



Calf Rearing Guide

Practical and easy to use

CONTEXT

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Calf Rearing Guide- Practical and easy to use

I. Charlton, S.J.

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Context Bookshop.com

Context Products Ltd

53 Mill Street, Packington

Ashby de la Zouch

Leicestershire. LE65 1WN England

Tel: +44 (0) 1530 411337 Fax: +44 (0) 1530 411289

Email: enquiries@contextbookshop.com

About the Author

Sally J. Charlton Bsc (Hons) Ani Sci, Pr Sci Nat.

Sally Charlton has a first class degree in Animal Science and has worked in managerial and advisory positions in the animal feed industry for the last 18 years. She was a milk product manager for Trouw Nutrition (Nutreco) and was a member of the South African Council for Natural Scientific Professions. Sally has been a consultant animal nutritionist in South Africa and Canada for premix and milk replacer companies.

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Calf Rearing Guide — Practical and easy to use

Introduction

It is impossible to write a book covering all the areas of calf rearing. There is a lot of information available and large variation in rearing methods, breeds and environment. Successful calf rearing requires an understanding of basic principles as well as experience and observation. Profitable calf rearing requires an ability to provide and monitor the most suitable environment and feed to meet growth and rearing targets.

This Calf Rearing Guide is compiled using solid research-based concepts with the objective to encourage calf producers to easily find and understand basic principles with practical applications and evaluation.

The book format is consistent throughout to enable readers to quickly find information on key calf topics. Each section is colour coded and each topic takes a 3-step approach for quick reference, i.e.

Explanation – what it is and why is it important

Application – practical applications for the producer, what, how and when

Evaluation – assessment and/or troubleshooting

This format enables the reader to quickly find relevant information on a given topic. Pictures, goals, targets, top tips and a concluding check list for each topic, add useful and quick reference points.

This easy to read guide on calf rearing from birth to weaning is ideal for producers, managers, veterinarians, advisors, students, teachers and other professionals providing an excellent reference tool or training aid for successful calf rearing.



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Section 1

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Physiology

Digestion Explanation

Definition

The process of breaking down food (complex substances) into small, simple substances that can be absorbed into the blood and lymph for use by the body for maintenance and growth.

What is it?

There are 3 processes of digestion:

Physical chewing and muscular action of the stomach(s) and intestines, which break down food particles and transport them through the system

Chemical enzymes contained in various secretions come into contact with the food

Microbial enzymes produced by micro-organisms, chiefly bacteria, which inhabit the tract

Digestion of food can take place in 3 regions:

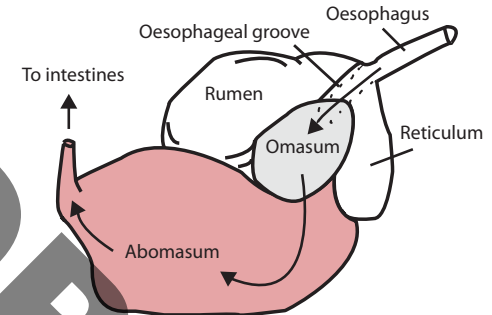
- The stomach (abomasum and rumen)
- The small intestine
- The large intestine

Why is it important?

1. The neonatal calf is essentially a monogastric (simple-stomached) animal.
2. The abomasum is the only compartment actively involved in digestion at birth.
3. The digestive capability of the calf governs the type of diet that must be provided to ensure high growth rates and health.
4. The early digestive system is only able to digest high quality milk-based liquid feed.
5. This limitation is due to the presence or absence of digestive enzymes in the abomasum and small intestine.
6. Activity of most enzymes increases with age to digest fat, protein and carbohydrates.
7. Knowledge of digestion provides for management, nutrition and health of the growing calf .

Fact

The calf digestive system can develop and change so that it can digest fibrous feeds in 6-8 weeks



Section 2

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Feed

Colostrum

Explanation

Definition

First 'milk' secreted by the mammary gland for the first 24 hours after birth.

What is it?

A thick, creamy, yellow fluid that contains:

Component	Role
Immunoglobulins: IgG (80-90%) IgA (5-10%) IgM (7-10%)	Large protein molecules which help animal fight infection Helps protect gut from bacterial invasion Absorbed Ig's for early passive immunity Identify and destroy absorbed pathogens Help in prevention of septicemia
Protein	Protein synthesis Ig absorption
Energy (Fat and Lactose)	Newborn has low energy stores, poor insulation Need for thermoregulation Help prevent hypothermia
Vitamins and minerals	Vitamins A, D and E do not cross the placenta in significant amounts Important to the animal in resistance of disease
Gut growth factors	Promote gut growth and development, especially during the first 24-48 hours after birth



Fresh colostrum

Section 3

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Management

Liquid Feeding Systems

Explanation

Definition

Methods of providing liquid milk to calves.

What types are there?

Restricted feeding

ONCE PER DAY

Bucket/Pail – open or via teat

1

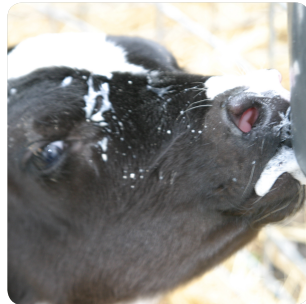


Restricted feeding

TWICE A DAY

Bucket/Pail – open or via teat

2



Ad-lib feeding

COLD

Ad-lib feeding system/
Mob feeders

3



Ad-lib feeding

WARM

Automatic machine/
Computer controlled feeder

4



Why is it important?

Calf growth during the milk-feeding stage is the most expensive per unit of feed and so must be done effectively and efficiently to meet producer targets.

The method of feeding calves must be suitable for:

- 1 The housing facilities available
- 2 Services available i.e. water supply, power supply, storage space
- 3 The number of calves being reared
- 4 The labour and level of stock personship available
- 5 The rearing targets e.g. growth, development, weaning age

Section 4

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Health

Hygiene

Explanation

Definition

The conditions and practises used to promote or preserve health.

What is it?

Hygiene practices are important in all areas of the calf environment, liquid feed preparation, handling, storage etc. Contamination and potential infection tends to be from faecal or aerosolized sources. These can include faeces, urine, saliva and secretions from the eyes, mouth and nose.

Important areas of hygiene awareness are:

Cow	Udder, soil, faeces, dirt etc
Housing	Ventilation, humidity, temperature, dampness, animal density, air quality
Bedding	Contact with calf of soiled bedding increases risk of bacterial challenge
Feeding equipment	Utensils, feeding vessels, pipelines, bulk milk tanks, etc
Feed	Collection, preparation, storage of colostrum, milk and dry feed
Water	For calf and washing must be of suitable quality and free of coliform organisms
Transport	Vehicles, holding pens, change of premises
Personnel hygiene	Hand washing etc

Why is it important?

Newborn and young calves are very susceptible to bacterial, viral and parasite challenges that can cause disease. Their immune system and intestines are not fully developed for several months.

Good hygiene must be practised from the first few hours of life and throughout the calf rearing period. Bacterial colonization of the sterile newborn intestine occurs within a few hours of birth.



Fact

High standards of hygiene encourages a healthy gut

Glossary

A

Abomasum - The fourth stomach of ruminating animals' equivalent to the only stomach present in single stomach animals. The abomasum secretes acids and enzymes to digest feed.

Absolute Humidity - The percentage of water vapour actually present in the air.

Acid Detergent Fibre (ADF) - A measure of the amount of highly indigestible plant material in a feed or forage. It includes cellulose, lignin and silica. The lower the value, the higher the digestibility or available energy.

Acidification - reducing the pH of a substance or solution; increasing the acidity.

Acidosis - Occurs when there is a decrease in pH (acidity level) of the rumen or blood (ruminal or metabolic acidosis, respectively). It can be rapid, severe and often fatal.

Acquired Immunity - Antibody production as a result of recovery from previous exposure to pathogenic microorganisms from the environment.

Active Immunity - artificially acquired immunity by use of a vaccine.

Acute - Said of a disease (or the phase of a disease) that is severe, intense and develops rapidly (opposite of chronic).

Ad-Libitum - Said of feeding, where animals have a free-choice access to feed (syn. Ad lib).

Apparent Efficiency of Absorption - (AEA) said of Ig's into the blood; calculated value from the mass of Ig ingested, the plasma concentration following Ig absorption, and the plasma volume. It is highest immediately after birth and declines to nearly zero by 24 hours of age. Typical level is 35%.

Anaerobic (Bacteria) - Species of bacteria that live in the absence of oxygen, which is toxic to them.

Anorexia - Loss of appetite.

Antibody - Proteins, found in blood, colostrum other secretions, synthesized in response to an infectious agent (antigen) to exert a specific restrictive or destructive action on the antigen. (syn. Immunoglobulin).

Antigen - Any foreign substance, from the production environment or controlled vaccination, which in entering the body stimulates the formation of an antibody. These substances can be bacteria, virus, fungi and their toxic products or other materials, plant, foreign proteins etc.

Average Daily Gain - An indicator of growth calculated as the difference in body weight between two measurements divided by the number of days (typically grams/day or kg/day).

Heifer Growth Targets

Average weight and wither height

Age (mo)	Holstein*		Jersey		Ayrshire		Brown Swiss		Guernsey	
	average weight(kg)	wither height (cm)	average weight(kg)	wither height (cm)	average weight(kg)	wither height (cm)	average weight(kg)	wither height (cm)	average weight(kg)	wither height (cm)
1	62	84	46	76	65	79	68	83	60	80
2	86	86	61	79	87	83	93	88	82	85
3	106	91	75	83	109	88	119	93	99	90
4	129	97	91	88	131	93	145	96	126	94
5	154	99	116	91	153	95	170	101	148	99
6	191	104	132	94	174	100	195	105	182	103
7	212	109	151	98	196	103	220	109	189	105
8	240	112	170	100	217	105	245	111	213	108
9	270	114	184	103	238	108	269	115	239	113
10	296	117	199	103	259	110	293	118	250	113
11	323	119	211	105	280	113	317	120	281	115
12	345	122	232	108	300	115	340	123	284	118
13	367	124	243	110	320	118	363	125	318	118
14	398	127	258	111	340	118	386	126	341	120
15	422	130	274	113	360	120	407	128	365	123
16	448	130	283	114	378	121	428	130	381	125
17	465	132	297	115	397	123	449	130	405	128
18	484	132	316	115	416	123	469	133	424	128
19	493	132	323	116	434	124	488	133	435	129
20	531	135	343	118	451	125	506	135	445	130
21	540	137	351	119	468	125	523	135	473	130
22	560	137	368	120	485	128	540	135	482	133
23	580	137	372	121	502	128	556	138	500	133
24	590	140	383	123	517	128	570	138	501	134

← Target breeding/ service for 2 year calving

Adapted from data from National Dairy Heifer Evaluation Project, USDA 1991-1992. *Recommendation for high genetic merit heifers. Growth targets should be adjusted to suit breed, genetic merit, calving and production targets.