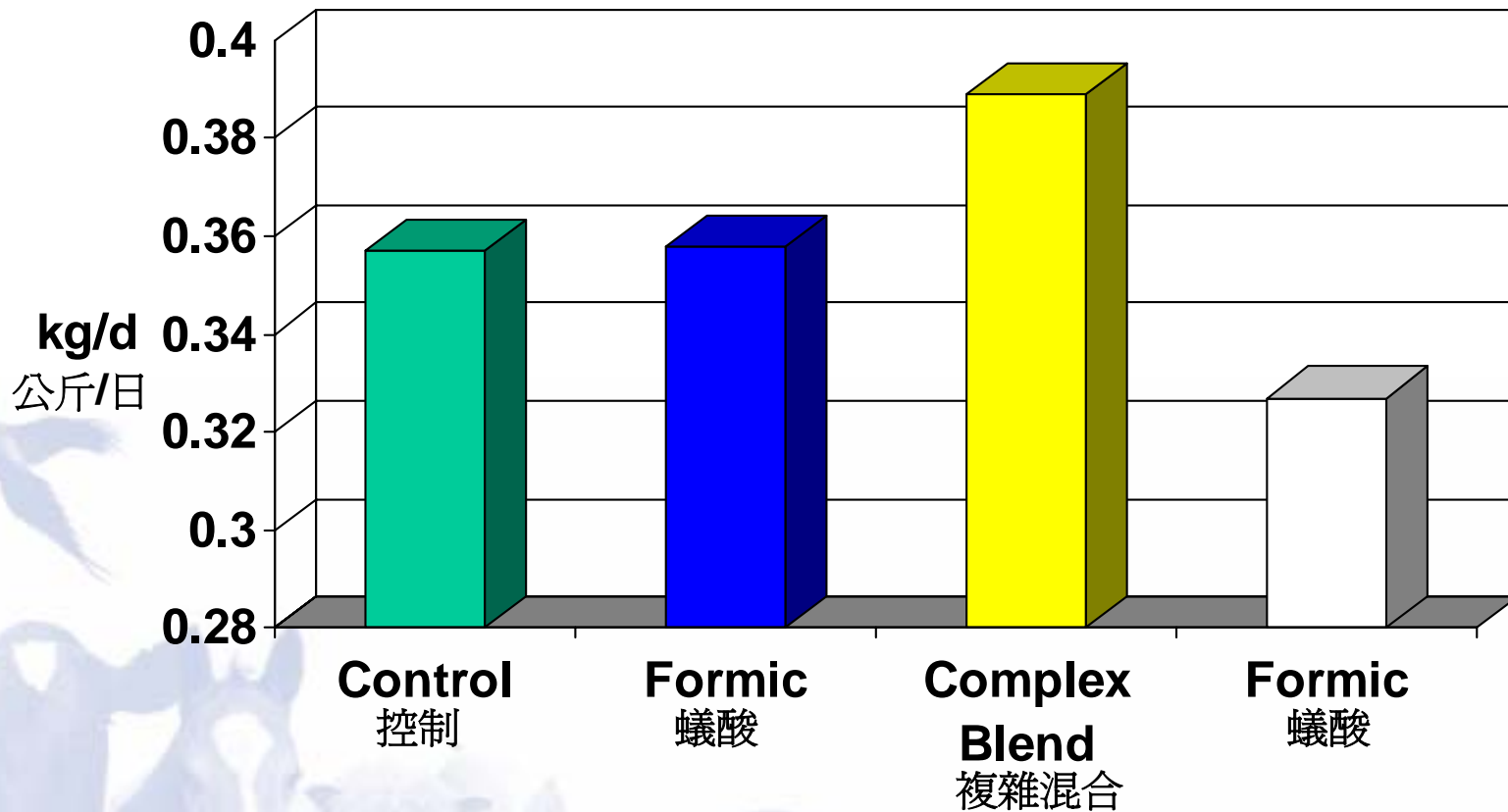


Each element - hits the cells via a different mechanism

各種元素透過不同機制打擊細胞

Post-weaning feed intake with organic acids

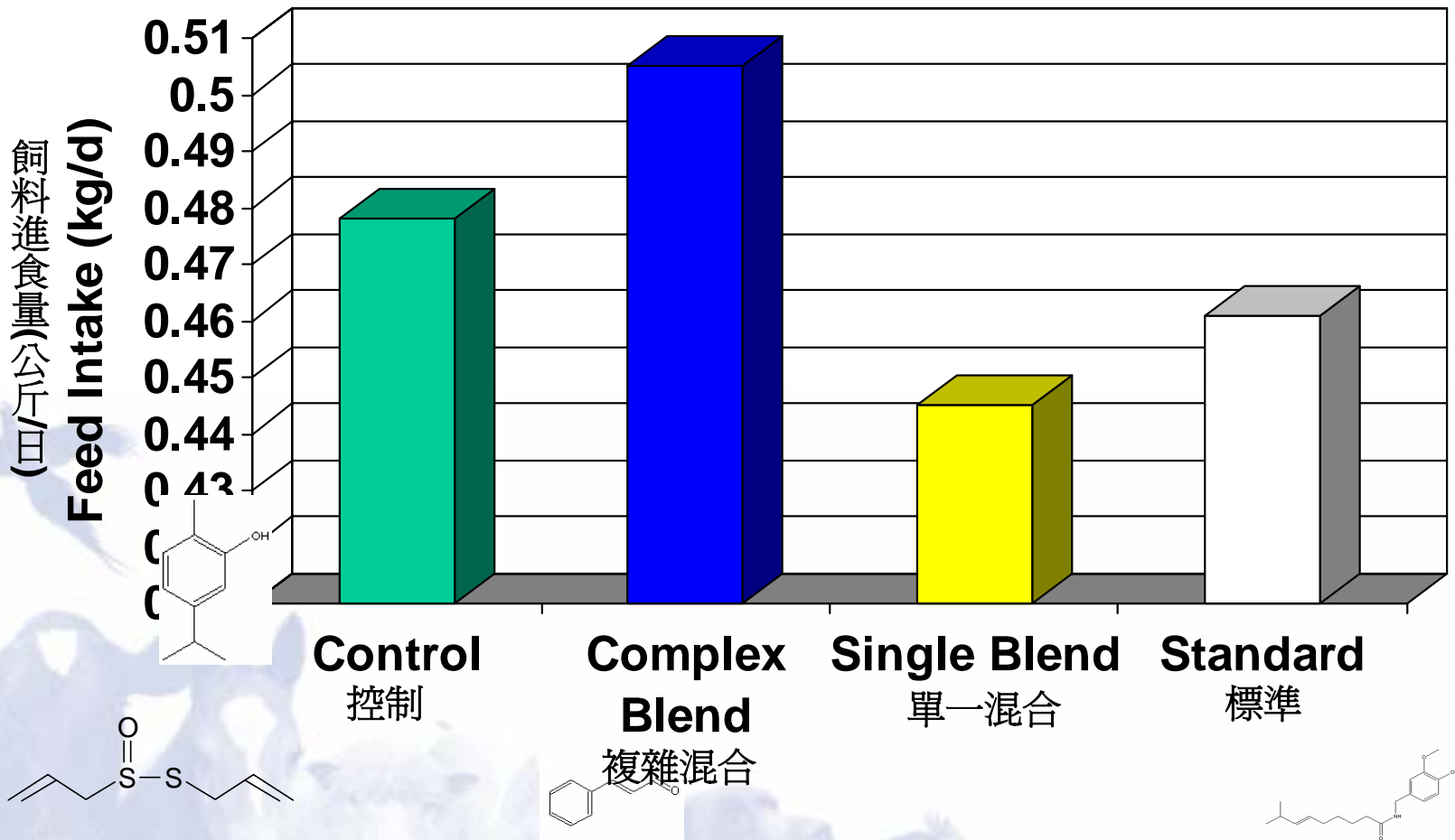
斷奶後有機酸飼料攝取



Essential oils hold are essential



精油保持絕對必要

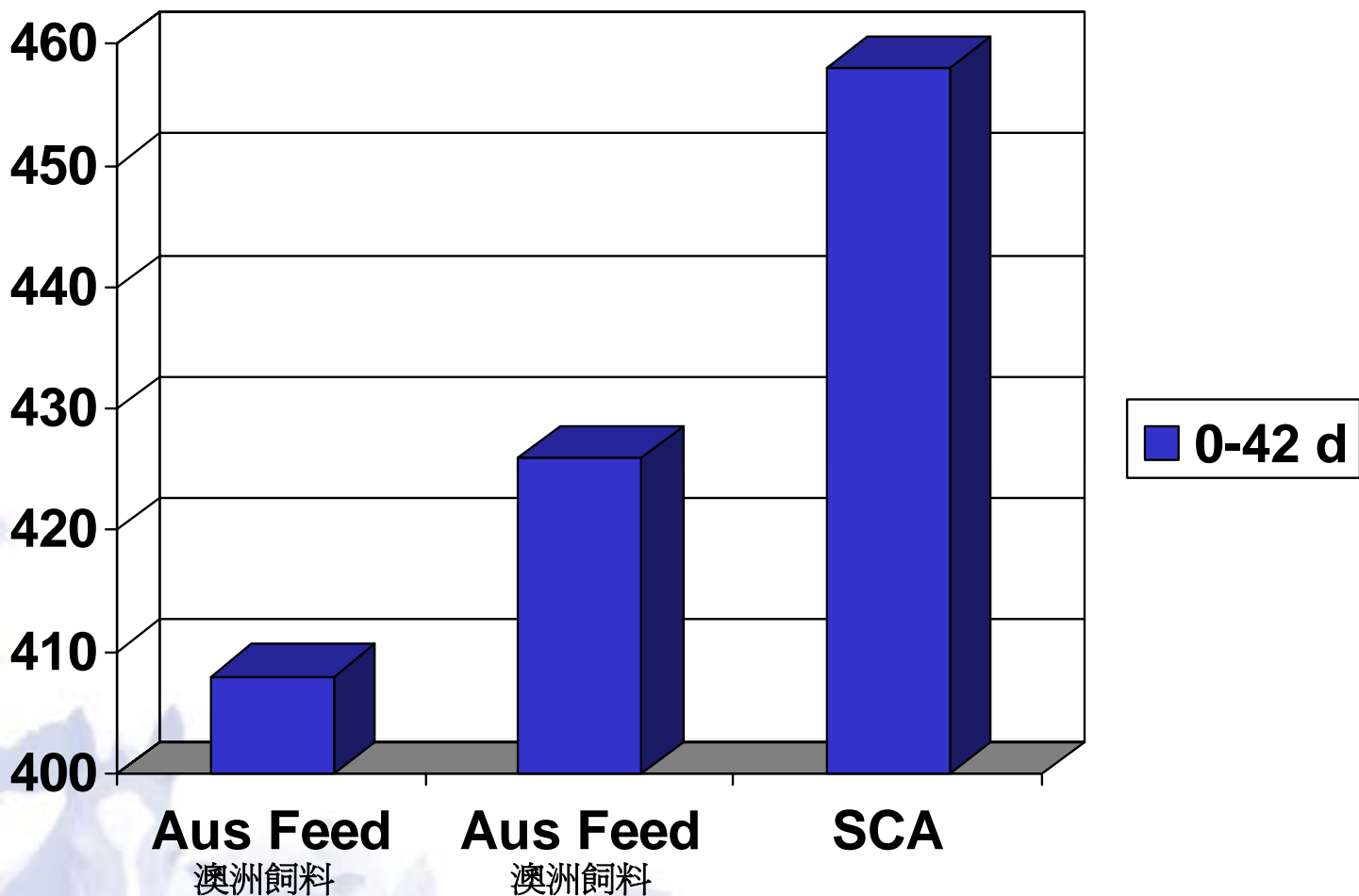


Will It Work In Taiwan

用在台灣行得通嗎？

Average Daily Gains Post-Weaning (g/d)

斷奶後平均每日增重(克/日)



It works OK in Australia ! 在澳洲實行得還不
錯 !

Why the European approach to feeds is the best ?

歐洲飼養方法爲何最好？

- **Careful Raw Material Selection and Use – Traceability, QA, QC, etc.**

原料挑選及使用極爲審慎 – 可追蹤性、品保、品管...等。

- **On-going analytical work**

持續進行分析工作

- **Raw Material Development**

原料開發

- **Research and Development at all levels**

全面研發



Swine Technology in the 21st Century



21 世紀養豬技術



Thank You All For Your Attention

謝謝！