AN EXPERT SYSTEM FOR SHEEP DRENCHING

G J Bishop-Hurley *

P L Nuthall **

* Research Officer Department of Farm Management

** Reader Department of Farm Management

Research Report No.227

May 1994

Agribusiness & Economics Research Unit PO Box 84 Lincoln University CANTERBURY

> Telephone No: (64) (3) 325 2811 Fax No: (64) (3) 325 3847

> > ISSN 1170-7682

AGRIBUSINESS & ECONOMICS RESEARCH UNIT

LINCOLN UNIVERSITY CANTERBURY NEW ZEALAND

The Agribusiness and Economics Research Unit (AERU) operates from Lincoln University providing research expertise for a wide range of organisations concerned with production, processing, distribution, finance and marketing.

The AERU operates as a semi-commercial research agency. Research contracts are carried out for clients on a commercial basis and University research is supported by the AERU through sponsorship of postgraduate research programmes. Research clients include Government Departments, both within New Zealand and from other countries, international agencies, New Zealand companies and organisations, individuals and farmers. Research results are presented through private client reports, where this is required, and through the publication system operated by the AERU. Two publication series are supported: Research Reports and Discussion Papers.

The AERU operates as a research co-ordinating body for the Economics and Marketing Department and the Department of Farm Management and Accounting and Valuation. This means that a total staff of approximately 50 professional people is potentially available to work on research projects. A wide diversity of expertise is therefore available for the AERU.

The major research areas supported by the AERU include trade policy, marketing (both institutional and consumer), accounting, finance, management, agricultural economics and rural sociology. In addition to the research activities, the AERU supports conferences and seminars on topical issues and AERU staff are involved in a wide range of professional and University related extension activities.

Founded as the Agricultural Economics Research Unit in 1962 from an annual grant provided by the Department of Scientific and Industrial Research (DSIR), the AERU has grown to become an independent, major source of business and economic research expertise. DSIR funding was discontinued in 1986 and from April 1987, in recognition of the development of a wider research activity in the agribusiness sector, the name of the organisation was changed to the Agribusiness and Economics Research Unit. An AERU Management Committee comprised of the Principal, the Professors of the three associate departments, and the AERU Director and Assistant Director administers the general Unit policy.

AERU MANAGEMENT COMMITTEE 1994

Professor A C Bywater, B.Sc., Ph.D. (Professor of Farm Management) Professor A C Zwart, B.Agr.Sc., M.Sc., Ph.D. (Professor of Marketing) R L Sheppard, B.Agr.Sc. (Hons), B.B.S. (Assistant Director, AERU)

AERU STAFF 1994

Director

Professor AC Zwart, B.Agr.Sc., M.Sc., Ph.D. Assistant Director

R L Sheppard, B.Agr.Sc. (Hons), B.B.S. Senior Research Officer

J. R. Fairweather, B.Agr.Sc., B.A., M.A., Ph.D.

Research Officers C. M. Scully, B.A. G Greer, B.Agr.Sc. (Hons) G. F. Thomson, B.Com. Secretary J Clark ı

Contents

		Page
LIST OF TABI	LES	(i)
PREFACE		(iii)
ACKNOWLED	OGEMENTS	(v)
SUMMARY		(vii)
CHAPTER 1	INTRODUCTION	1
CHAPTER 2	REVIEW OF DRENCHING TECHNOLOGY	3
	2.1 Introduction2.2 Internal Parasites2.3 Control of Parasites	3 3 6
CHAPTER 3	THE DEVELOPMENT OF THE DRENCHING EXPERT SYSTEM	11
	3.1 Introduction3.2 System Factors3.3 System Rules	11 11 12
	 3.3.1 Drenching Rules 3.3.2 Feed Stress Rules 3.3.3 Animal Condition Rules 3.3.4 Safe Pasture for Sheep Rules 3.3.5 Grazing Interchange System Rules 	12 13 14 14 15
CHAPTER 4	FARMER COMMENTS ON THE EXPERT SYSTEM	17
	 4.1 Introduction 4.2 Farmers' Existing Drenching Practices 4.3 Farmers' Views on the Drenching Expert 	17 17 20
REFERENCES		25
APPENDIX 1 APPENDIX 2 APPENDIX 3 APPENDIX 4 APPENDIX 5	Drenching Rule Set Pasture Safety Rule Set Stock Condition Rule Set Feeding Stress Rule Set Drenching Expert Explanations	27 51 77 79 81
APPENDIX 6	Drenching Expert Help	85

ı

List of Tables

1	The Drenching Frequency of the Sample Farmers	18
2	The Decision Variables Used in Determining Drenching Time	18
3	The Farmers' Scores on the Importance of the Factors Used in Determining Whether to Drench	20
4	The Farmers' Scores on the Importance of the Factors Used to Determine the Safeness of a Pasture	21
5	The Farmers' Scores on the Importance of the Factors Used to Determine Stock Condition	21
6	The Farmers' Scores on the Importance of the Factors Used to Determine Feed Stress	22
7	Additional Factors Some Farmers Believe Should be Considered	22

Preface

Computers are becoming an increasing part of the range of tools available to farmers in carrying out their farm management activities. However, there is a range of utilisation of computers within the farming sector. This Research Report provides an application which farmers would find of value in assisting with decisions regarding sheep drenching. Other publications in this Series present systems applicable to lamb weaning and pasture conservation and a farmer evaluation of the use of this type of computer assistance.

The approach taken is to design an "expert system" which provides responses to farmers on the basis of IF a condition exists, THEN this is the rule to follow. The computer approach is based on inputs by experts in the particular field and those expert views are built into the computer response process. An "expert system" approach is seen as a way of providing management assistance/advice on an "on-call" basis and this helps to improve the overall level of farm management expertise and the utilisation of farm consultant skills.

The Agribusiness and Economics Research Unit is pleased to be associated with this work and to participate in its dissemination through this and future publications.

> R L Sheppard ASSISTANT DIRECTOR

Acknowledgements

The assistance of the experts who acted as consultants and checked the knowledge base (the rules) is gratefully acknowledged. These were largely numbers of the Animal and Veterinary Sciences Group (P Beatson, A S Familton, Dr G A G Frengley, D Elvidge, Dr R G McFarlane, K Thompson).

The farmers that agreed to use and comment on the system also made an extremely valuable contribution and their assistance is also acknowledged.

We would also like to record the help provided by Mrs Judy Derby in preparing the manuscript, and to Mrs Jan Clark who prepared the manscript for publication.

~ . t

Summary

The animal grazing industry is a major sector of New Zealand's economy. Managers controlling the utilisation of the nation's massive pasture production tend to make utilisation decisions using experience and intuition in contrast to formal analytical analyses. Yet, when related to the potential, production achieved tends to suggest improvements are possible. That is, greater production is possible with the same resources, or alternatively the same production is possible from a smaller resource input. It appears one of the reasons for the lack of formal planning is the farmers' belief that the work involved is not commensurate with the gains. Thus, if techniques that are simple to use and provide an efficiency gain can be found they clearly have potential. The study reported in this Report concerns the development of an expert system for a small component of the grazing management problem. It is proposed that such an expert system meets these requirements. This report is one of a series describing several expert systems in the area of grazing management. Another contains an evaluation of these expert systems.

An expert system is a set of knowledge and decision rules, usually computer-based for ease of access and retrieval, gleaned from experts (thus the term 'expert system') and made widely available to decision makers so they can gain the benefits of the 'experts' knowledge and experience. Essentially, creating an expert system involves questioning the experts to find out the factors they observe, and the conclusions they reach given the various values the factors or parameters can take on. This information is then computerised.

Grazing management involves many aspects. A single system that would cover all components would be extremely valuable, but it would be unmanageable. Thus, it needs to be broken into practicable sections. Three problems frequently mentioned by farmers are the selection of weaning date, deciding whether to drench, and deciding when to close an area of pasture for conservation. While there are also many others, the importance, in terms of farmers' comments, of these three meant they were selected for study. This Report contains a description of the drenching expert system.

Drenching practice has been an area of scientific study. Consequently, there is a body of research available to form an underpinning for advisers. One of the 'experts', therefore, that needs consulting is this body of research. From the literature the set of important factors was isolated, and the rules on whether to drench a group of ewes or lambs for each set of values was isolated. These 'if-then' rules were then presented to a committee of animal science and veterinary experts, as well as an experienced farm consultant, for review.

The important factors, rules and explanations resulting from this process are listed in the Appendices. This list is the heart of the system and is the result of all the work. People interested in the conclusions and wishing to improve their decision skills in this area should consult these Appendices.

The acceptability of any system must be judged by the potential users as it is they that decide whether it is useful, not the experts. Consequently, a search was made for sheep farmers with suitable equipment that might be prepared to evaluate the system. Of the approximately 400 farmers that might have helped, 22 finally tested the system and completed an evaluation questionnaire.

Eighty percent agreed with the advice provided, and 76.2% with the explanations given for each conclusion. In that it is most unlikely to find complete agreement, this must be regarded as a very positive outcome. The farmers did make some comments on how to improve the system - these tended to involve a request for a more holistic and comprehensive health system. This might suggest mixed expert system/data base systems could be worth exploring, though the cost of producing a comprehensive health reference and integrated diagnostic system that took due account of the economics of treatment would be large.

CHAPTER ONE

INTRODUCTION

New Zealand relies heavily on pastoral products for its economic wellbeing. Approximately \$8000 million of its exports (NZ Meat and Wool Board's Economic Service, 1993) are from pasture, and these mainly animal products. When compared to all other exports, pastoral products contribute some 45% of the total. Clearly, efficiency in utilising available pasture is crucial to the economic and social benefit of farmers and New Zealanders in general.

When animal output is compared with pasture production from cutting trials (Nuthall and Bishop-Hurley, 1994) it is clear efficiency of pasture utilisation could be improved. Yet few farmers spend time formally calculating feed supply and demand and committing plans to paper. Feed management is very much a matter of experience and mental figuring. Also relevant to efficiency is animal health in that it affects feed demand and conversion rates.

Formal feed budgeting, the business of estimating expected feed supplies and demand and adjusting plans to ensure appropriate animal intake levels period by period, is a well-recognised management technique. The few that use the procedure believe it is extremely valuable. (Nuthall and Bishop-Hurley, 1994). Managers, therefore, do have techniques available to help improve the efficiency of feed management, but they are seldom used. When asked why feed management is not formally used, most simply note the benefits do not outweigh the time and effort involved (Nuthall and Bishop-Hurley, 1994). Some might hypothesise, however, that the real reason is a lack of understanding and a dislike for 'office work'. Given systems that simplified the procedures, perhaps computer-based, the situation may well change. Similarly, related simple systems that help ensure appropriate animal health may assist feeding efficiency.

Even with computerised feed budgeting, and animal health systems, there is still an appreciable time input required, as well as a reasonable knowledge of the procedures. Consequently there could well be a place for simple question and answer systems that in part rely on the farmer's experience. The study reported in this bulletin is one of a series designed to explore this hypothesis.

A likely 'simple question and answer system' that many authors believe has promise for assisting farmers' decision analysis is an 'expert system' (Bramer, 1986). Bramer defines an expert system as:

A computing system which consists of organised human knowledge concerning some specific area of expertise, sufficient to perform as a skilful and cost effective consultant.

Effectively, an expert system attempts to mimic an expert and uses the simple methods of an expert - namely observation and questioning, though in a computer system the observation frequently reduces to additional questions. Expert systems are regarded as being a branch of the general area of artificial intelligence in which machines are used to perform human tasks requiring intelligence.

Clearly, some humans are intuitively very good at managing animal grazing and health - these are the experts. If systems can be devised that capture this expertise and are simple to operate, the resulting computer systems could provide real benefits to producers and still be very easy to use.

There are a large number of decisions to be made when managing animals and their feeding. It is not possible to include all these in one expert system. The particular decision for which a description is contained in this Report is that of drenching sheep to control internal parasites. Expert systems for the weaning and pasture conservation decision are described in other Reports. These three decision areas were selected to explore expert systems as they represent different decision types and are frequently mentioned problems (Nuthall and Bishop-Hurley, 1994). They also cover a range of problem types all effecting the efficiency of pasture utilisation.

The procedure in developing an expert system (Forsyth and Naylor, 1986) involves elucidating the rules used by an expert/s when coming to a conclusion, incorporating these into a computer programme, and after checking the completeness of the programme, checking that the rules, and therefore conclusions reached, are generally acceptable (validation). Of course, experts do not all agree, and indeed in many situations a range of answers might provide a similar end result. In the end, if a farmer believes the system is useful in assisting the decision process the expert system must be regarded as being at least adequate. Ironically, a perfect expert system is of little use if the intended users do not in fact use it.

Most expert systems use IF-THEN type rules. IF, for example, the faecal egg count is less than 250 eggs per gram THEN do not drench no matter what the feed quantity and quality and other conditions might be. Developing an expert system, therefore, means finding out all these conditions for a wide range of situations and then incorporating them into a computer based question and answer system.

This report contains firstly a review of the technical factors and research relating to drenching. The development of the associated expert system is then described, and finally results from asking the views of farmers exposed to the system for testing purposes are reported. The appendices contain a full list of the rules used as well as the explanations provided. It has been found expert systems should provide not only a conclusion, but also an explanation of the conclusion. Experts tend to operate through explanation and so users of expert systems tend to demand the same output.

CHAPTER TWO

REVIEW OF DRENCHING TECHNOLOGY

2.1 Introduction

An animal that lives on or in another animal, the host, is termed a parasite. All animals both domesticated and wild harbour a wide range of parasites. In the wild state parasite and host live in harmony with outbreaks of parasitic disease being uncommon. In contrast, uncontrolled parasitic infections in domestic animals frequently result in recognisable disorders. The main reason is that domesticated animals are kept in large groups confined to small areas (Brunsdon and Adam, 1975) favouring the build up of large parasite populations.

Although in wild populations parasites may from time to time exert a modest effect on growth and productivity it is of little practical importance (Brunsdon and Adam, 1975). Under farming conditions, however, where the aim is to produce as much as possible, any effect on production may be economically significant.

The effects of infection vary widely from death and total economic loss to sub-clinical effects which are difficult to detect and may be uneconomic to treat. Other effects that may be economically important include reduced liveweight gain, poor wool growth rates and quality, reduced fertility, poor milk production, rejection of carcasses or organs at slaughter, or predisposition to other diseases (Brunsdon and Adam, 1975).

While eradication of parasites of grazing animals is not practical they do need to be controlled to levels compatible with economic production. The result is a compromise between the level of control possible, control costs and the effects on production.

2.2 Internal Parasites

Most of the important internal parasites of sheep and cattle fall into three groups:

the "roundworms" or nematodes the "flukes" or trematodes the "tapeworms" or cestodes.

Of these, the nematodes are considered the most important with many different species being found in the alimentary tract. A table of the most common species and their location in the gut can be found in Brunsdon and Adam (1975). Charleston (1982) provides a table which lists gastrointestinal nematodes according to their importance in cattle and sheep.

3

Charleston (1982) also reports that the abomasal parasites *Haemonchus*, *Ostertagia* and *Trichostrongylus* and the small intestine species of *Trichostrongylus*, *Nematodirus* and *Cooperia* are most commonly associated with production losses and clinical disease. The moist, moderate climate (temperate climate) of New Zealand is particularly favourable to the development and survival of larval stages, specially in the spring and autumn.

With specific regard to sheep parasites, generally the nematodes are distributed throughout the country with the exception of *Haemonchus* and *Nematodirus*. Since *Haemonchus* requires a much higher temperature for larval development it is more of a problem in the North Island than in the South Island (Charleston, 1982). Species of *Nematodirus* have the unusual ability to survive cold winters, therefore they are more common in the cooler areas of the South Island such as Canterbury, Otago and Southland (Brunsdon and Adam, 1975).

For a detailed account of the life cycles the reader is referred to Brunsdon and Adam (1975), Charleston (1982), and Vlassoff (1982). In summary the mature adults in the gut of the sheep lay eggs that pass out in the faeces. Providing the conditions are suitable the first larval stage develops in the egg. In most cases the larvae then hatches out and develops through a second larval stage to the third or infective larval stage. The larvae of *Nematodirus* develop through to the third stage before hatching out of the egg which accounts for its longevity on the pasture. Development through the fourth stage to the adult is dependent on ingestion by a suitable host animal.

Under favourable conditions the cycle takes about 6 weeks. Development can be modified inside the animal by host resistance and on the pasture by climatic conditions. Brunsdon and Adam (1975) and Vlassoff (1982) describe the population dynamics of the free living stages. Vlassoff (1982) describes in detail larval development in the field, larval migration and survival. Infective larvae require water films to migrate from the faeces to the soil and onto herbage. Larvae require in excess of 10 °C to develop while on the pasture, below this they remain viable but do not develop.

Nematodes feed on the lining of the host's stomach and intestine. First and second stage larvae are not infective and are digested if eaten. While under favourable conditions eggs can develop to infective larvae in just five days they normally require at least ten days and can take up to twelve months. Since most worms are ingested as larvae they must mature before they can lay eggs which occurs in 15 to 21 days.

The seasonal pattern of larval availability on pasture is the result of the interaction between weather and faecal egg output of lambs (Vlassoff, 1982). The majority of larvae on pasture are located in the first centimetre of soil and the 2.5 cm of plant above ground level. Therefore animals which are forced to graze low are exposed to a larger number of infective larvae. However, grazing low also exposes the larvae to the climate and fewer survive. Pastures grazed by sheep typically produce a small larval peak in spring and a larger peak in autumn. The following sequence of event comes from Vlassoff (1982).

- The post-partum rise in faecal egg count of the breeding ewe is the main source of contamination contributing to the spring peak of larvae on pasture.
- Larvae from this source result in the first generation of worms which accumulate in the lambs during summer.
- Eggs deposited by lambs in late February and early March are the source of the large autumn peak of infective larvae on pasture, after autumn rains have given favourable conditions for the development of eggs to larvae.
- These larvae produce the 2nd generation of worms in lambs, which causes clinical disease in autumn and winter. A proportion of these larvae also overwinter on pasture to provide a source of infection for ewes and lambs in the spring.
- Most of the eggs deposited in the autumn (from the 2nd generation worms) fail to develop because of progressively declining temperatures.

Animals subject to poor nutrition or other diseases suffer more from parasite challenge than do better fed counterparts. Sheep may also exhibit resistance which is the ability to stop worms establishing or to restrict their growth. The level of resistance may differ between breeds and between individuals within the breeds. As animals get older (> 20 months) they generally become resistant to worm infection, they carry relatively few parasites and pass few eggs in their faeces (Brunsdon, 1982a). Goats are the exception and do not appear to develop any resistance with age. Most gastrointestinal parasites are host specific, that is, parasites of cattle do not usually infect sheep or vice versa. Again goats are the exception and may allow both cattle and sheep parasites to develop to maturity.

Sykes and Poppi (1982) conclude that the major effects of parasitism on the metabolism and performance of sheep include loss of appetite (reduced food intake), changes in mineral metabolism (smaller skeleton), changes in protein metabolism (less muscle and reduced energetic efficiency) and gut abnormalities (causing diarrhoea). They go on to say that the result is a reduction in efficiency of utilization of food as well as reduced growth rate. Scouring, ill-thrift, anaemia and dull, poor quality wool are well recognised effects caused by worms in lambs.

With the introduction of broad spectrum drenches in the '60s it became clear that there were large production losses due to parasite nematodes (Kettle, 1982). Using a preventative drenching programme increases liveweight gains by up to 50% and greasy fleece weight by up to 25% (Vlassoff and Brunsdon, 1981). There is very little doubt substantial gains in production efficiency are possible through effective parasite control in young sheep. Other workers (Barger and Southcott, 1975; Steel, *et al.*, 1980; Levya *et al.*, 1981) have reported that adult sheep, already resistant to larval challenge, may also suffer significant production losses. However, field results have been variable although they usually realise small responses in favour of treatment (Sykes, 1982).

2.3 Control of Parasites

Kettle (1982) outlines the history of drench use in New Zealand. Phenothiazine was used from 1938 until the early 1960s but was ineffective against larval stages and several species of roundworms, fluke and tapeworms. It also required a large dose to be administered and caused urine to stain the wool red. In 1961 Thiabendazole was introduced and routine drenching became common practice (Kettle, 1982). Other anthelmintic chemicals were added to the benzimidazole family of drenches and then a second action family was introduced, the levamisole/morantel group. The first group acts by interfering with the metabolism of the parasite and the second family by causing paralysis (these drenches are not ovicidal). The third chemical group or action family, introduced in the 1980s, is the milbemycin/avermectin group which also acts by paralysing the parasite. The mode of action for all three chemical groups or action families are outlined by Kettle (1982). In addition there are a number of narrow spectrum drenches available. For example, rafoxinide to control liver fluke.

Because the efficiency of drench is limited to 24 to 36 hours there is little point in drenching animals (young stock in particular) if they are to be grazed on contaminated pastures. Either they need to be drenched very frequently, or additional parasite control methods must be used in conjunction with drenching.

In the early 1980's it was estimated that New Zealand farmers spent at least \$25 million on anthelmintics (Aglink FPP187, 1983). Prior to the introduction of broad spectrum drenches parasite problems were treated individually or by grazing management (Kettle, 1982). From their introduction through to the end of the 1970s broad spectrum drenches were considered to be essential to maintaining economic animal production. Researchers working with parasite control were advocating an integrated control program as early as 1975 (Brunsdon and Adam, 1975). This involved strategic drenching and pasture management to reduce the larval challenge, particularly to young stock.

With the appearance of drench resistance in the early to mid 1980's it became clear to producers that continued reliance on anthelmintics as the predominant means of parasite control was impracticable. Over the next ten years there has been a slow but gradual move to integrated internal parasite management. Brunsdon and Adam (1975) report that most parasite control was based on regular anthelmintic treatment. Farmers were reluctant to reduce drench usage as it usually resulted in economic production responses. Brunsdon (1982b) reports on a 1980 national survey of sheep farmers which looked at farmers' drenching practices and attitudes to preventive control. Recently the Meat Research and Development Council (1993) released a booklet titled "Internal Parasite Management Booklet, A Guide to Sustainable Internal Parasite Management: Coping with Drench Resistance" in an attempt to avert the threat imposed by drench resistance on profitable sheep production in New Zealand.

Drench resistance is the ability of some worms to survive treatment by a chemical at a level that would normally kill most of the parasite population. When an animal is drenched and the susceptible worms killed the resistant ones become proportionately more common. Therefore the chances of two resistant adults mating is higher as is the proportion of resistant worms. Worms that are resistant to one compound are usually resistant to other drugs within that action family (Kettle, 1982). According to an MRDC Monitor farmer, drench resistance on their property could be attributed to the continual use of one drench family as well as under dosing. Both practices were used in an attempt to save money (MRDC, 1993).

Kettle (1982) reports on a random nationwide survey undertaken by MAF staff to determine the extent of resistance. Farmers were asked to complete a questionnaire on drenching practises. In addition groups of lambs were treated with drenches from "the two action families" with faecal egg counts (FEC) taken before and after. Eggs were cultured to determine the species present. While this study revealed only one case of resistance others have been recorded in New Zealand. Drenching on this property appeared to be of little use when gauged by FEC.

It has been reported however that in 1993 60% of sheep farms were affected and 5% of those may have parasites resistant to two of the three drench families (MRDC, 1993). There have been no documented cases of Avermectin resistance reported in New Zealand according to the MRDC (1993) report. The report goes on to say that once drench resistance occurs on a property it will be there indefinitely and that the prospects of a new drench family being developed are small.

It should be remembered that eradication of parasites is not practical and that the objective is to maintain the population at a level compatible with economic production. Therefore control methods need to be cost effective.

The Meat Research and Development Council is currently funding research projects on internal parasites and a programme to educate producers on sustainable integrated internal parasite control programmes in an effort to delay the onset of drench resistance on farms. Parasite action groups have been set up across the country in an attempt to further develop strategies to combat the problem (MRDC, 1993).

A recent booklet by MRDC outlines the guidelines for sustainable internal parasite control. Producers are asked to plan and adopt a parasite control programme. The key points of this are to reduce the annual number of drenches to decrease selection pressure for drench resistance, reduce exposure of young stock to parasite contaminated pastures, include appropriate drench management strategies and to check that the programme is working.

The following are the factors identified by the MRDC (1993) when designing a control programme:

- Because most of the parasite population is on the pasture effective control must reduce the exposure of susceptible stock to these.
- Pasture parasite numbers peak in spring and autumn when the climate favours parasite development and young stock are present.
- The most effective way to remove larvae is by removing the affected herbage.
- To reduce the number of infective larvae pastures need to be spelled for more

than three months. While cold weather slows their development it does not kill them. Exposure to direct sunlight can dry out and kill some eggs and larvae.

- Sheep and cattle, but not goats, develop a level of natural immunity at around eight to nine months and should not be exposed to high levels of infective larvae until then.
- Since animals under stress are less able to counter the effects of worms it is important to maintain a good level of nutrition throughout the year. Adult animals, animals suffering mineral deficiency and stock that have recently lambed also release eggs on to the pasture unless drenched.
- Giving up ewe drench is possibly the easiest due to the ewes' natural immunity. This immunity should be supported by good nutrition. Drenching on faecal egg count levels is recommended.
 - below 250 eggs/gram, don't drench
 - between 250 and 500 eggs/gram drench depend on animal condition
 - above 500 eggs/gram, drench

Always take into account and establish a flexible approach in response to animal condition, feed supply, adverse conditions and specific local conditions.

The culmination of the MRDC (1993) review are the following strategies:

Drench strategies

On sheep dominant properties a five drench preventative program is advisable. Faecal egg count values should be taken and a vet consulted prior to drenching. Under a five drench preventative programme lambs are given three drenches, starting from weaning, at 22 day intervals, followed by two at 28 day intervals. Subsequent drenching should only be on the basis of results. On properties where an integrated approach is possible sheep should only be drenched when FEC's indicate it is necessary.

All sheep farms should drench and quarantine all stock coming onto the property including those that have been away grazing. This is achieved by drenching with a Milbemycin/Avermectin drench and holding the stock in yards, or a small paddock, set aside for the purpose for 12 - 24 hours before being released on to the farm. Ideally this should be carried out before the animals arrive on the property. The effectiveness of the drench being used needs to be checked annually by FEC's 7 - 12 days after drenching. When drench families are changed the new drench needs to be checked that it will be effective. It is also important not to under dose by using less than the recommended quantity. Drench guns should be based on the bodyweight, as determined by scales, of the largest animal in the group. Once the dose has been set it needs to be checked and then rechecked

8

every day or after every 500 doses. Drench families should be changed from year to year for the first drench after winter. When goats and sheep are grazed on the same property and are both being drenched, then the same drench family should be used for both species. If goats are to be drenched then Levamisole/Morantel drenches should not be used as they are ineffective.

Grazing Strategies

Since unstressed stock are less susceptible to internal parasite challenge they should, wherever possible, be well fed and in good health throughout the year. Some plant species produce swards less conducive to larval survival, e.g. chicory and lucerne. Susceptible stock should be given the safest highest quality pasture available especially during the stress periods of weaning and autumn. Generally, safer pastures can be prepared by not grazing sheep on an area for 10 - 12 weeks, but this is dependant on the season and vulnerability of the animals. By removing the source of contamination safe pastures can be created. Safe pastures are defined as having too few nematodes to damage susceptible animals. Newly established pastures, crop stubble, fodder crops, standing hay and paddock cut for supplements are examples of safe pastures.

Grazing interchange systems incorporate cattle, deer and adult non lactating sheep. Resistant animals are used to prepare pasture for susceptible stock, although this may take from 4 -16 weeks. Cattle, for example, can be used to create safe pasture for lambs. Sheep younger than two years of age should not be grazed with goats as they cross infect. The most effective grazing sequence is reported to be lambs followed by ewes and then cattle. Any age class of cattle can prepare safe pasture for sheep or goats and vice versa.

Pasture grazed by susceptible stock rapidly becomes recontaminated, because they continually return parasite eggs to the pasture. Although dependent on the weather and stocking rate, pastures will only remain safe for 1 - 5 weeks in summer/autumn before the larvae on pasture builds up to a harmful level. Lambs then should not be grazed for more than a week before being moved on. The higher the stocking rate for a particular stock class the higher the potential parasite problem. Parasite densities can be reduced by diversification to other species.

Much of the information contained in the MRDC (1993) booklet referred to and summarised here can also be found in the popular and scientific literature from the 1980's. A few examples are: Aglink FPP 187, 1983; Aglink FPP 203, 1982; Brunsdon and Adam, 1975; Brunsdon and Vlassoff, 1982; Nicol and Thompson, 1982.

2.4 General Recommendations

The literature review clearly indicates the emphasis should be on preventing parasite problems through the use of an integrated approach rather than using drench as a cure. Under this programme the objective is to reduce the challenge on young susceptible animals until immunity develops while maintaining growth and production. An essential component

of this is "safe" pasture (pasture that has too few nematodes on it to damage susceptible animals). Because of drench resistance it is logical to drench sparingly and reduce selection for resistance. The general recommendations for drenching are:

- All lambs should be placed on a five drench preventative program starting at weaning with three drenches at 22 day intervals followed by two drenches at 28 day intervals, followed by drenching only on the basis of the results of Faecal Egg Count (FEC).

- All other stock should be drenched on the basis of the results of FEC.

- All animals should be drenched with the same drench in the same year.
- Change between effective drench families each farming year (first drench after winter).
- Resistance should be checked using FEC's 7-12 days after drenching.
- Dose should be based on animal weights and checked every day, or 500 doses, whichever comes first.

CHAPTER THREE

THE DEVELOPMENT OF THE DRENCHING EXPERT SYSTEM

3.1 Introduction

As drenching has received a reasonable amount of research attention over the years it was simple to determine the rules as recommended by experts. In addition a researcher ¹ currently working in the area of drenching and drench resistance was consulted.

The approach adopted was to build a system based on the research results and recommendations and then to obtain further experts' opinions on the rules. This allows the experts to effectively use their time and provides them with a completed system. Experts have something concrete to comment on in contrast to analysing hypothetical situations.

With all the factors identified the system was developed by entering the decision factors or parameters into a spreadsheet and following each combination through to a conclusion. Using a spreadsheet helps ensure all eventualities are included. Once the knowledge base had been checked and re-checked for completeness induction was used to construct the rule set required by the inference engine to run a consultation. A user interface was added and the system given to the experts for comment (a group of six animal scientists, vets and a farm consultant). Some minor changes were made as a result and the system was then sent to computer using farmers willing to assist in the project.

3.2 System Factors

From the review of literature it is clear the following factors need to be considered in the drenching expert system:

- class of stock to be drenched
- the reason for considering drenching at this time
- results of Faecal Egg Count tests
- the presence or absence of an existing internal parasite prevention programme

¹A Familton, Animal Science Group, Lincoln University.

- condition of the animals to be drenched
 - whether or not the animals are scouring
 - condition of the wool
 - body condition over time
- amount of stress placed on the animals due to feeding regime
 - pasture quantity
 - pasture quality
- presence or absence of safe pasture for the animals to go onto after drenching
 - pasture type
 - grazing history of the paddock
 - species of animal that grazed the paddock last
 - age of the animals that grazed the paddock last
 - the current season
 - the height of the grass on the pasture
 - stocking rate of the farm

3.3 System Rules

The following section contains a summary of the rules used in Drenching Expert. Appendices One to Four contain the actual rules used in the system and Appendix Five the explanations used. Appendix Six contains the help files accessible when using the package.

3.3.1 Drenching Rules

- Stock with a low FEC (< 250 eggs/g) are not drenched.
- You should have a reason for drenching stock other than they are always drenched at a particular time (traditional).
- Mobs of Ewes and Lambs are not drenched.

Stock with a high FEC (> 500 eggs/gram) value are drenched.

- Any stock that has been away from the farm and is returning, and all stock new to the farm, should be quarantine drenched before joining the flock.
- When the reason to drench lambs is that they are scouring, or they have ill-thrift, or they are to be shifted and the FEC value is (250-500 eggs/gram) and there is no preventative program, THEN they are drenched if their condition is average or poor, and not drenched if their condition is good.
- When the reason to drench lambs is that they are scouring, or they exhibit ill-thrift, or they are to be shifted and a FEC is not available, and a preventative program is not in place and animal condition is good, THEN don't drench, but drench if condition is poor. When condition is average and feed stress is high they should be drenched, BUT when feed stress is low they should <u>not</u> be drenched. If feed stress is moderate and pasture is safe then they should be drenched, however if there is no safe pasture then they should <u>not</u> be drenched. They should be drenched if the stocking rate is high (>15 su/ha) but <u>not</u> if the stocking rate is low (<10) or average (10-15). See below for rules defining safe pasture, feed stress and condition.
- When the reason to drench hoggets or adult sheep is that they are scouring, have illthrift, or they are due to be shifted but the FEC value is low, THEN do not drench.
- When the reason to drench hoggets or adult sheep is that they are scouring, have illthrift, or that they are due to be shifted and the FEC value is average, THEN drench if their condition is average or poor, BUT do <u>not</u> drench if their condition is good.
- When the reason to drench hoggets or adult sheep is that they are scouring, have illthrift, or that they are due to be shifted and the FEC value is high THEN drench.
- When the reason to drench hoggets or adult sheep is that they are scouring, have illthrift, or that they are to be shifted and there is no FEC value and animal condition is good, THEN do not drench, BUT do drench if their condition is poor. When their condition is average and feed stress is high they <u>should</u> be drenched BUT when feed stress is low they should <u>not</u> be drenched. If feed stress is moderate and there is safe pasture for them to go onto THEN they should be drenched, however if there is no safe pasture then they should <u>not</u> be drenched. They should be drenched if the stocking rate is high (>15 su/ha), BUT not if the stocking rate is low (<10) or average (10-15).

3.3.2 Feed Stress Rules

- when the quantity of currently available feed is high feed stress is low, unless the quality is poor, then feed stress is moderate.
- when the quantity of feed available is medium, feed stress is low when the quality is good, but the feed stress is medium when the quality is average, but high when quality is poor.

when the feed quantity is low feed stress is high, except when the quality is good in which case feed stress is defined as moderate.

3.3.3 Animal Condition Rules

- if scouring is severe then overall condition is poor.
- if scouring is moderate and the wool condition good overall condition goes from good through average to poor as body condition goes from increasing to stable to decreasing.
- if scouring is moderate and the wool is poor and the body condition is stable, or decreasing THEN overall condition is poor unless the body condition is increasing in which case condition is average.
- when the animals are not scouring and the wool condition is good, overall condition is good when the body condition is increasing or stable, <u>and</u> average when the body condition is decreasing.
- if the animals are not scouring, animal overall condition is good when the body condition is increasing, OR average when the body condition is stable, poor when body condition is decreasing.

3.3.4 Safe Pasture for Sheep Rules

In the following rules the word "safer" is used to describe pasture that is not yet totally safe, but is useable under certain conditions. MRDC (1993) define it as areas not grazed for 10-12 weeks, but the required time depends on the susceptibility of the animal to be grazed and on season conditions.

- New pasture, forage crops, crop residues and pastures cut for hay/silage are all safe.
- Pasture or chicory/lucerne that has been spelled for more than 13 weeks is safe.
- Pasture or chicory/lucerne that has not had stock for 10-12 weeks is considered safer.
- Pasture or chicory/lucerne that has had sheep or goats on it at any time over the last 0-9 weeks is unsafe.
- Pasture or chicory/lucerne that has been grazed by cattle or deer at least 5 or more weeks ago is considered safe.
- Chicory/Lucerne pastures will be safer for any given set of factors when compared to Pasture (ryegrass/whiteclover).

3.3.5 Grazing Interchange System Rules

- Pasture that has been grazed by deer or cattle for 5-8 weeks during spring or autumn is unsafe.
- Pasture that has been grazed by deer or cattle for 5-8 weeks during summer or winter is unsafe when pasture height is short or average, rank pasture is considered safer.
- Pasture that has been grazed by deer or cattle for 9-12 weeks during spring or autumn is unsafe when pasture height is short or average, rank pasture is considered safer.
- Pasture that has been grazed by deer or cattle for 9-12 weeks during summer or winter is unsafe when pasture height is short, safer when pasture height is average and safe when pasture height is rank.
- Pasture that has been grazed by adult ewes for 9-12 weeks during spring or autumn is unsafe.
- Pasture that has been grazed by adult ewes for 9-12 weeks during summer or winter is unsafe when pasture height is short or average, rank pasture is considered safer.
- Pasture that has been grazed by deer or cattle for 13-16 weeks during spring or autumn is unsafe when pasture height is short, safer when pasture height is average and safe when pasture height is rank.
- Pasture that has been grazed by deer or cattle for 13-16 weeks during summer or winter is safer when pasture height is short, safe when pasture height is average or rank.
- Pasture that has been grazed by adult ewes for 13-16 weeks during spring or autumn is unsafe when pasture height is short or average, rank pasture is considered safer.
 - Pasture that has been grazed by adult ewes for 13-16 weeks during summer or winter is unsafe when pasture height is short, safer when pasture height is average and safe when pasture height is rank.
 - Pasture that has been grazed by deer or cattle for 17-20 weeks during spring or autumn is safe when pasture height is rank or average and safer when pasture height is short.
 - Pasture that has been grazed by deer or cattle for 17-20 weeks during summer or winter is safe.
 - Pasture that has been grazed by adult ewes for 17-20 weeks during spring or autumn is unsafe when pasture height is short, safer when pasture height is average and safe when pasture height is rank.

Pasture that has been grazed by adult ewes for 17-20 weeks during summer or winter is safer when pasture height is short, safe when pasture height is average or rank.

Pasture that has been grazed by deer, cattle or adult non-lactating sheep for 21-52 weeks is safe.

CHAPTER FOUR

FARMER COMMENTS ON THE EXPERT SYSTEM

4.1 Introduction

As a result of the expert's review of the rules used in the drenching expert system some minor modifications were made. In general, however, the experts believed the system was a good representation of current thinking on drenching. The rules and explanations as reported in the appendices include the modifications suggested.

The final system was coded into a mouse driven package using an object orientated language designed for presenting expert systems (Knowledge Pro's KPWin Gold). It operates under the Windows interface on MSDOS based computers.

The real test of any system is whether farmers find it acceptable and useful. To this end as many sheep farmers as possible with suitable equipment were located, asked to use the package and to answer a series of questions on the package. The result was twenty-two completed questionnaires.

Location involved searching a data base of farmers receiving a computer newsletter for which data was held on their computers. All Ministry of Agriculture and Fisheries offices were also contacted with a request for farmers' names. In the end, nearly 400 farmers that might well have had Windows were written to asking if they would be happy to assist in an evaluation. Ninety-two responded with an offer to use the system, but 54 of these did not have a sufficiently powerful computer. The remaining 38 were sent the package (disks and manual), installation system and questionnaire. After reminders and phone calls, twenty two completed evaluations were received. The following sections document the responses. The questionnaire contained a wide range of topics aimed at elucidating the farmers' views on not only the drenching topic itself, but also on topics such as the format, screen presentation, and value of the system. This confirmation , and its analysis, is presented in another Report.

4.2 Farmers' Existing Drenching Practices

Clearly, if farmers' current practices are similar to the recommendations embodied in the expert system there is unlikely to be much benefit from using the system. Thus, the farmers were asked to specify their procedures. The sample is small, however, so their comments cannot be construed as being typical of all farmers, but at least they provide an initial basis for viewing the package.

Table 1 lists the amount of drenching being carried out, and Table 2 the decision variables used by the farmers.

Number of drenches/year	Ewes	Hoggets	Lambs	Cattle
1	59.1	19.0	-	16.7
2	22.7	19.0	4.6	16.7
3	9.1	42.9	13.6	16.7
4	9.1	9.5	18.2	33.3
5	-	-	9.1	11.1
6	-	4.8	22.7	5.5
7	-	-	13.6	-
≥8	-	4.8	18.2	-
Average	1.68	2.90	5.45	3.06

Table 1 The Drenching Frequency of the Sample Farmers Percentage of Farmers

Table 2					
The Decision	Variables	Used in	Determining	Drenching Ti	<u>me</u>
Percentage of Farmers					

Decision Variable	Ewes	Hoggets	Lambs	Cattle
Rely on a predetermined programme	66.7	65.0	81.8	63.1
Animal condition	42.9	50.0	40.9	26.3
Feed condition	14.3	-	-	21.0
Availability of clean pasture	4.8	-	-	-
Faecal Egg Count	28.6	5.0	13.6	-
Economic gain	9.5	-	-	-
Growth rate	-	10.0	9.0	15.8

NOTE: The columns totals may exceed 100% as more than one variable may be used.

It is clear producers largely rely on set drenching regimes which, no doubt have been developed over years of experimentation, reading and attending field days. Animal condition is also important, as it must be, as the environment is unpredictable and specific conditions that appear from time to time must be dealt with.

The low level of faecal egg counting (FEC) is probably to be expected given ready access has not been available for long. A significant number of the sample farms use quite high levels of lamb drenching. The difficulty of this is the cost and the build up of drench resistance.

When asked whether they used FEC, 50% said 'yes'. This was mainly for testing resistance (72.7%). Other reasons were to decide when to drench (18.2%) and to help determine why the animals might be in very poor condition. For those farmers using egg counts the average frequency of its use was 1.75 times per year for ewes, 2.0 per year for hoggets and similarly 2.0 times per year for lambs.

It is recommended that drench families are rotated each year. It appears this is generally accepted as 91% follow this practice even though 76.2% say they do not have any signs of resistance. Rotating the drench families will maintain for as long as possible the lack of resistance. Furthermore, 91% indicate they do not skimp on the recommended dose rate (this encourages the development of resistance). Checking that the animals actually receive the correct dose is important - 80.9% check the dose gun through using a calibrated measure and only 9.5% rely on a 'visual check'. The majority (81.8%) rely on actually weighing the animals when determining the dose rate; 18.2% rely on an eye assessment.

When it comes to checking the dose effectiveness 77.8% of those farmers using FEC indicate they use it in this context. Others rely on visual and growth assessments.

As noted earlier the use of larval free pasture can be an important component of control measures. The farmers agree in that 91% use this approach to a greater or lesser extent. To create safe pastures the practices used are cattle grazing (52.6%), shutting up for crops or hay (10.5%), and simple spelling of a paddock (52.6%). These techniques are not, of course, mutually exclusive.

Quarantining animals brought on to the farm is also recommended, and 70% of the sample farmers indicated they do this through 'drenching on to a safe area' (20%), 'drenching and holding in the yards' (73.3%), and 'run separately' (6.7%).

Overall, it must be concluded that there is quite a wide range of practices and procedures used suggesting there could well be a place for a drenching expert. The final decision on this conclusion must, however, be left to the farmers.

4.3 Farmers' Views on the Drenching Expert

The farmers were asked to score the importance of parameters used by the expert system in coming to its conclusion. A scale of 1 = very important, to 10 = not at all important was used. The following tables give their responses with respect to the actual drench decision, to whether a pasture is 'safe', to the factors important to assessing animal condition and the level of feed stress.

Table 3 <u>The Farmers' Scores on the Importance of the Factors Used</u> in Determining Whether to Drench

(1 = very important.....10 = not at all important)

Factor	Average Score	Standard Deviation	Rank
Stock class (lambs, ewes)	2.19	1.73	1
Animal condition	3.00	1.54	2
FEC levels	3.24	2.62	3
The existence of a regular programme	3.62	2.36	4
Feeding stress (quantity/quality)	3.90	2.52	5
Existence of safe pasture	4.48	2.08	6
Stocking rate	5.71	2.51	7

Table 4The Farmers' Scores on the Importance of the Factors Usedto Determine the Safeness of a Pasture

Factor	Average Score	Standard Deviation	Rank
Paddock history	2.76	2.22	1
Animal type	2.86	1.83	2
Animal age	3.81	2.61	3
Pasture height	3.90	2.47	4
Current season	4.30	2.55	5
Type of pasture	5.05	3.73	6

(1 = very important.....10 = not at all important)

Table 5The Farmers' Scores on the Importance of the FactorsUsed to Determine Stock Condition

	Average Score	Standard Deviation	Rank
Body condition	2.29	1.61	1
Scouring	2.33	1.93	2
Wool condition	4.24	2.45	3

Table 6 The Farmers' Scores on the Importance of the Factors Used to Determine Feed Stress

	Average Score	Standard Deviation	Rank
Pasture quality	2.05	1.84	1
Pasture quantity	2.90	2.16	2

In general the farmers have a similar view to the experts, though some differences occur. For drenching, the farmers put 'animal condition' above the FEC levels and the existence of a regular programme. This is possibly a matter of education and FEC availability as clearly the worm population must be a critical factor. For safe pasture categorisation the farmers completely downgrade the type of pasture. It is suspected this occurs as most farmers do not in fact have a choice of pasture type and consequently do not consider it as a factor. If pasture type is removed from the list the other factors fall into the same sequence as exhibited in the expert system.

With respect to assessing stock condition and the level of feed stress the farmers have a different view of the first two priorities. However, their scores are only slightly different (2.29/2.33 and 2.05/2.90) respectively), particularly in the former case, so these differences cannot be taken as crucial.

Some of the farmers also believe additional factors should be taken into account. Table 7 contains a listing and the numbers mentioning each factor.

Factor	Percentage Mentioning the Factor
Weather conditions	36.4
Rate of LW gain	9.1
Previous stock health	9.1
Ease of handling/mustering	4.5
Planned future of the stock	4.5
Moon phase	4.5

Table 7 Additional Factors Some Farmers Believe Should be Considered

The weather conditions and the ease of getting the stock in to some yards to carry out the drenching are clearly important considerations. If mustering the stock is a major expense in terms of time and people then tempering the drenching recommendations may well be economically sensible. Similarly if the weather conditions on the day mean the process would be difficult to complete.

If the stock, for example, are about to be sold then this may be a reason to ignore a drenching recommendation, though this must depend on the nature and condition of the sale. Whether the moon phase is important has yet to be conclusively determined. Certainly none of the experts mentioned it but perhaps their education needs broadening. With respect to the rate of LW gain, and the previous stock health which may well be reflected in the gain, this must be a relevant consideration as if this is excellent then the chance of drenching being an economic action must be markedly reduced. However, the presented expert system attempts to consider this factor through the 'animal condition' question as well as indirectly through the FEC.

Despite the comment about the additional factors to consider and the priority variations, 80% of the farmers agreed with the advice provided. Similarly, 76.2% agreed with the explanations provided so that overall the farmers can be said to believe in the system. Furthermore, 80% said using the system would make drenching easier. These high percentages provide considerable confidence in the system.

When those not agreeing were asked for comments typical replies were 'my vet says differently', 'different in my region', 'need to consider totality of health, not just drenching', 'can't wait till get to computer, must decide in the paddock'. Clearly, one system is most unlikely to suit everyone's needs.

Finally the farmers were asked for other suggestions. These could be paraphrased with 'would prefer an extensive CD Rom based total health package', and 'would like a system that keeps the drenching history to aid in assessing success and future action'. Most people would probably agree with these sentiments. Constructing an all encompassing system would, however, require a very heavy investment. The current system is the first step in this direction.
References

Aglink FPP187 (1983): Roundworms in Lambs; Integrated Control.

Aglink FPP 203 (1982): Roundworms in Sheep; Control.

- Barger, I.A.; Southcott, W.H. (1975): Trichostrongylosis and wool growth, 3. The wool growth response of resistant grazing sheep to larval challenge. Australian Journal of Experimental Agriculture, 15:167.
- Bramer, M. (1986): Expert Systems. Some Guidelines. Information Technology in the Civil Service. HM Treasury.
- Brunsdon, R.V. (1982a): Host/parasite interrelationships in Trichostronglylid infections. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Brunsdon, R.V. (1982b): Current farmer drenching practices. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Brunsdon, R.V.; Adam, J. L. (1975): New Zealand Society of Animal Production, Occasional Publication No 4., 53pp.
- Brunsdon, R.V.; Vlassoff, A. (1982): Parasite control A revised approach. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Charleston, W.A.G. (1982): An introduction to gastrointestinal nematode parasites of sheep and cattle in New Zealand. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Forsyth, R.; Naylor, C. (1986): The Hitchhikers' Guide to Artificial Intelligence, Chapman and Hall, Methuen, London.
- Kettle, P.R. (1982): Uses and limitations of anthelmintics. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Levya, V.R.; Henderson, A.E.; Sykes, A.R. (1981): The effect of daily infection with o. circumcincta larvae on the performance of pregnant and lactating sheep. Proceedings of the New Zealand Society of Animal Production, 41:279.

- Meat Research and Development Council (MRDC) (1993): Internal parasite management booklet, A guide to sustainable internal parasite management: Coping with drench resistance. Agriculture New Zealand, Meat Research and Development Council.
- Nicol, A.M.; Thompson, K.F. (1982): Planning the use of safe pasture in an integrated control programme. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Nuthall, P.L.; Bishop-Hurley, G. (1994): Feed Management and Computer Practices of a Random Sample of New Zealand Farmers, AERU Research Report No.225, Lincoln University, Canterbury.
- Steel, J.W.; Symons, L.E.A.; Jones, W.O. (1980): Effects of level of larval intake on the productivity and metabolic response of lambs infected with *Trichostrongylus* colubriformis. Australian Journal of Agricultural Research, 31:821.
- Sykes, A.R. (1982): Parasitism in sheep. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Sykes, A.R.; Poppi, D.P. (1982): Effects of parasitism on metabolism in sheep. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Vlassoff, A. (1982): Biology and population dynamics of the free living stages of gastrointestinal nematodes of sheep. Control of Internal Parasites in Sheep: Animal Industries Workshop. ed A.D. Ross. Lincoln College, Veterinary Services Council, Ministry of Agriculture and Fisheries.
- Vlassoff, A.; Brunsdon, R.V. (1981): Control of gastrointestinal nematodes: Advantages of a preventive over a protective anthelmintic drenching programme for lambs on pasture. New Zealand Journal of Experimental Agriculture, 9:221.

Appendix One

Drenching Ruleset

(See APPENDIX FIVE for the Explanations)

Rule 1:			
Class of Stock:	Works Lambs	Rule 5:	
Reason to Use System:	Scouring	Class of Stock:	Works Lambs
Faecal Egg Count Value:	Low (< 250 eggs/g)	Reason to Use System:	Scouring
Prevention Programme:	Due	Faecal Egg Count Value:	Ave (250-500eggs/g)
C		Prevention Programme:	Not Due
Do drench this mob of Wo	rks Lambs.	<u> </u>	
		Don't drench this mob of V	Works Lambs.
Explanation:	08		
		Explanation:	12, 03, 04
Rule 2:			
Class of Stock:	Works Lambs	Rule 6:	
Reason to Use System:	Scouring	Class of Stock:	Works Lambs
Faecal Egg Count Value:	Low (<250eggs/g)	Reason to Use System:	Scouring
Prevention Programme:	Not Due	Faecal Egg Count Value:	Ave (250-500eggs/g)
-		Prevention Programme:	No Program
Don't drench this mob of V	Works Lambs.	Condition of Animals:	Good
Explanation:	09, 01	Don't drench this mob of V	Works Lambs.
-			
		Explanation:	13, 02
Rule 3:		-	
Class of Stock:	Works Lambs		
Reason to Use System:	Scouring	Rule 7:	
Faecal Egg Count Value:	Low $(< 250 \text{ eggs/g})$	Class of Stock:	Works Lambs
Prevention Programme:	No Program	Reason to Use System:	Scouring
		Faecal Egg Count Value:	Ave $(250-500 \text{eggs/g})$
Don't drench this mob of V	Works Lambs.	Prevention Programme:	No Program
		Condition of Animals:	Average
Explanation	10 01 02	condition of Aminuis.	11001uBC
Explanation:	10, 01, 02	Do drench this mob of Wo	rks I ambs
Pulo 4.		Do drehen this mob of wo	iks Lamos.
Class of Stock:	Works Lambs	Evaluation	14 02
Passon to Use System:	Scouring		14, 02
Feeded Egg Count Values	Ave $(250, 500 \text{ args}/a)$		
Provention Programme	Ave (250-500eggs/g)		
r revenuon r rogramme:	Due		
Do drench this mob of Wo	rke Lambe	·.	
Explanation	11		
Lapimianon.	11		

Rule 8:Rule 13:Class of Stock:Works LambsClass of Stock:Reason to Use System:ScouringReason toFaecal Egg Count Value:Ave (250-500eggs/g)Faecal EggPrevention Programme:No ProgramPreventionCondition of Animals:PoorConditionDo drench this mob of Works Lambs.Do drench

15.02

Rule 9:Class of Stock:Works LambsReason to Use System:ScouringFaecal Egg Count Value:High (> 500eggs/g)

Do drench this mob of Works Lambs.

Explanation:

Explanation:

16, 03, 04

Rule 10:

Class of Stock:Works LambsReason to Use System:ScouringFaecal Egg Count Value:No fec ValuePrevention Programme:Due

Do drench this mob of Works Lambs.

Explanation: 17, 03, 04

Rule 11:

Class of Stock:Works LambsReason to Use System:ScouringFaecal Egg Count Value:No fec ValuePrevention Programme:Not Due

Don't drench this mob of Works Lambs.

Explanation:

18, 03, 04

Rule 12:

Class of Stock:Works LambsReason to Use System:ScouringFaecal Egg Count Value:No fec ValuePrevention Programme:No ProgramCondition of Animals:Good

Don't drench this mob of Works Lambs.

Explanation: 19, 02

Class of Stock:Works LambsReason to Use System:ScouringFaecal Egg Count Value:No fec ValuePrevention Programme:No ProgramCondition of Animals:AverageFeeding Stress:HighDo drench this mob of Works Lambs.Explanation:20, 02, 06Bule 14:

Rule 14: Class of Stock: Reason to Use System: Faecal Egg Count Value: Prevention Programme: Condition of Animals: Feeding Stress: Safety of Pasture:

Works Lambs Scouring No fec Value No Program Average Moderate Safe

21.02

Do drench this mob of Works Lambs.

Explanation:

Rule 15:

Class of Stooler	Wontra Lonata
Class of Stock:	WORKS Lambs
Reason to Use System:	Scouring
Faecal Egg Count Value:	No fec Value
Prevention Programme:	No Program
Condition of Animals:	Average
Feeding Stress:	Moderate
Safety of Pasture:	Safer
Mob Stocking Rate:	High (>15su/ha)

Do drench this mob of Works Lambs.

Explanation: 22, 02

Rule 16:		Rule 19:	
Class of Stock:	Works Lambs	Class of Stock:	Works Lambs
Reason to Use System:	Scouring	Reason to Use System:	Scouring
Faecal Egg Count Value:	No fec Value	Faecal Egg Count Value:	No fec Value
Prevention Programme:	No Program	Prevention Programme:	No Program
Condition of Animals:	Average	Condition of Animals:	Average
Feeding Stress:	Moderate	Feeding Stress:	Low
Safety of Pasture:	Safer	C	
Mob Stocking Rate:	Ave (10-15su/ha)	Don't drench this mob of V	Works Lambs.
Don't drench this mob of V	Works Lambs.	Explanation:	26, 02
Explanation:	23, 02		
		Rule 20:	
Rule 17:		Class of Stock:	Works Lambs
Class of Stock:	Works Lambs	Reason to Use System:	Scouring
Reason to Use System:	Scouring	Faecal Egg Count Value:	No fec Value
Faecal Egg Count Value:	No fec Value	Prevention Programme:	No Program
Prevention Programme:	No Program	Condition of Animals:	Poor
Condition of Animals:	Average		
Feeding Stress:	Moderate	Do drench this mob of Wo	rks Lambs.
Safety of Pasture:	Safer		
Mob Stocking Rate:	Low (<10su/ha)	Explanation:	27, 02
Don't drench this mob of V	Works Lambs.		
		Rule 21:	
Explanation:	24, 02	Class of Stock:	Works Lambs
		Reason to Use System:	Due to be
Rule 18:			
Class of Stock:	Works Lambs	Do drench this mob of Wo	orks Lambs.
Reason to Use System:	Scouring		
Faecal Egg Count Value:	No fec Value	Explanation:	- 28
Prevention Programme:	No Program		
Condition of Animals:	Average		
Feeding Stress:	Moderate	Rule 22:	
Safety of Pasture:	Unsafe	Class of Stock:	Works Lambs
		Reason to Use System:	Shifting
Don't drench this mob of V	Works Lambs.	Faecal Egg Count Value:	Low $(< 250 \text{eggs/g})$
		Prevention Programme:	Due
Explanation:	25, 02		
		Do drench this mob of Wo	orks Lambs.
		Explanation:	08
	,		

4.

Rule 28: Rule 23: Class of Stock: Works Lambs Class of Stock: Works Lambs Reason to Use System: Shifting Reason to Use System: Shifting Low (<250eggs/g) Faecal Egg Count Value: Ave (250-500eggs/g) Faecal Egg Count Value: Prevention Programme: Prevention Programme: Not Due No Program Condition of Animals: Average Don't drench this mob of Works Lambs. Do drench this mob of Works Lambs. 09,01 Explanation: Explanation: 29,02 **Rule 24:** Class of Stock: Works Lambs **Rule 29:** Reason to Use System: Shifting Class of Stock: Works Lambs Faecal Egg Count Value: Low (< 250 eggs/g)Reason to Use System: Shifting Prevention Programme: No Program Faecal Egg Count Value: Ave (250-500eggs/g) Prevention Programme: No Program Condition of Animals: Don't drench this mob of Works Lambs. Poor Do drench this mob of Works Lambs. Explanation: 10, 01, 02 **Rule 25:** Explanation: 30, 02 Works Lambs Class of Stock: Reason to Use System: Shifting **Rule 30:** Faecal Egg Count Value: Ave (250-500eggs/g) Class of Stock: Works Lambs Reason to Use System: Prevention Programme: Due Shifting Faecal Egg Count Value: High (> 500 eggs/g)Do drench this mob of Works Lambs. Do drench this mob of Works Lambs. 11 **Explanation: Explanation:** 16, 03, 04 Rule 26: Works Lambs **Rule 31:** Class of Stock: Reason to Use System: Shifting Class of Stock: Works Lambs Faecal Egg Count Value: Ave (250-500eggs/g) Reason to Use System: Shifting Prevention Programme: Not Due Faecal Egg Count Value: No fec Value **Prevention Programme:** Due Don't drench this mob of Works Lambs. Do drench this mob of Works Lambs. Explanation: 12 17, 03, 04 Explanation: **Rule 27:** Class of Stock: Works Lambs **Rule 32:** Class of Stock: Works Lambs Reason to Use System: Shifting Faecal Egg Count Value: Ave (250-500eggs/g) Reason to Use System: Shifting **Prevention Programme:** No Program Faecal Egg Count Value: No fec Value Condition of Animals: Good Prevention Programme: Not Due Don't drench this mob of Works Lambs. Don't drench this mob of Works Lambs. 13,02 Explanation: 18, 03, 04 Explanation:

Rule 33: **Rule 37:** Works Lambs Works Lambs Class of Stock: Class of Stock: Reason to Use System: Shifting Reason to Use System: Shifting Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Prevention Programme: No Program Prevention Programme: No Program Condition of Animals: Good Condition of Animals: Average Feeding Stress: Moderate Don't drench this mob of Works Lambs. Safety of Pasture: Safer Mob Stocking Rate: Ave (10-15su/ha) 31,02 Explanation: Don't drench this mob of Works Lambs. **Rule 34:** 23, 02 Class of Stock: Works Lambs Explanation: Shifting Reason to Use System: Faecal Egg Count Value: No fec Value **Rule 38:** Prevention Programme: Class of Stock: Works Lambs No Program Condition of Animals: Reason to Use System: Shifting Average No fec Value Feeding Stress: Faecal Egg Count Value: High **Prevention Programme:** No Program Do drench this mob of Works Lambs. Condition of Animals: Average Moderate Feeding Stress: Explanation: 20, 02, 06 Safety of Pasture: Safer Mob Stocking Rate: Low (< 10 su/ha)**Rule 35:** Class of Stock: Works Lambs Don't drench this mob of Works Lambs. Reason to Use System: Shifting 24.02 Faecal Egg Count Value: No fec Value Explanation: **Prevention Programme:** No Program Condition of Animals: **Rule 39:** Average Works Lambs Feeding Stress: Moderate Class of Stock: Safe Safety of Pasture: Reason to Use System: Shifting Faecal Egg Count Value: No fec Value Do drench this mob of Works Lambs. **Prevention Programme:** No Program Condition of Animals: Average 21,02 Feeding Stress: Moderate Explanation: Safety of Pasture: Unsafe Rule 36: Works Lambs Don't drench this mob of Works Lambs. Class of Stock: Shifting Reason to Use System: Faecal Egg Count Value: No fec Value 25,02 **Explanation:** Prevention Programme: No Program Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Safer Mob Stocking Rate: High (> 15su/ha)Do drench this mob of Works Lambs. Explanation: 22,02

Rule 40:		Rule 45:	
Class of Stock:	Works Lambs	Class of Stock:	Works Lambs
Reason to Use System:	Shifting	Reason to Use System:	Ill Thrift
Faecal Egg Count Value:	No fec Value	Faecal Egg Count Value:	Low (<250eggs/g)
Prevention Programme:	No Program	Prevention Programme:	No Program
Feeding Stress:	Low	Don't drench this mob of W	Vorks Lambs.
Don't drench this mob of V	Works Lambs.	Explanation:	10, 01, 02
Explanation:	26, 02	Rule 46:	
		Class of Stock:	Works Lambs
Rule 41:		Reason to Use System:	III Thrift
Class of Stock:	Works Lambs	Faecal Egg Count Value:	Ave (250-500eggs/g)
Reason to Use System:	Shifting	Prevention Programme:	Due
Faecal Egg Count Value:	No fec Value		
Prevention Programme:	No Program	Do drench this mob of Wor	rks Lambs.
Condition of Animals:	Poor		
		Explanation:	11
Do drench this mob of Wo	rks Lambs.		
		Rule 47:	
Explanation:	27, 02	Class of Stock:	Works Lambs
		Reason to Use System:	Ill Thrift
Rule 42:		Faecal Egg Count Value:	Ave (250-500eggs/g)
Class of Stock:	Works Lambs	Prevention Programme:	Not Due
Reason to Use System:	Traditional		
			Works Lambs.
Don't drench this mob	Vorks Lambs.		
		Explanation:	12, 03, 04
Explanation:	28	-	
		Rule 48:	
Rule 43:		Class of Stock:	Works Lambs
Class of Stock:	Works Lambs	Reason to Use System:	Ill Thrift
Reason to Use System:	Ill Thrift	Faecal Egg Count Value:	Ave (250-500eggs/g)
Faecal Egg Count Value:	Low $(< 250 \text{eggs/g})$	Prevention Programme:	No Program
Prevention Programme:	Due	Condition of Animals:	Good
Do drench this mob of Wo	rks Lambs.	Don't drench this mob of V	Works Lambs.
Explanation:	08	Explanation:	13, 02
Rule 44:		Rule 49:	
Class of Stock:	Works Lambs	Class of Stock:	Works Lambs
Reason to Use System:	Ill Thrift	Reason to Use System:	III Thrift
Faecal Egg Count Value	Low (< 250 eggs/g)	Faecal Egg Count Value	Ave (250-500eggs/g)
Prevention Programme	Not Due	Prevention Programme	No Program
		Condition of Animals.	Average
Don't drench this mob of V	Works Lambs	condition of Animals.	11101060
	TOTAS LUTIDS.	Do drench this mob of Wo	rks I ambs
Explanation	09.01		ing Lambo.
	··· , ·· .	Explanation	32. 02
		L	,

Rule 50:Class of Stock:Works LambsReason to Use System:III ThriftFaecal Egg Count Value:Ave (250-500eggs/g)Prevention Programme:No ProgramCondition of Animals:Poor

Do drench this mob of Works Lambs.

Explanation: 33, 02

Rule 51:

Class of Stock:Works LambsReason to Use System:Ill ThriftFaecal Egg Count Value:High (> 500eggs/g)

Do drench this mob of Works Lambs.

Explanation:

16, 03, 04

17, 03, 04

Rule 52:

Class of Stock:Works LambsReason to Use System:Ill ThriftFaecal Egg Count Value:No fec ValuePrevention Programme:Due

Do drench this mob of Works Lambs.

Explanation:

Rule 53:

Class of Stock:Works LambsReason to Use System:Ill ThriftFaecal Egg Count Value:No fec ValuePrevention Programme:Not Due

Don't drench this mob of Works Lambs.

Explanation:

18, 03, 04

Rule 54:

Class of Stock:	Works Lambs
Reason to Use System:	Ill Thrift
Faecal Egg Count Value:	No fec Value
Prevention Programme:	No Program
Condition of Animals:	Good

Don't drench this mob of Works Lambs.

Explanation: 34, 02

Rule 55: Class of Stock: Works Lambs Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Prevention Programme: No Program Condition of Animals: Average Feeding Stress: High Do drench this mob of Works Lambs. Explanation: 20, 02, 06 Rule 56: Class of Stock: Works Lambs Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Prevention Programme: No Program Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Safe Do drench this mob of Works Lambs. 21,02 Explanation: **Rule 57:** Class of Stock: Works Lambs Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Prevention Programme: No Program Condition of Animals: Average Moderate Feeding Stress: Safety of Pasture: Safer Mob Stocking Rate: High (> 15su/ha)Do drench this mob of Works Lambs.

22,02

33

Explanation:

Rule 58:		Rule 61:	
Class of Stock:	Works Lambs	Class of Stock:	Works Lambs
Reason to Use System:	Ill Thrift	Reason to Use System.	III Thrift
Facel Egg Count Value	No fee Value	Faecal Egg Count Value:	No foc Value
Provention Programma	No Program	Provention Programma	No Program
Condition of Animala	Assesses	Canditian of Animalat	No Flogram
Condition of Animals:	Average	Condition of Animals:	Average
Feeding Stress:	Moderate	Feeding Stress:	Low
Safety of Pasture:	Safer		
Mob Stocking Rate:	Ave (10-15su/ha)	Don't drench this mob of V	Vorks Lambs.
Don't drench this mob of V	Vorks Lambs.	Explanation:	26, 02
Explanation:	23, 02	Rule 62:	
•		Class of Stock:	Works Lambs
Rule 59:		Reason to Use System:	Ill Thrift
Class of Stock:	Works Lambs	Faecal Egg Count Value:	No fee Value
Posson to Use System:	Ill Thrift	Provention Programme	No Program
Reason to Use System.	Mi Humi	Condition of Animala	Deen
Faecal Egg Count value:	No rec value	Condition of Animals:	Poor
Prevention Programme:	No Program		
Condition of Animals:	Average	Do drench this mob of Wo	rks Lambs.
Feeding Stress:	Moderate		
Safety of Pasture:	Safer	Explanation:	27,02
Mob Stocking Rate:	Low (<10su/ha)		
-		Rule 63:	
Don't drench this mob of V	Works Lambs.	Class of Stock:	Works Lambs
		Reason to Use System:	Ret./New
Explanation:	24 02		
	24, 02	Do dronch this mob of Wo	rke Lambe
Dula 60.		Do thench this mod of wo	
Rue ou:	XXZ - ul - X - ul -		25
Class of Stock:	WORKS Lambs	Explanation:	35
Reason to Use System:	III Thrift		
Faecal Egg Count Value:	No fec Value	Rule 64:	
Prevention Programme:	No Program	Class of Stock:	Repl. Lambs
Condition of Animals:	Average	Reason to Use System:	Scouring
Feeding Stress:	Moderate	Faecal Egg Count Value:	Low $(< 250 \text{eggs/g})$
Safety of Pasture:	Unsafe	Prevention Programme:	Due
Don't drench this mob of V	Works Lambs.	Do drench this mob of Rep	ol. Lambs.
Explanation:	25, 02	Explanation:	08
		Rule 65.	
		Class of Stock:	Pont Lambs
		Passon to Use Sustem:	Securing
		Reason to Use System.	$\frac{1}{2}$
		Faecal Egg Count value:	Low $(< 250 \text{ eggs/g})$
		Prevention Programme:	Not Due
		Don't drench this mob of I	Repl. Lambs.
		Explanation:	09. 01
			,

Rule 66: Rule 70: Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Reason to Use System: Reason to Use System: Scouring Scouring Faecal Egg Count Value: Low (< 250 eggs/g)Faecal Egg Count Value: Ave (250-500eggs/g) Prevention Programme: No Program Prevention Programme: No Program Condition of Animals: Average Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. 10, 01, 02 Explanation: Explanation: 14.02 **Rule 67:** Class of Stock: **Rule 71:** Repl. Lambs Reason to Use System: Scouring Class of Stock: Repl. Lambs Ave (250-500eggs/g) Scouring Faecal Egg Count Value: Reason to Use System: Prevention Programme: Faecal Egg Count Value: Ave (250-500eggs/g) Due Prevention Programme: No Program Condition of Animals: Do drench this mob of Repl. Lambs. Poor Explanation: 11 Do drench this mob of Repl. Lambs. **Rule 68:** Explanation: 15.02 Class of Stock: Repl. Lambs Reason to Use System: Scouring **Rule 72:** Faecal Egg Count Value: Ave (250-500eggs/g) Class of Stock: Repl. Lambs Prevention Programme: Not Due Reason to Use System: Scouring Faecal Egg Count Value: High (> 500 eggs/g)Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 12, 03, 04 16, 03, 04 Explanation: **Rule 69:** Class of Stock: Repl. Lambs **Rule 73:** Class of Stock: Repl. Lambs Reason to Use System: Scouring Faecal Egg Count Value: Ave (250-500eggs/g) Reason to Use System: Scouring Prevention Programme: No fec Value No Program Faecal Egg Count Value: Condition of Animals: Good **Prevention Programme:** Due Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 13, 02 **Explanation**: 17, 03, 04 **Rule 74:** Class of Stock: Repl. Lambs Reason to Use System: Scouring Faecal Egg Count Value: No fec Value **Prevention Programme:** Not Due Don't drench this mob of Repl. Lambs. Explanation: 18, 03, 04

Rule 75: Rule 79: Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Reason to Use System: Scouring Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Prevention Programme: No Program Prevention Programme: No Program Condition of Animals: Good Condition of Animals: Average Feeding Stress: Moderate Don't drench this mob of Repl. Lambs. Safety of Pasture: Safer Ave (10-15su/ha) Mob Stocking Rate: Explanation: 19.02 Don't drench this mob of Repl. Lambs. **Rule 76:** Explanation: Class of Stock: Repl. Lambs 23,02 Scouring Reason to Use System: Faecal Egg Count Value: No fec Value **Rule 80:** Prevention Programme: No Program Class of Stock: Repl. Lambs Condition of Animals: Average Reason to Use System: Scouring No fec Value Feeding Stress: High Faecal Egg Count Value: **Prevention Programme:** No Program Do drench this mob of Repl. Lambs. Condition of Animals: Average Feeding Stress: Moderate Explanation: 20, 02, 06 Safety of Pasture: Safer Mob Stocking Rate: Low (< 10 su/ha)**Rule 77:** Class of Stock: Repl. Lambs Don't drench this mob of Repl. Lambs. Reason to Use System: Scouring No fec Value Faecal Egg Count Value: Explanation: 24, 02 Prevention Programme: No Program Condition of Animals: Average **Rule 81:** Feeding Stress: Moderate Class of Stock: Repl. Lambs Safety of Pasture: Safe Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Prevention Programme: Do drench this mob of Repl. Lambs. No Program Condition of Animals: Average 21,02 Explanation: Feeding Stress: Moderate Unsafe Safety of Pasture: **Rule 78:** Class of Stock: Repl. Lambs Don't drench this mob of Repl. Lambs. Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Explanation: 25,02 Prevention Programme: No Program Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Safer Mob Stocking Rate: High (> 15su/ha)Do drench this mob of Repl. Lambs. Explanation: 22,02

Rule 82: Rule 87: Class of Stock: Class of Stock: Repl. Lambs Repl. Lambs Reason to Use System: Scouring Reason to Use System: Shifting Low (< 250 eggs/g)Faecal Egg Count Value: No fec Value Faecal Egg Count Value: Prevention Programme: No Program Prevention Programme: No Program Condition of Animals: Average Feeding Stress: Don't drench this mob of Repl. Lambs. Low 10, 01, 02 Don't drench this mob of Repl. Lambs. Explanation: 26.02 **Rule 88:** Explanation: Class of Stock: Repl. Lambs **Rule 83:** Reason to Use System: Shifting Faecal Egg Count Value: Class of Stock: Repl. Lambs Ave (250-500eggs/g) Scouring Prevention Programme: Due Reason to Use System: Faecal Egg Count Value: No fec Value Prevention Programme: No Program Do drench this mob of Repl. Lambs. Condition of Animals: Poor Explanation: 11 Do drench this mob of Repl. Lambs. **Rule 89:** Class of Stock: Repl. Lambs Explanation: 27,02 Reason to Use System: Shifting Ave (250-500eggs/g) **Rule 84:** Faecal Egg Count Value: Prevention Programme: Not Due Class of Stock: Repl. Lambs Reason to Use System: Due to be Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. 12 Explanation: 28 Explanation: **Rule 90:** Class of Stock: Repl. Lambs **Rule 85:** Class of Stock: Repl. Lambs Shifting Reason to Use System: Ave (250-500eggs/g) Reason to Use System: Shifting Faecal Egg Count Value: Faecal Egg Count Value: Low (< 250 eggs/g)Prevention Programme: No Program **Prevention Programme:** Condition of Animals: Good Due Do drench this mob of Repl. Lambs. Don't drench this mob of Repl. Lambs. Explanation: 08 Explanation: 13, 02 **Rule 86: Rule 91:** Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Reason to Use System: Shifting Reason to Use System: Shifting Faecal Egg Count Value: Low (< 250 eggs/g)Faecal Egg Count Value: Ave (250-500eggs/g) Not Due Prevention Programme: Prevention Programme: No Program Condition of Animals: Average Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 09, 01 29,02 Explanation:

Rule 92: Rule 97: Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Reason to Use System: Reason to Use System: Shifting Shifting Faecal Egg Count Value: Ave (250-500eggs/g) Faecal Egg Count Value: No fec Value Prevention Programme: No Program Prevention Programme: No Program Condition of Animals: Condition of Animals: Average Poor Feeding Stress: High Do drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. 30.02 Explanation: 20, 02, 06 Explanation: **Rule 93:** Class of Stock: **Rule 98:** Repl. Lambs Repl. Lambs Reason to Use System: Shifting Class of Stock: Faecal Egg Count Value: High (> 500 eggs/g)Reason to Use System: Shifting Faecal Egg Count Value: No fec Value Do drench this mob of Repl. Lambs. Prevention Programme: No Program Condition of Animals: Average 16, 03, 04 Feeding Stress: Moderate Explanation: Safety of Pasture: Safe **Rule 94:** Class of Stock: Repl. Lambs Do drench this mob of Repl. Lambs. Reason to Use System: Shifting Faecal Egg Count Value: No fec Value Explanation: 21,02 Prevention Programme: Due **Rule 99:** Do drench this mob of Repl. Lambs. Class of Stock: Repl. Lambs Reason to Use System: Shifting 17, 03, 04 Faecal Egg Count Value: No fec Value Explanation: **Prevention Programme:** No Program **Rule 95:** Condition of Animals: Average Feeding Stress: Moderate Class of Stock: Repl. Lambs Reason to Use System: Shifting Safety of Pasture: Safer Faecal Egg Count Value: No fec Value Mob Stocking Rate: High (>15su/ha)Prevention Programme: Not Due Do drench this mob of Repl. Lambs. Don't drench this mob of Repl. Lambs. Explanation: 22,02 18, 03, 04 Explanation: **Rule 96:** Class of Stock: Repl. Lambs Reason to Use System: Shifting Faecal Egg Count Value: No fec Value Prevention Programme: No Program Condition of Animals: Good Don't drench this mob of Repl. Lambs. Explanation: 31, 02

Rule 100:		Rule 103:	
Class of Stock:	Repl. Lambs	Class of Stock:	Repl. Lambs
Reason to Use System:	Shifting	Reason to Use System:	Shifting
Faecal Egg Count Value:	No fec Value	Faecal Egg Count Value:	No fec Value
Prevention Programme:	No Program	Prevention Programme:	No Program
Condition of Animals:	Average	Condition of Animals:	Average
Feeding Stress:	Moderate	Feeding Stress:	Low
Safety of Pasture:	Safer	•	
Mob Stocking Rate:	Ave (10-15su/ha)	Don't drench this mob of H	Repl. Lambs.
Don't drench this mob of I	Repl. Lambs.	Explanation:	26,02
Explanation:	23, 02	Rule 104:	
•		Class of Stock:	Repl. Lambs
Rule 101:		Reason to Use System:	Shifting
Class of Stock:	Repl. Lambs	Faecal Egg Count Value:	No fec Value
Reason to Use System:	Shifting	Prevention Programme:	No Program
Faecal Egg Count Value:	No fec Value	Condition of Animals:	Poor
Prevention Programme:	No Program		
Condition of Animals:	Average	Do drench this mob of Ren	ol. Lambs.
Feeding Stress:	Moderate	1	
Safety of Pasture:	Safer	Explanation:	27.02
Mob Stocking Rate:	Low (<10su/ha)	1	
8		Rule 105:	
Don't drench this mob of 1	Repl. Lambs.	Class of Stock:	Repl. Lambs
	1	Reason to Use System:	07itional
Explanation:	24. 02		
	, -	Don't drench this mob of I	Repl. Lambs.
Rule 102:		×	
Class of Stock:	Repl. Lambs	Explanation:	28
Reason to Use System:	Shifting	•	
Faecal Egg Count Value:	No fec Value	Rule 106:	
Prevention Programme:	No Program	Class of Stock:	Repl. Lambs
Condition of Animals:	Average	Reason to Use System:	Ill Thrift
Feeding Stress:	Moderate	Faecal Egg Count Value:	Low $(< 250 \text{eggs/g})$
Safety of Pasture:	Unsafe	Prevention Programme:	Due
Don't drench this mob of i	Repl. Lambs.	Do drench this mob of Rep	pl. Lambs.
Explanation:	25, 02	Explanation:	08
		Pule 107.	
		Class of Stock:	Pont Lambs
		Passon to Use System:	Il Theift
		Facal Egg Count Value	L_{OW} ($< 250 eggs/g$)
		Prevention Programme:	Not Due
		revenuon rrogramme:	NUL DUE
		Don't drench this mob of	Repl. Lambs.
		Explanation:	09, 01

Rule 113: Rule 108: Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Reason to Use System: Ill Thrift Reason to Use System: Ill Thrift Faecal Egg Count Value: Ave (250-500eggs/g) Faecal Egg Count Value: Low (< 250 eggs/g)Prevention Programme: No Program Prevention Programme: No Program Condition of Animals: Poor Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 10, 01, 02 Explanation: 33.02 **Rule 109:** Class of Stock: Repl. Lambs Rule 114: Reason to Use System: Ill Thrift Class of Stock: Repl. Lambs Faecal Egg Count Value: Ave (250-500eggs/g) Reason to Use System: Ill Thrift Prevention Programme: Due Faecal Egg Count Value: High (> 500 eggs/g)Do drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 11 Explanation: 16, 03, 04 Rule 115: **Rule 110:** Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Reason to Use System: Ill Thrift Reason to Use System: Ill Thrift Faecal Egg Count Value: Faecal Egg Count Value: Ave (250-500eggs/g) No fec Value Prevention Programme: Prevention Programme: Not Due Due Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 12, 03, 04 Explanation: 17, 03, 04 **Rule 116:** Rule 111: Class of Stock: Repl. Lambs Class of Stock: Repl. Lambs Ill Thrift Ill Thrift Reason to Use System: Reason to Use System: Faecal Egg Count Value: Ave (250-500eggs/g) Faecal Egg Count Value: No fec Value Prevention Programme: Prevention Programme: No Program Not Due Condition of Animals: Good Don't drench this mob of Repl. Lambs. Don't drench this mob of Repl. Lambs. Explanation: 18, 03, 04 Explanation: 13,02 Rule 117: Rule 112: Class of Stock: Repl. Lambs Class of Stock: Reason to Use System: Ill Thrift Repl. Lambs Faecal Egg Count Value: Reason to Use System: III Thrift No fec Value Prevention Programme: Faecal Egg Count Value: Ave (250-500eggs/g) No Program Prevention Programme: Condition of Animals: No Program Good Condition of Animals: Average Don't drench this mob of Repl. Lambs. Do drench this mob of Repl. Lambs. Explanation: 34, 02 Explanation: 32.02

Rule 118:		Rule 121:	
Class of Stock:	Repl. Lambs	Class of Stock:	Repl. Lambs
Reason to Use System:	III Thrift	Reason to Use System:	Ill Thrift
Faecal Egg Count Value:	No fec Value	Faecal Egg Count Value:	No fec Value
Prevention Programme:	No Program	Prevention Programme:	No Program
Condition of Animals:	Average	Condition of Animals:	Average
Feeding Stress:	High	Feeding Stress:	Moderate
C	e	Safety of Pasture:	Safer
Do drench this mob of Rep	ol. Lambs.	Mob Stocking Rate:	Ave (10-15su/ha)
Explanation:	20, 02, 06	Don't drench this mob of 1	Repl. Lambs.
Rule 119:		Explanation:	23, 02
Class of Stock:	Repl. Lambs		
Reason to Use System:	Ill Thrift	Rule 122:	
Faecal Egg Count Value:	No fec Value	Class of Stock:	Repl. Lambs
Prevention Programme:	No Program	Reason to Use System:	Ill Thrift
Condition of Animals:	Average	Faecal Egg Count Value:	No fec Value
Feeding Stress:	Moderate	Prevention Programme:	No Program
Safety of Pasture:	Safe	Condition of Animals:	Average
		Feeding Stress:	Moderate
Do drench this mob of Repl. Lambs.		Safety of Pasture:	Safer
	•	Mob Stocking Rate:	Low $(< 10 \text{su/ha})$
Explanation:	21, 02	-	
-		Don't drench this mob of	Repl. Lambs.
Rule 120:			•
Class of Stock:	Repl. Lambs	Explanation:	24, 02
Reason to Use System:	Ill Thrift	•	
Faecal Egg Count Value:	No fec Value	Rule 123:	
Prevention Programme:	No Program	Class of Stock:	Repl. Lambs
Condition of Animals:	Average	Reason to Use System:	Ill Thrift
Feeding Stress:	Moderate	Faecal Egg Count Value:	No fec Value
Safety of Pasture:	Safer	Prevention Programme:	No Program
Mob Stocking Rate:	High (> 15su/ha)	Condition of Animals:	Average
e		Feeding Stress:	Moderate
Do drench this mob of Rep	pl. Lambs.	Safety of Pasture:	Unsafe
Explanation:	22, 02	Don't drench this mob of	Repl. Lambs.
		Explanation:	25, 02

Rule 124: Rule 129: Hoggets Class of Stock: Repl. Lambs Class of Stock: Reason to Use System: Ill Thrift Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Faecal Egg Count Value: Ave (250-500eggs/g) Condition of Animals: **Prevention Programme:** No Program Average Condition of Animals: Average Feeding Stress: Do drench this mob of Hoggets. Low Don't drench this mob of Repl. Lambs. Explanation: 14 Explanation: 26,02 Rule 130: Class of Stock: Hoggets Rule 125: Reason to Use System: Scouring Ave (250-500eggs/g) Class of Stock: Repl. Lambs Faecal Egg Count Value: Reason to Use System: Ill Thrift Condition of Animals: Poor Faecal Egg Count Value: No fec Value Prevention Programme: No Program Do drench this mob of Hoggets. Condition of Animals: Poor Explanation: 15 Do drench this mob of Repl. Lambs. Rule 131: 27,02 Class of Stock: Hoggets Explanation: Reason to Use System: Scouring Faecal Egg Count Value: High (> 500 eggs/g)Rule 126: Class of Stock: Repl. Lambs Reason to Use System: Ret./New Do drench this mob of Hoggets. 16 Do drench this mob of Repl. Lambs. Explanation: Rule 132: 35 Explanation: Class of Stock: Hoggets Rule 127: Reason to Use System: Scouring No fec Value Class of Stock: Hoggets Faecal Egg Count Value: Condition of Animals: Reason to Use System: Scouring Good Faecal Egg Count Value: Low (< 250 eggs/g)Don't drench this mob of Hoggets. Don't drench this mob of Hoggets. Explanation: 19, 01, 05 Explanation: 36.01 Rule 133: **Rule 128:** Class of Stock: Hoggets Reason to Use System: Scouring Class of Stock: Hoggets Reason to Use System: Faecal Egg Count Value: No fec Value Scouring Faecal Egg Count Value: Ave (250-500eggs/g) Condition of Animals: Average Condition of Animals: Good Feeding Stress: High Don't drench this mob of Hoggets. Do drench this mob of Hoggets. 20, 05, 06 Explanation: 13 Explanation:

Rule 134: Rule 138: Class of Stock: Hoggets Class of Stock: Hoggets Scouring Reason to Use System: Scouring Reason to Use System: Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Condition of Animals: Condition of Animals: Average Average Feeding Stress: Moderate Feeding Stress: Moderate Safety of Pasture: Safe Safety of Pasture: Unsafe Don't drench this mob of Hoggets. Do drench this mob of Hoggets. 25, 01, 05 Explanation: 21.05 Explanation: Rule 135: Rule 139: Class of Stock: Class of Stock: Hoggets Hoggets Reason to Use System: Scouring Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Condition of Animals: Average Condition of Animals: Average Feeding Stress: Moderate Feeding Stress: Low Safety of Pasture: Safer Mob Stocking Rate: High (>15su/ha)Don't drench this mob of Hoggets. Do drench this mob of Hoggets. Explanation: 26, 01, 05 Rule 140: Explanation: 22.05 Class of Stock: Hoggets **Rule 136:** Reason to Use System: Scouring Hoggets Faecal Egg Count Value: No fec Value Class of Stock: Reason to Use System: Scouring Condition of Animals: Poor Faecal Egg Count Value: No fec Value Condition of Animals: Average Do drench this mob of Hoggets. Feeding Stress: Moderate Safety of Pasture: Safer Explanation: 27,05 Mob Stocking Rate: Ave (10-15su/ha) **Rule 141:** Don't drench this mob of Hoggets. Class of Stock: Hoggets Reason to Use System: Due to be Explanation: 23, 01, 05 Don't drench this mob of Hoggets. Rule 137: Class of Stock: Hoggets Explanation: 37,05 Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Rule 142: Average Condition of Animals: Class of Stock: Hoggets Feeding Stress: Moderate Reason to Use System: Shifting Safety of Pasture: Safer Faecal Egg Count Value: Low (< 250 eggs/g)Mob Stocking Rate: Low (< 10 su/ha)Don't drench this mob of Hoggets. Don't drench this mob of Hoggets. Explanation: 36 Explanation: 24, 01, 05

Rule 143: Rule 148: Class of Stock: Hoggets Class of Stock: Hoggets Reason to Use System: Shifting 07itional Reason to Use System: Faecal Egg Count Value: Ave (250-500eggs/g) Condition of Animals: Good Don't drench this mob of Hoggets. Don't drench this mob of Hoggets. **Explanation:** 07 Explanation: 13 Rule 149: Class of Stock: Hoggets Rule 144: Reason to Use System: Ill Thrift Class of Stock: Hoggets Faecal Egg Count Value: Low (< 250 eggs/g)Reason to Use System: Shifting Faecal Egg Count Value: Ave (250-500eggs/g) Don't drench this mob of Hoggets. Condition of Animals: Average Explanation: 36.01 Do drench this mob of Hoggets. Rule 150: 29 Class of Stock: Hoggets Explanation: Reason to Use System: Ill Thrift Rule 145: Faecal Egg Count Value: Ave (250-500eggs/g) Class of Stock: Hoggets Condition of Animals: Good Reason to Use System: Shifting Faecal Egg Count Value: Ave (250-500eggs/g) Don't drench this mob of Hoggets. Condition of Animals: Poor **Explanation:** 13 Do drench this mob of Hoggets. **Rule 151:** Class of Stock: Explanation: 30 Hoggets Reason to Use System: Ill Thrift Faecal Egg Count Value: **Rule 146:** Ave (250-500eggs/g) Condition of Animals: Class of Stock: Hoggets Average Reason to Use System: Shifting Faecal Egg Count Value: High (> 500 eggs/g)Do drench this mob of Hoggets. Do drench this mob of Hoggets. Explanation: 14 Explanation: 16 Rule 152: Class of Stock: Hoggets Rule 147: Reason to Use System: Ill Thrift Class of Stock: Faecal Egg Count Value: Hoggets Ave (250-500eggs/g) Shifting Reason to Use System: Condition of Animals: Poor Faecal Egg Count Value: No fec Value Do drench this mob of Hoggets. Don't drench this mob of Hoggets. Explanation: 15 38,05 Explanation:

Rule 153:Class of Stock:HoggetsReason to Use System:Ill ThriftFaecal Egg Count Value:High (> 500eggs/g)

Do drench this mob of Hoggets.

Explanation:

16

19, 01, 05

20, 05, 06

Rule 154:

Class of Stock:HoggetsReason to Use System:Ill ThriftFaecal Egg Count Value:No fec ValueCondition of Animals:Good

Don't drench this mob of Hoggets.

Explanation:

Rule 155:

Class of Stock:HoggetsReason to Use System:Ill ThriftFaecal Egg Count Value:No fec ValueCondition of Animals:AverageFeeding Stress:High

Do drench this mob of Hoggets.

Explanation:

Rule 156:

Class of Stock:HoggetsReason to Use System:Ill ThriftFaecal Egg Count Value:No fec ValueCondition of Animals:AverageFeeding Stress:ModerateSafety of Pasture:Safe

Do drench this mob of

Explanation:

21,05

Rule 157: Hoggets Class of Stock: Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Condition of Animals: Average Moderate Feeding Stress: Safety of Pasture: Safer Mob Stocking Rate: High (> 15su/ha)Do drench this mob of Hoggets. 22,05 Explanation: Rule 158: Hoggets Class of Stock: Ill Thrift Reason to Use System: Faecal Egg Count Value: No fec Value Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Safer Mob Stocking Rate: Ave (10-15su/ha)Don't drench this mob of Hoggets. Explanation: 23, 01, 05 Rule 159: Hoggets Class of Stock: Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Safer Low (< 10 su/ha)Mob Stocking Rate: Don't drench this mob of Hoggets. Explanation: 24, 01, 05 Rule 160: Class of Stock: Hoggets Ill Thrift Reason to Use System: Faecal Egg Count Value: No fec Value Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Unsafe Don't drench this mob of Hoggets.

Explanation: 25, 01, 05

Rule 161:		Rule 166:	
Class of Stock:	Hoggets	Class of Stock:	Adult Sheep
Reason to Use System:	Ill Thrift	Reason to Use System:	Scouring
Faecal Egg Count Value:	No fec Value	Faecal Egg Count Value:	Ave (250-500eggs/g)
Condition of Animals:	Average	Condition of Animals:	Good
Feeding Stress:	Low		
C		Don't drench this mob of A	Adult Sheep.
Don't drench this mob of I	Hoggets.		-
		Explanation:	13
Explanation:	26,01,05	-	
-		Rule 167:	
Rule 162:		Class of Stock:	Adult Sheep
Class of Stock:	Hoggets	Reason to Use System:	Scouring
Reason to Use System:	III Thrift	Faecal Egg Count Value:	Ave (250-500eggs/g)
Faecal Egg Count Value:	No fec Value	Condition of Animals:	Average
Condition of Animals:	Poor		
		Do drench this mob of Adv	ult Sheep.
Do drench this mob of Ho	ggets.		
	66	Explanation:	14
Explanation:	27.05		
	,	Rule 168:	
Rule 163:		Class of Stock:	Adult Sheep
Class of Stock:	Hoggets	Reason to Use System:	Scouring
Reason to Use System:	Ret /New	Faecal Egg Count Value	Ave $(250-500eggs/g)$
Reason to ose system.		Condition of Animals:	Poor
Do drench this mob of Ho	agets	condition of Alimitats.	1001
Do diench das mob of mogges.		Do dranch this mob of Ad	ult Sheen
Explanation.	35	Do arelient uns mob of Au	uit bheep.
	55	Explanation:	15
Rule 164.		Explanation.	15
Class of Stock:	Fwes/Lambs	Rula 160.	
Class of Stock.	Lwes/Lambs	Class of Stock:	Adult Shoon
Don't dranch this mak of l	Errog/Lomba	Class of Slock.	Souring
Don't drench unis mob or i	Ewes/Lamos.	Reason to Use System:	Scouring Utation ($> 500 \circ a \sigma a (\sigma)$)
Frankright	20 02 05	Faecal Egg Count value:	Hign (> 500eggs/g)
Explanation:	39, 02, 03	De duanch this week of Ad	ult Chaon
D-1-1(5)		Do drench this mod of Ad	uit Sneep.
			17
Class of Stock:	Adult Sneep	Explanation:	16
Reason to Use System:	Scouring		
Faecal Egg Count Value:	Low $(< 250 \text{eggs/g})$	Rule 170:	
		Class of Stock:	Adult Sheep
Don't drench this mob of A	Adult Sheep.	Reason to Use System:	Scouring
		Faecal Egg Count Value:	No fec Value
Explanation:	36, 01	Condition of Animals:	Good
		Don't drench this mob of .	Adult Sheep.
		Explanation:	19, 01, 05

Rule 171: Rule 175: Class of Stock: Adult Sheep Class of Stock: Adult Sheep Reason to Use System: Scouring Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Condition of Animals: Condition of Animals: Average Average Feeding Stress: High Feeding Stress: Moderate Safety of Pasture: Safer Do drench this mob of Adult Sheep. Mob Stocking Rate: Low (< 10 su/ha)Explanation: 20, 05, 06 Don't drench this mob of Adult Sheep. Rule 172: Explanation: 24, 01, 05 Class of Stock: Adult Sheep Rule 176: Reason to Use System: Scouring No fec Value Faecal Egg Count Value: Class of Stock: Adult Sheep Condition of Animals: Average Reason to Use System: Scouring Faecal Egg Count Value: Feeding Stress: Moderate No fec Value Safety of Pasture: Safe Condition of Animals: Average Feeding Stress: Moderate Do drench this mob of Adult Sheep. Safety of Pasture: Unsafe Explanation: 21,05 Don't drench this mob of Adult Sheep. Rule 173: Explanation: 25, 01, 05 Class of Stock: Adult Sheep Reason to Use System: Scouring Rule 177: Faecal Egg Count Value: No fec Value Class of Stock: Adult Sheep Condition of Animals: Average Reason to Use System: Scouring Feeding Stress: Moderate Faecal Egg Count Value: No fec Value Safety of Pasture: Safer Condition of Animals: Average Mob Stocking Rate: High (>15su/ha)Feeding Stress: Low Do drench this mob of Adult Sheep. Don't drench this mob of Adult Sheep. Explanation: 22,05 Explanation: 26, 01, 05 Rule 174: Rule 178: Class of Stock: Adult Sheep Class of Stock: Adult Sheep Reason to Use System: Scouring Reason to Use System: Scouring Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Condition of Animals: Average Condition of Animals: Poor Feeding Stress: Moderate Safety of Pasture: Safer Do drench this mob of Adult Sheep. Mob Stocking Rate: Ave (10-15su/ha) Explanation: 27,05 Don't drench this mob of Adult Sheep. Explanation: 23, 01, 05

Rule 179: **Rule 184:** Class of Stock: Adult Sheep Class of Stock: Adult Sheep Reason to Use System: Due to be Reason to Use System: Shifting High (>500 eggs/g)Faecal Egg Count Value: Don't drench this mob of Adult Sheep. Do drench this mob of Adult Sheep. 37,05 Explanation: Explanation: 16 **Rule 180:** Class of Stock: Adult Sheep Rule 185: Reason to Use System: Shifting Class of Stock: Adult Sheep Low (< 250 eggs/g)Faecal Egg Count Value: Reason to Use System: Shifting Faecal Egg Count Value: No fec Value Don't drench this mob of Adult Sheep. Don't drench this mob of Adult Sheep. Explanation: 36 Explanation: 38.05 Rule 181: Class of Stock: Adult Sheep Rule 186: Reason to Use System: Shifting Class of Stock: Adult Sheep Faecal Egg Count Value: Ave (250-500eggs/g) Reason to Use System: 07itional Condition of Animals: Good Don't drench this mob of Adult Sheep. Don't drench this mob of Adult Sheep. Explanation: 07 Explanation: 13 **Rule 187: Rule 182:** Class of Stock: Adult Sheep Class of Stock: Adult Sheep Reason to Use System: Ill Thrift Reason to Use System: Shifting Faecal Egg Count Value: Low (< 250 eggs/g)Faecal Egg Count Value: Ave (250-500eggs/g) Condition of Animals: Average Don't drench this mob of Adult Sheep. Do drench this mob of Adult Sheep. Explanation: 36,01 **Rule 188:** Explanation: 29 Class of Stock: Adult Sheep Rule 183: Reason to Use System: Ill Thrift Class of Stock: Adult Sheep Faecal Egg Count Value: Ave (250-500eggs/g) Condition of Animals: Reason to Use System: Shifting Good Faecal Egg Count Value: Ave (250-500eggs/g) Condition of Animals: Poor Don't drench this mob of Adult Sheep. Do drench this mob of Adult Sheep. Explanation: 13 Explanation: 30

Rule 189: Rule 194: Class of Stock: Adult Sheep Class of Stock: Adult Sheep Reason to Use System: Ill Thrift Reason to Use System: Ill Thrift Faecal Egg Count Value: Ave (250-500eggs/g) Faecal Egg Count Value: No fec Value Condition of Animals: Condition of Animals: Average Average Feeding Stress: Moderate Safety of Pasture: Do drench this mob of Adult Sheep. Safe Explanation: 14 Do drench this mob of Adult Sheep. Rule 190: Explanation: 21.05 Class of Stock: Adult Sheep Reason to Use System: Ill Thrift Rule 195: Faecal Egg Count Value: Ave (250-500eggs/g) Class of Stock: Adult Sheep Condition of Animals: Reason to Use System: Ill Thrift Poor Faecal Egg Count Value: No fec Value Condition of Animals: Do drench this mob of Adult Sheep. Average Feeding Stress: Moderate Explanation: 15 Safety of Pasture: Safer Mob Stocking Rate: High (> 15su/ha)Rule 191: Class of Stock: Adult Sheep Do drench this mob of Adult Sheep. Reason to Use System: Ill Thrift Faecal Egg Count Value: High (> 500 eggs/g)Explanation: 22,05 Do drench this mob of Adult Sheep. Rule 196: Class of Stock: Adult Sheep 16 Explanation: Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value **Rule 192:** Condition of Animals: Average Class of Stock: Adult Sheep Feeding Stress: Moderate Reason to Use System: Ill Thrift Safety of Pasture: Safer Faecal Egg Count Value: No fec Value Mob Stocking Rate: Ave (10-15su/ha) Condition of Animals: Good Don't drench this mob of Adult Sheep. Don't drench this mob of Adult Sheep. Explanation: 23, 01, 05 Explanation: 19, 01, 05 Rule 197: **Rule 193:** Class of Stock: Adult Sheep Class of Stock: Reason to Use System: Adult Sheep Ill Thrift Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Faecal Egg Count Value: No fec Value Condition of Animals: Average Condition of Animals: Feeding Stress: Moderate Average Feeding Stress: High Safety of Pasture: Safer Mob Stocking Rate: Low (< 10 su/ha)Do drench this mob of Adult Sheep. Don't drench this mob of Adult Sheep. Explanation: 20, 05, 06 Explanation: 24, 01, 05

Rule 198: Class of Stock: Adult Sheep Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Condition of Animals: Average Feeding Stress: Moderate Safety of Pasture: Unsafe Don't drench this mob of Adult Sheep. **Explanation:** 25, 01, 05 **Rule 199:** Class of Stock: Adult Sheep Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Condition of Animals: Average Feeding Stress: Low Don't drench this mob of Adult Sheep. Explanation: 26, 01, 05 **Rule 200:** Class of Stock: Adult Sheep Reason to Use System: Ill Thrift Faecal Egg Count Value: No fec Value Condition of Animals: Poor Do drench this mob of Adult Sheep. 27,05 Explanation:

Rule 201:

Class of Stock: Adult Sheep Reason to Use System: Ret./New

Do drench this mob of Adult Sheep.

Explanation: 35

Appendix Two

Pasture Safety Ruleset

Rule 1: Type of Pasture: Safety of Pasture is Safe.	New Pasture	Rule 7: Type of Pasture: Previous Grazing History: Safety of Pasture is Unsafe.	Pasture 1 to 4 Weeks
Rule 2: Type of Pasture: Safety of Pasture is Safe.	Forage Crops	Rule 8: Type of Pasture: Previous Grazing History: Species of Last Grazer:	Pasture 5 to 8 Weeks Goats
Rule 3: Type of Pasture:	Crop Residues	Safety of Pasture is Unsafe.	
Safety of Pasture is Safe. Rule 4: Type of Pasture: Safety of Pasture is Safe.	Cut for Hay/Silage	Rule 9: Type of Pasture: Previous Grazing History: Species of Last Grazer: Safety of Pasture is Unsafe.	Pasture 9 to 12 Weeks Goats
Rule 5: Type of Pasture: Previous Grazing History: Weeks	Pasture Spelled < 12	Rule 10: Type of Pasture: Previous Grazing History: Species of Last Grazer: Safety of Pasture is Unsafe.	Pasture 13 to 16 Weeks Goats
Safety of Pasture is Unsafe. Rule 6: Type of Pasture: Previous Grazing History:	Pasture Spelled > 12 Weeks	Rule 11: Type of Pasture: Previous Grazing History: Species of Last Grazer: Safety of Pasture is Unsafe.	Pasture 17 to 20 Weeks Goats
Safety of Pasture is Safe.		Rule 12: Type of Pasture: Previous Grazing History: Species of Last Grazer: Safety of Pasture is Unsafe.	Pasture 21 to 52 Weeks Goats

Rule 13:Type of Pasture:PasturePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:Other

Safety of Pasture is Unsafe.

Rule 14:

Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:Other

Safety of Pasture is Unsafe.

Rule 15:Type of Pasture:PasturePrevious Grazing History:13 to 16 WeeksSpecies of Last Grazer:Other

Safety of Pasture is Unsafe.

Rule 16:Type of Pasture:PasturePrevious Grazing History:17 to 20 WeeksSpecies of Last Grazer:Other

Safety of Pasture is Unsafe.

Rule 17:

Type of Pasture:PasturePrevious Grazing History:21 to 52 WeeksSpecies of Last Grazer:Other

Safety of Pasture is Unsafe.

Rule 18:

Type of Pasture:PasturePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:DeerSeason of the Year:Spring

Safety of Pasture is Unsafe.

Rule 19:

Type of Pasture:PasturePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:DeerSeason of the Year:SummerHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 20: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 5 to 8 Weeks Deer Summer Average

Pasture 5 to 8 Weeks

Deer

Rank

Summer

Pasture 5 to 8 Weeks

Autumn

Deer

Safety of Pasture is Unsafe.

Rule 21: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 22: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year:

Safety of Pasture is Unsafe.

Rule 23: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 5 to 8 Weeks Deer Winter Short

Safety of Pasture is Unsafe.

Rule 24: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 5 to 8 Weeks Deer Winter Average

Safety of Pasture is Unsafe.

Rule 25:Type of Pasture:Previous Grazing History:Species of Last Grazer:Season of the Year:Height of Pasture:

Pasture 5 to 8 Weeks Deer Winter Rank

Safety of Pasture is Safer.

Rule 26: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year:

Pasture 5 to 8 Weeks Cattle Spring

Safety of Pasture is Unsafe.

Rule 27:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Pasture 5 to 8 Weeks Cattle Summer Short

Safety of Pasture is Unsafe.

Rule 28:

Type of Pasture:	Pasture
Previous Grazing History:	5 to 8 Weeks
Species of Last Grazer:	Cattle
Season of the Year:	Summer
Height of Pasture:	Average

Safety of Pasture is Unsafe.

Rule 29:

Type of Pasture:	Pasture
Previous Grazing History:	5 to 8 Weeks
Species of Last Grazer:	Cattle
Season of the Year:	Summer
Height of Pasture:	Rank
÷	

Safety of Pasture is Safer.

Rule 30:

Type of Pasture:	
Previous Grazing History:	
Species of Last Grazer:	
Season of the Year:	

Pasture 5 to 8 Weeks Cattle Autumn

Safety of Pasture is Unsafe.

Rule 31: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 5 to 8 Weeks Cattle Winter Short

Safety of Pasture is Unsafe.

Rule 32:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Pasture 5 to 8 Weeks Cattle Winter Average

Pasture 5 to 8 Weeks

Cattle

Winter

Rank

Safety of Pasture is Unsafe.

Rule 33:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 34:

Type of Pasture:PasturePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:Sheep

Safety of Pasture is Unsafe.

Rule 35:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 9 to 12 Weeks Deer Spring Short

Safety of Pasture is Unsafe.

Rule 36:

Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:DeerSeason of the Year:SpringHeight of Pasture:Average

Safety of Pasture is Unsafe.

Rule 37: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 9 to 12 Weeks Deer Spring Rank

Safety of Pasture is Safer.

Rule 38:Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:DeerSeason of the Year:SummerHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 39:Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:DeerSeason of the Year:SummerHeight of Pasture:Average

Safety of Pasture is Safer.

Rule 40:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 9 to 12 Weeks Deer Summer Rank

Safety of Pasture is Safe.

Rule 41:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Deer Autumn Short

Safety of Pasture is Unsafe.

Rule 42: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 9 to 12 Weeks Deer Autumn Average

Pasture

Autumn

Pasture

Winter

Short

Deer

Deer

Rank

9 to 12 Weeks

Safety of Pasture is Unsafe.

Rule 43:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 44:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 45:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 46:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe

Declaration

9 to 12 Weeks

Pasture 9 to 12 Weeks Deer Winter Average

Pasture 9 to 12 Weeks Deer Winter Rank

Rule 47: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 9 to 12 Weeks Cattle Spring Short

Safety of Pasture is Unsafe.

Rule 48:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Cattle Spring Average

Safety of Pasture is Unsafe.

Rule 49:

Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:CattleSeason of the Year:SpringHeight of Pasture:Rank

Safety of Pasture is Safer.

Rule 50:

Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:CattleSeason of the Year:SummerHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 51:PastureType of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:CattleSeason of the Year:SummerHeight of Pasture:Average

Safety of Pasture is Safer.

Rule 52:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 53: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 54:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Cattle Autumn Average

Safety of Pasture is Unsafe.

Rule 55:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Cattle Autumn Rank

Safety of Pasture is Safer.

Rule 56: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 9 to 12 Weeks Cattle Winter Short

Safety of Pasture is Unsafe.

Pasture 9 to 12 Weeks Cattle Summer Rank

Pasture

Cattle

Short

Autumn

9 to 12 Weeks

Rule 57:	
Type of Pasture:	Pasture
Previous Grazing History:	9 to 12 Weeks
Species of Last Grazer:	Cattle
Season of the Year:	Winter
Height of Pasture:	Average

Pasture

Cattle

Winter

Rank

9 to 12 Weeks

Weeks

Safety of Pasture is Safer.

Rule 58:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 59:

Type of Pasture:	Pasture
Previous Grazing History:	9 to 12
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Spring

Safety of Pasture is Unsafe.

Rule 60:

Type of Pasture:	Pasture
Previous Grazing History:	9 to 12 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Summer
Height of Pasture:	Short

Safety of Pasture is Unsafe.

Rule 61:

Type of Pasture:	Pasture
Previous Grazing History:	9 to 12 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Summer
Height of Pasture:	Average

Safety of Pasture is Unsafe.

Rule 62: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 63: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year:

Safety of Pasture is Unsafe.

Rule 64:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Sheep Adult Winter Short

Safety of Pasture is Unsafe.

Rule 65:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Sheep Adult Winter Average

Safety of Pasture is Unsafe.

Rule 66:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Pasture 9 to 12 Weeks Sheep Adult Winter Rank

Safety of Pasture is Safer.

56

Rank Pasture 9 to 12 Weeks Sheep

Pasture

Sheep

Adult

Adult

Autumn

Summer

9 to 12 Weeks

Rule 67:Type of Pasture:PasturePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:SheepAge of Last Grazer:Lactating

Safety of Pasture is Unsafe.

Rule 68: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Age of Last Grazer:

Pasture 9 to 12 Weeks Sheep < 2 Years

Safety of Pasture is Unsafe.

Rule 69:

Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Deer
Season of the Year:	Spring
Height of Pasture:	Short

Safety of Pasture is Unsafe.

Rule 70:

Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Deer
Season of the Year:	Spring
Height of Pasture:	Average

Safety of Pasture is Safer.

Rule 71: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 72:Type of Pasture:PasturPrevious Grazing History:13 toSpecies of Last Grazer:DeerSeason of the Year:SummHeight of Pasture:Short

Pasture 13 to 16 Weeks Deer Summer Short

Pasture

Deer

Spring

Rank

13 to 16 Weeks

Safety of Pasture is Safer.

Rule 73: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 74: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 75:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 76: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 77: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Pasture 13 to 16 Weeks Deer Summer Average

Pasture 13 to 16 Weeks Deer Summer Rank

Pasture 13 to 16 Weeks Deer Autumn Short

Pasture 13 to 16 Weeks Deer Autumn Average

Pasture 13 to 16 Weeks Deer Autumn Rank Rule 78: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 79:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 80:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 81:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 82:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Pasture 13 to 16 Weeks Deer Winter Short

Pasture 13 to 16 Weeks Deer Winter Average

Pasture 13 to 16 Weeks Deer Winter Rank

Pasture 13 to 16 Weeks Cattle Spring Short

Pasture

Cattle

Spring

Average

13 to 16 Weeks

Rule 83: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 84: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 85:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 86:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 87:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Pasture 13 to 16 Weeks Cattle Spring Rank

Pasture 13 to 16 Weeks Cattle Summer Short

Pasture 13 to 16 Weeks Cattle Summer Average

Pasture 13 to 16 Weeks Cattle Summer Rank

Pasture 13 to 16 Weeks Cattle Autumn Short Rule 88: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 89:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 90:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 91:

Type of Pasture:PasturePrevious Grazing History:13 to 16 WeeksSpecies of Last Grazer:CattleSeason of the Year:WinterHeight of Pasture:Average

Safety of Pasture is Safe.

Rule 92: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Pasture 13 to 16 Weeks Cattle Autumn Average

Pasture 13 to 16 Weeks Cattle Autumn Rank

Pasture 13 to 16 Weeks Cattle Winter Short

Winter Average Pasture 13 to 16 Week

13 to 16 Weeks Cattle Winter Rank

Rule 93: Type of Pasture: Pasture Previous Grazing History: 13 to 16 Weeks Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Spring Height of Pasture: Short Safety of Pasture is Unsafe. Rule 94: Type of Pasture: Pasture Previous Grazing History: 13 to 16 Weeks Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Spring Height of Pasture: Average Safety of Pasture is Unsafe. **Rule 95:** Type of Pasture: Pasture Previous Grazing History: 13 to 16 Weeks Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Spring Height of Pasture: Rank Safety of Pasture is Safer. **Rule 96:** Type of Pasture: Pasture Previous Grazing History: 13 to 16 Weeks Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Summer Height of Pasture: Short Safety of Pasture is Unsafe. **Rule 97:**

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Pasture 13 to 16 Weeks Sheep Adult Summer Average

Safety of Pasture is Safer.
Rule 98:	
Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Summer
Height of Pasture:	Rank
Safety of Pasture is Safe.	
Rule 99:	
Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Autumn
Height of Pasture:	Short
Safety of Pasture is Unsafe.	
Rule 100:	
Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Autumn
Height of Pasture:	Average
Safety of Pasture is Unsafe.	
Rule 101:	
Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Autumn
Height of Pasture:	Rank
Safety of Pasture is Safer.	
Rule 102:	
Type of Pasture:	Pasture
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Winter
Height of Pasture:	Short

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Rule 103:

Safety of Pasture is Safer.

Rule 104: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 105: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 106: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 107: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Pasture 13 to 16 Weeks Sheep Adult Winter Average

Pasture 13 to 16 Weeks Sheep Adult Winter Rank

Pasture 13 to 16 Weeks Sheep Lactating

Pasture 13 to 16 Weeks Sheep < 2 Years

Pasture 17 to 20 Weeks Deer Spring Short

Safety of Pasture is Unsafe.

60

Rule 108: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 109:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 110:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 111:

Type of Pasture: **Previous Grazing History:** Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe. Rule 112: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Pasture 17 to 20 Weeks Deer Spring Average

Pasture 17 to 20 Weeks Deer Spring Rank

Pasture 17 to 20 Weeks Deer Summer Short

Pasture

Summer

Average

Deer

17 to 20 Weeks

Pasture 17 to 20 Weeks Deer Summer Rank

Rule 113: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 114: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 115: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 116:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 117: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Pasture 17 to 20 Weeks Deer Winter Average

Safety of Pasture is Safe.

Pasture 17 to 20 Weeks Deer Autumn Short

Pasture 17 to 20 Weeks Deer Autumn Average

Pasture 17 to 20 Weeks Deer Autumn Rank

17 to 20 Weeks

Pasture

Deer

Short

Winter

61

Rule 118: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Deer Winter Rank

Pasture

Cattle

Spring

Pasture

Cattle

Spring

Average

Pasture

Cattle

Spring

Pasture

Cattle

Short

Summer

17 to 20 Weeks

Rank

17 to 20 Weeks

17 to 20 Weeks

Short

17 to 20 Weeks

Pasture

Safety of Pasture is Safe.

Rule 119:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 120:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 121:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 122: Type of Pasture:

Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

17 to 20 Weeks Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Safety of Pasture is Safe.

> Rule 124: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 125:

Rule 123:

Type of Pasture:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 126: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 127: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Pasture 17 to 20 Weeks Cattle Summer Average

Pasture 17 to 20 Weeks Cattle Summer Rank

Pasture 17 to 20 Weeks Cattle Autumn Short

Pasture 17 to 20 Weeks Cattle Autumn Average

Pasture 17 to 20 Weeks Cattle Autumn Rank

Rule 128: Type of Pasture: Pasture 17 to 20 Weeks **Previous Grazing History:** Species of Last Grazer: Cattle Winter Season of the Year: Short Height of Pasture:

Safety of Pasture is Safe.

Rule 129:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 130:

Type of Pasture: Pasture Previous Grazing History: 17 to 20 Weeks Species of Last Grazer: Cattle Season of the Year: Winter Height of Pasture: Rank

Safety of Pasture is Safe.

Rule 131:

Type of Pasture: Pasture 17 to 20 Weeks **Previous Grazing History:** Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Spring Short Height of Pasture:

Safety of Pasture is Unsafe.

Rule 132: Type of Pasture:

Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Pasture 17 to 20 Weeks Sheep Adult Spring Average

Pasture

Cattle

Winter

Average

17 to 20 Weeks

Safety of Pasture is Safer.

Rule 133:

Type of Pasture: Pasture Previous Grazing History: 17 to 20 Weeks Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Spring Height of Pasture: Rank Safety of Pasture is Safe. Rule 134: Type of Pasture: Pasture Previous Grazing History: 17 to 20 Weeks Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Summer Height of Pasture: Short Safety of Pasture is Safer. **Rule 135:** Type of Pasture: Previous Grazing History: Species of Last Grazer: Sheep Age of Last Grazer: Adult Season of the Year: Summer Height of Pasture: Average

Safety of Pasture is Safe.

Rule 136:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 137: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Pasture 17 to 20 Weeks Sheep Adult Autumn Short

Safety of Pasture is Unsafe.

Pasture 17 to 20 Weeks

Pasture 17 to 20 Weeks Sheep Adult Summer Rank

Rule 138:	
Type of Pasture:	Pasture
Previous Grazing History:	17 to 20 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Autumn
Height of Pasture:	Average
Safety of Pasture is Safer.	
Rule 139:	
Type of Pasture:	Pasture
Previous Grazing History:	17 to 20 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer	Adult
Season of the Vear:	Autumn
Height of Postures	Donic
neight of rasture.	Kalik
Safety of Pasture is Safe.	
Rule 140.	
Turno of Pasturo	Pastura
Provide Grazing History	17 to 20 Woole
Frevious Grazing History.	17 to 20 weeks
Species of Last Grazer:	Sneep
Age of Last Grazer:	Adult
Season of the Year:	Winter
Height of Pasture:	Short
Safety of Pasture is Safer.	
Pula 141.	
Type of Pastures	Desture
Province Graning History	17 to 20 Woolra
Species of Lest Creaser	Shoop
Species of Last Grazer:	Sneep
Age of Last Grazer:	Adult
Season of the Year:	Winter
Height of Pasture:	Average
Safety of Pasture is Safe.	
$\mathbf{D}_{\mathbf{u}}$ 142.	
Ruit 142:	Destruct
i ype of Pasture:	
Previous Grazing History:	17 to 20 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Winter
Height of Pasture:	Rank
Conference of Dearth and C. C. C.	

Rule 143: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Pasture 17 to 20 Weeks Sheep Lactating

17 to 20 Weeks

Pasture

Sheep < 2 Years

Pasture

Safety of Pasture is Unsafe.

Rule 144: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 145: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Safe.

Rule 146: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Safe.

Rule 147: Type of Pasture: Previous Grazing History:

Species of Last Grazer:

Safety of Pasture is Safe.

Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

21 to 52 Weeks Deer

Pasture 21 to 52 Weeks Cattle

21 to 52 Weeks

Pasture

Sheep

Pasture 21 to 52 Weeks Sheep Lactating

64

Rule 148: Type of Pasture:

- F
 - I 5

Safety of Pasture is Safe.

Rule 149:Type of Pasture:PastPrevious Grazing History:21 tSpecies of Last Grazer:SheAge of Last Grazer:< 2</td>

Pasture 21 to 52 Weeks Sheep < 2 Years

Safety of Pasture is Unsafe.

Rule 150:Type of Pasture:Chicory/LucernePrevious Grazing History:Spelled < 12 Weeks</td>

Safety of Pasture is Unsafe.

Rule 151:Type of Pasture:Chicory/LucernePrevious Grazing History:Spelled > 12 Weeks

Safety of Pasture is Safe.

Rule 152:Type of Pasture:Chicory/LucernePrevious Grazing History:1 to 4 Weeks

Safety of Pasture is Unsafe.

Rule 153:Chicory/LucerneType of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:Goats

Safety of Pasture is Unsafe.

Rule 154:Chicory/LucerneType of Pasture:Chicory/LucernePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:Goats

Safety of Pasture is Unsafe.

Rule 155: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Unsafe.

Rule 156: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Unsafe.

Rule 157: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Unsafe.

Rule 158: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Unsafe.

Rule 159:Type of Pasture:CPrevious Grazing History:9Species of Last Grazer:C

Safety of Pasture is Unsafe.

Rule 160:Type of Pasture:ChicorPrevious Grazing History:13 toSpecies of Last Grazer:Other

Safety of Pasture is Unsafe.

Rule 161: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Unsafe.

Rule 162: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Chicory/Lucerne 21 to 52 Weeks Other

Safety of Pasture is Unsafe.

Chicory/Lucerne

13 to 16 Weeks

Goats

Chicory/Lucerne 17 to 20 Weeks Goats

Chicory/Lucerne 21 to 52 Weeks Goats

Chicory/Lucerne 5 to 8 Weeks Other

Chicory/Lucerne 9 to 12 Weeks Other

Chicory/Lucerne 13 to 16 Weeks Other

Chicory/Lucerne 17 to 20 Weeks

Other

Rule 163:Chicory/LucerneType of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:DeerSeason of the Year:SpringHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 164:

Type of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:DeerSeason of the Year:SpringHeight of Pasture:Average

Safety of Pasture is Unsafe.

Rule 165:

Type of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:DeerSeason of the Year:SpringHeight of Pasture:Rank

Safety of Pasture is Safer.

Rule 166:

Type of Pasture:OPrevious Grazing History:5Species of Last Grazer:1Season of the Year:5Height of Pasture:5

Chicory/Lucerne 5 to 8 Weeks Deer Summer Short

Safety of Pasture is Unsafe.

Rule 167:

Chicory/Lucerne
5 to 8 Weeks
Deer
Summer
Average

Safety of Pasture is Safer.

Rule 168:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 169:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 170:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 171:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 172:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Chicory/Lucerne 5 to 8 Weeks Deer Summer Rank

Chicory/Lucerne 5 to 8 Weeks Deer Autumn Short

Chicory/Lucerne 5 to 8 Weeks Deer Autumn Average

Chicory/Lucerne 5 to 8 Weeks Deer Autumn Rank

Chicory/Lucerne 5 to 8 Weeks Deer Winter Short Rule 173:Chicory/LucerneType of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:DeerSeason of the Year:WinterHeight of Pasture:Average

Safety of Pasture is Safer.

Rule 174:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 175:

Type of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:CattleSeason of the Year:SpringHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 176:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture: Chicory/Lucerne 5 to 8 Weeks Cattle Spring Average

Chicory/Lucerne

5 to 8 Weeks

Deer

Rank

Winter

Safety of Pasture is Unsafe.

Rule 177:

Type of Pasture:	Chicory/Lucerne
Previous Grazing History:	5 to 8 Weeks
Species of Last Grazer:	Cattle
Season of the Year:	Spring
Height of Pasture:	Rank

Safety of Pasture is Safer.

Rule 178: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 179:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 180:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 181:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 182:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Chicory/Lucerne 5 to 8 Weeks Cattle Summer Short

Chicory/Lucerne 5 to 8 Weeks Cattle Summer Average

Chicory/Lucerne 5 to 8 Weeks Cattle Summer Rank

Chicory/Lucerne 5 to 8 Weeks Cattle Autumn Short

Chicory/Lucerne 5 to 8 Weeks Cattle Autumn Average Rule 183: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 184:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 185:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 186:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 187:

Type of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:SheepAge of Last Grazer:AdultSeason of the Year:Spring

Safety of Pasture is Unsafe.

Rule 188:

Chicory/Lucerne

Chicory/Lucerne

Chicory/Lucerne 5 to 8 Weeks

Chicory/Lucerne

5 to 8 Weeks

Cattle

Winter

Rank

5 to 8 Weeks

Cattle

Short

Cattle

Winter

Average

Winter

5 to 8 Weeks

Cattle

Rank

Autumn

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 189: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 190:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 191:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year:

Safety of Pasture is Unsafe.

Rule 192:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Chicory/Lucerne 5 to 8 Weeks Sheep Adult Summer Short

Chicory/Lucerne 5 to 8 Weeks Sheep Adult Summer Average

Chicory/Lucerne 5 to 8 Weeks Sheep Adult Summer Rank

Chicory/Lucerne 5 to 8 Weeks Sheep Adult Autumn

Chicory/Lucerne 5 to 8 Weeks Sheep Adult Winter Short

Safety of Pasture is Unsafe.

Rule 193:Chicory/LucerneType of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:SheepAge of Last Grazer:AdultSeason of the Year:WinterHeight of Pasture:Average

Safety of Pasture is Unsafe.

Rule 194:

Type of Pasture:Chicory/LucernePrevious Grazing History:5 to 8 WeeksSpecies of Last Grazer:SheepAge of Last Grazer:AdultSeason of the Year:WinterHeight of Pasture:Rank

Safety of Pasture is Safer.

Rule 195:

Type of Pasture:Chicory/LucernePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:DeerSeason of the Year:SpringHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 196:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 197:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year:

Safety of Pasture is Safe.

Chicory/Lucerne 9 to 12 Weeks Deer Spring Average

Chicory/Lucerne 9 to 12 Weeks Deer Spring Rule 198: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 199:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 200:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 201:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 202: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Chicory/Lucerne 9 to 12 Weeks Deer Summer Short

Chicory/Lucerne 9 to 12 Weeks Deer Summer Average

Chicory/Lucerne 9 to 12 Weeks Deer Summer Rank

Chicory/Lucerne 9 to 12 Weeks Deer Autumn Short

Chicory/Lucerne 9 to 12 Weeks Deer Autumn Average Rule 203: Chicory/Lucerne Type of Pasture: Previous Grazing History: 9 to 12 Weeks Species of Last Grazer: Deer Season of the Year: Autumn Height of Pasture: Rank Safety of Pasture is Safe. **Rule 204:** Chicory/Lucerne Type of Pasture: 9 to 12 Weeks Previous Grazing History: Species of Last Grazer: Deer Season of the Year: Winter Height of Pasture: Short Safety of Pasture is Safer. **Rule 205:** Chicory/Lucerne Type of Pasture: Previous Grazing History: 9 to 12 Weeks Species of Last Grazer: Deer Season of the Year: Winter Height of Pasture: Average Safety of Pasture is Safe. **Rule 206:** Type of Pasture: Chicory/Lucerne 9 to 12 Weeks **Previous Grazing History:** Species of Last Grazer: Deer Season of the Year: Winter Height of Pasture: Rank Safety of Pasture is Safe. **Rule 207:** Chicory/Lucerne Type of Pasture: 9 to 12 Weeks Previous Grazing History: Species of Last Grazer: Cattle Season of the Year: Spring

Short

Safety of Pasture is Unsafe.

Height of Pasture:

Rule 208: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 209: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 210:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 211:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 212: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Chicory/Lucerne 9 to 12 Weeks Cattle Spring Average

Chicory/Lucerne 9 to 12 Weeks Cattle Spring Rank

Chicory/Lucerne 9 to 12 Weeks Cattle Summer Short

Chicory/Lucerne 9 to 12 Weeks Cattle Summer Average

Chicory/Lucerne 9 to 12 Weeks Cattle Summer Rank Rule 213:Type of Pasture:Chicory/LucernePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:CattleSeason of the Year:AutumnHeight of Pasture:Short

Safety of Pasture is Unsafe.

Rule 214:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 215:

Type of Pasture:Chicory/LucernePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:CattleSeason of the Year:AutumnHeight of Pasture:Rank

Safety of Pasture is Safe.

Rule 216:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 217:

Type of Pasture:ChPrevious Grazing History:9Species of Last Grazer:CaSeason of the Year:WHeight of Pasture:Av

Safety of Pasture is Safe.

Chicory/Lucerne 9 to 12 Weeks Cattle Winter Average

Chicory/Lucerne

9 to 12 Weeks

Cattle

Winter

Short

Chicory/Lucerne

9 to 12 Weeks

Cattle

Autumn

Average

Rule 218: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 219:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 220:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Chicory/Lucerne 9 to 12 Weeks Sheep Adult Spring Average

Chicory/Lucerne

9 to 12 Weeks

Sheep

Adult

Spring

Rank

Safety of Pasture is Unsafe.

Rule 221:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 222:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Chicory/Lucerne 9 to 12 Weeks Sheep Adult Summer Short

Safety of Pasture is Unsafe.

71

Chicory/Lucerne 9 to 12 Weeks Cattle Winter Rank

Chicory/Lucerne

9 to 12 Weeks

Sheep

Adult

Spring

Short Chicory/Lucern Rule 223: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer. **Rule 224:** Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 225:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 226:

Type of Pasture:Chicory/LucernePrevious Grazing History:9 to 12 WeeksSpecies of Last Grazer:SheepAge of Last Grazer:AdultSeason of the Year:AutumnHeight of Pasture:Average

Safety of Pasture is Unsafe.

Rule 227:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Chicory/Lucerne 9 to 12 Weeks Sheep Adult Autumn Rank

Safety of Pasture is Safer.

Chicory/Lucerne 9 to 12 Weeks Sheep Adult Summer Average

Chicory/Lucerne 9 to 12 Weeks Sheep Adult Summer Rank

Chicory/Lucerne 9 to 12 Weeks Sheep Adult Autumn Short Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 229:

Rule 228:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 230: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 231: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 232: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Chicory/Lucerne 9 to 12 Weeks Sheep Adult Winter

Chicory/Lucerne

Chicory/Lucerne

9 to 12 Weeks

9 to 12 Weeks

Sheep

Adult

Short

Sheep

Adult

Rank

Winter

Average

Winter

Chicory/Lucerne 9 to 12 Weeks Sheep Lactating

Chicory/Lucerne 9 to 12 Weeks Sheep < 2 Years Rule 233: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 234: Type of Pasture:

Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 235:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 236:

Type of Pasture:	Chicory/Lucerne
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Deer
Season of the Year:	Summer

Safety of Pasture is Safe.

Rule 237:

Type of Pasture: **Previous Grazing History:** Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Chicory/Lucerne 13 to 16 Weeks Deer Spring Short

Chicory/Lucerne 13 to 16 Weeks Deer Spring Average

Chicory/Lucerne 13 to 16 Weeks Deer Spring Rank

Weeks

Chicory/Lucerne 13 to 16 Weeks Deer Autumn Short

Rule 238:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 239:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 240:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year:

Safety of Pasture is Safe.

Rule 241: Type of Pasture: **Previous Grazing History:** Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 242:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Chicory/Lucerne 13 to 16 Weeks Deer Autumn Average

Chicory/Lucerne 13 to 16 Weeks Deer Autumn Rank

Chicory/Lucerne 13 to 16 Weeks Deer Winter

Chicory/Lucerne 13 to 16 Weeks Cattle Spring Short

Chicory/Lucerne 13 to 16 Weeks Cattle Spring Average

Rule 243: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 244: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year:

Safety of Pasture is Safe.

Rule 245:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 256:Type of Pasture:Previous Grazing History:Species of Last Grazer:Season of the Year:Height of Pasture:

Safety of Pasture is Safe.

Rule 257: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 258: Type of Pasture: Previous Grazing History: Species of Last Grazer: Season of the Year:

Safety of Pasture is Safe.

Chicory/Lucerne 13 to 16 Weeks Cattle Spring Rank

Chicory/Lucerne 13 to 16 Weeks Cattle Summer

Chicory/Lucerne 13 to 16 Weeks Cattle Autumn Short

Chicory/Lucerne 13 to 16 Weeks Cattle Autumn Average

Chicory/Lucerne 13 to 16 Weeks Cattle Autumn Rank

Chicory/Lucerne 13 to 16 Weeks Cattle Winter Rule 259: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 260: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 261: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 262:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safer.

Rule 263: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Spring Short

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Spring Average

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Spring Rank

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Summer Short

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Summer Average

Rule 264:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 265:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Unsafe.

Rule 266:

Type of Pasture:	Chicory/Lucerne
Previous Grazing History:	13 to 16 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	Adult
Season of the Year:	Autumn
Height of Pasture:	Average

Safety of Pasture is Safer.

Rule 267:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 268:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture: Chicory/Lucerne 13 to 16 Weeks Sheep Adult Winter Short

Chicory/Lucerne

13 to 16 Weeks

Sheep

Adult

Rank

Autumn

Safety of Pasture is Safer.

Rule 269:

Chicory/Lucerne

Chicory/Lucerne

13 to 16 Weeks

13 to 16 Weeks

Sheep

Adult

Rank

Sheep

Adult

Short

Autumn

Summer

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 270:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer: Season of the Year: Height of Pasture:

Safety of Pasture is Safe.

Rule 271:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 272: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 273: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Safe.

Rule 274: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Safe.

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Winter Average

Chicory/Lucerne 13 to 16 Weeks Sheep Adult Winter Rank

Chicory/Lucerne 13 to 16 Weeks Sheep Lactating

Chicory/Lucerne 13 to 16 Weeks Sheep < 2 Years

Chicory/Lucerne 17 to 20 Weeks Deer

Chicory/Lucerne 17 to 20 Weeks Cattle Rule 275:Type of Pasture:Chicory/LucernePrevious Grazing History:17 to 20 WeeksSpecies of Last Grazer:SheepAge of Last Grazer:Adult

Safety of Pasture is Safe.

Rule 276: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Chicory/Lucerne 17 to 20 Weeks Sheep Lactating

Safety of Pasture is Unsafe.

Rule 277:

Type of Pasture:	Chicory/Lucerne
Previous Grazing History:	17 to 20 Weeks
Species of Last Grazer:	Sheep
Age of Last Grazer:	< 2 Years

Safety of Pasture is Unsafe.

Rule 278:Type of Pasture:Chicory/LucernePrevious Grazing History:21 to 52 WeeksSpecies of Last Grazer:Deer

Safety of Pasture is Safe.

Rule 279: Type of Pasture: Previous Grazing History: Species of Last Grazer:

Safety of Pasture is Safe.

Rule 280:

Type of Pasture: Previous Grazing History: Species of Last Grazer: Chicory/Lucerne 21 to 52 Weeks Sheep

Chicory/Lucerne 21 to 52 Weeks

Cattle

Safety of Pasture is Safe.

Rule 281: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Safety of Pasture is Unsafe.

Rule 282: Type of Pasture: Previous Grazing History: Species of Last Grazer: Age of Last Grazer:

Chicory/Lucerne 21 to 52 Weeks Sheep < 2 Years

Chicory/Lucerne

21 to 52 Weeks

Sheep

Lactating

Safety of Pasture is Unsafe.

Appendix Three

Stock Condition Ruleset

Rule 1: Severity of Scouring: Condition of Stock is Poor.	Severe	Rule 8: Severity of Scouring: Condition of Wool: Body Condition:	Not Scouring Bright/Good Increasing
Rule 2: Severity of Scouring: Condition of Wool: Body Condition:	Moderate Bright/Good Increasing	Condition of Stock is Good. Rule 9: Severity of Scouring:	Not Scouring
Condition of Stock is Good.		Condition of Wool: Body Condition:	Bright/Good Stable
Rule 3: Severity of Scouring:	Moderate	Condition of Stock is Good.	
Condition of Wool: Body Condition:	Bright/Good Stable	Rule 10: Severity of Scouring: Condition of Wool:	Not Scouring Bright/Good
Condition of Stock is Averag	e.	Body Condition:	Decreasing
Rule 4: Severity of Scouring:	Moderate	Condition of Stock is Averag	e.
Condition of Wool:	Bright/Good	Rule 11:	
Body Condition:	Decreasing	Severity of Scouring: Condition of Wool:	Not Scouring Dull/Poor
Condition of Stock is Poor.		Body Condition:	Increasing
Rule 5:		Condition of Stock is Good.	
Severity of Scouring:	Moderate		
Condition of Wool:	Dull/Poor	Rule 12:	
Body Condition:	Increasing	Severity of Scouring: Condition of Wool:	Not Scouring Dull/Poor
Condition of Stock is Averag	e.	Body Condition:	Stable
Rule 6:		Condition of Stock is Average.	
Severity of Scouring:	Moderate		
Condition of Wool:	Dull/Poor	Rule 13:	
Body Condition:	Stable	Severity of Scouring: Condition of Wool:	Not Scouring Dull/Poor
Condition of Stock is Poor.		Body Condition:	Decreasing
Rule 7:		Condition of Stock is Poor.	
Severity of Scouring:	Moderate		
Condition of Wool: Body Condition:	Dull/Poor		
	Dereasing		
Condition of Stock is Poor.			

77

ŧ.

Appendix Four

Feeding Stress Ruleset

Rule	1:		
Quan	tity	of	Feed:

Quality of Feed:

High Good

Stress of Feeding is Low.

Rule 2:Quantity of Feed:HiQuality of Feed:Av

High Average

Stress of Feeding is Low.

Rule 3:	
Quantity of Feed:	High
Quality of Feed:	Poor

Stress of Feeding is Moderate.

Rule 4:Quantity of Feed:MediumQuality of Feed:Good

Stress of Feeding is Low.

Rule 5:Quantity of Feed:MediumQuality of Feed:Average

Stress of Feeding is Moderate.

Rule 6:Quantity of Feed:MediumQuality of Feed:Poor

Stress of Feeding is High.

Rule 7:	
Quantity of Feed:	Low
Ouality of Feed:	Good

Stress of Feeding is Moderate.

Rule 8:Quantity of Feed:LowQuality of Feed:Average

Stress of Feeding is High.

Rule 9:Quantity of Feed:LowQuality of Feed:Poor

Stress of Feeding is High.

Appendix Five

Drenching Expert Explanations

Explanation 01:

If the problem does not begin to show obvious signs of improvement you should seek help from your vet to try and determine the cause of the problem.

Explanation 02:

We advise putting lambs on an internal parasite prevention programme starting at weaning.

Five drench preventive programme

Three lamb drenches starting from weaning at 22 day intervals, followed by two lamb drenches at 28 day intervals, followed by drenching only on the basis of the results of faecal egg count (FEC).

Explanation 03:

Make sure that the next time the animals are drenched they are placed on the safest pasture available to prevent early re-infection.

Explanation 04:

If the drenching programme appears to be ineffective then you should check that drench resistance is not the problem. This can be checked by taking faecal egg counts from 10-12 animals 7-12 days after drenching.

Explanation 05:

Ewe drenches are possibly the easiest to stop because of the ewes natural immunity. This immunity will be supported by good nutrition. Dropping ewe drenches also provides the potential for significant savings. Drenching on faecal egg count (FEC) levels is recommended.

Explanation 06:

Animals are less able to counter the effects of a worm burden when under stress. It is therefore vital to maintain good levels of nutrition that meet the seasonal needs of the animal.

Explanation 07:

You should not drench adult animals at set times (traditional)as this can be both a waste of money and increase the chances of resistance.

Act now to delay the onset of drench resistance, prolong the effectiveness of the remaining drenches, and minimise the occurrence of total drench failure.

Plan and adopt a parasite control programme:

- Reduce the number of drenches annually therefore decreasing selection pressure for drench resistance.
- Include farm grazing management practices to reduce exposure of young stock to parasite-contaminated pastures.
- Include appropriate drench management strategies.
- Include measures to check the programme is working.

Explanation 08:

Stock is not usually drenched when the faecal egg count value is low (< 250 eggs/g), however, these lambs are on a internal parasite prevention program and this needs to be maintained so the lambs should be drenched according to the programme.

Explanation 09:

These animals are on a internal parasite prevention programme and are not due to be drenched at this time. Even though the animals are not doing so well the faecal egg count value is low (< 250 eggs/g) indicating that it may not be a internal parasite problem.

Explanation 10:

Since these animals are not on an internal parasite prevention programme and the faecal egg count value is low (< 250 eggs/g) they should not be drenched.

Explanation 11:

These animals should be drenched as they are on an internal parasite prevention programme and are due to be drenched. When the faecal egg count value is average (250-500 eggs/g) animals are drenched based on the condition of the animals.

Explanation 12:

While the faecal egg count value is average (250-500 eggs/g), the animals should not be drenched because they are currently under an internal parasite prevention programme and are not due to be drenched at this time. The timing of drenches as prescribed by the programme should be strictly adhered to.

Explanation 13:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on there condition. Since these animals are in good condition they should not be drenched.

Explanation 14:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on there condition. Since these animals are in average condition and are scouring they should be drenched.

Explanation 15:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on there condition. Since these animals are in poor condition and are scouring they should be drenched.

Explanation 16:

When the faecal egg count value is high (> 500 eggs/gram) stock should be drenched and placed on the safest best pasture available.

Explanation 17:

These animals should be drenched as they are on an internal parasite prevention programme and are due to be drenched.

Explanation 18:

These animals should not be drenched because they are currently under an internal parasite prevention programme and are not due to be drenched at this time. The timing of drenches as prescribed by the programme should be strictly adhered to.

Explanation 19:

These animals should not be drenched as they are in good condition even though they are scouring.

Explanation 20:

These animals should be drenched as they are under a high level of feeding related stress and are only in average condition.

Explanation 21:

Since there is safe pasture for the animals to go onto and they are of average condition and under moderate feed stress they should be drenched.

Explanation 22:

Since the stocking rate of this mob is high and there is safer pasture for them to go onto after drenching they should be drenched.

Explanation 23:

Although the condition of the animals in this mob is only average and they are under moderate feed stress they should not be drenched since the pasture available for them to go onto is not entirely safe and the stocking rate is only average (10-15 su/ha).

Explanation 24:

Although the condition of the animals in this mob is only average and they are under moderate feed stress they should not be drenched since the pasture available for them to go onto is not entirely safe and the stocking rate is low (< 10 su/ha).

Explanation 25:

Because animal condition is average and there is no safe pasture for them to go onto after drenching these animals should not be drenched.

Explanation 26:

While animal condition is average stress on the animals related to feeding is low so they should not be drenched.

Explanation 27:

Since these animals are not doing well and they are in poor condition they should be drenched and put on the best quality and quantity of safest pasture available.

Explanation 28:

Lambs that are on a preventative programme need to be drenched at the times specified by the programme. Failure to drench at the specified times may affect the effectiveness of the prevention programme.

Explanation 29:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on their condition. Since these animals are only in average condition they should be drenched.

Explanation 30:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on their condition. Since these animals are in poor condition they should be drenched.

Explanation 31:

These animals should not be drenched as they are in good condition so probably don't have a worm problem.

Explanation 32:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on their condition. Since these animals are in average condition and not doing very well they should be drenched.

Explanation 33:

When the faecal egg count value is average (250-500 eggs/gram) animals are drenched based on their condition. Since these animals are not doing so well they should be drenched.

Explanation 34:

These animals should not be drenched as they are in good condition even though they are not doing so well.

Explanation 35:

When new stock are brought (including those that have been away grazing) onto a farm they should be quarantine drenched with a Milbemycin/Avermectin drench and then held in the yards or a small paddock set aside for the purpose, for 12-24 hours before being released onto the farm. The reason for this is that live eggs will still be passed by the stock for a few hours after drenching. If possible try and drench the stock before transporting them to a new farm.

Explanation 36:

When the faecal egg count level is low (<250 eggs/gram) stock should not be drenched.

Explanation 37:

We do not recommend putting these animals onto an internal parasite prevention programme. You should consider not drenching the animals at this time.

Explanation 38:

Since shifting is the only reason to consider drenching these animals at this time they should not be drenched.

Explanation 39:

It is not usual to drench either the ewes and/or the lambs in a mob of ewes for practical reasons.

Appendix Six

Drenching Expert Help

"Readme" Button Help:

You would use this expert system if you wish to know whether or not to drench a specific mob of sheep. It will ask you a series of questions and then render an opinion based on the answers given to the system by you. Then you will be asked if you wish to be given an explanation of the system's opinion.

Class of Stock Help:

Class of Stock

Select the list item that best describes the animals in the mob you wish the system to consider.

- Works lambs are weaned lambs that are being grown for meat and will when ready be sent to the freezing works. Weaned store lambs may also be included in this category.
- Repl. Lambs (replacement lambs or ewe lambs) are weaned lambs that are to be retained for the flock.
- Hoggets, replacement animals older than one year and less than two years.
- Ewes/Lambs, ewes with lambs at foot.
- Adult Sheep refers to all other animals from two-tooths and older. These may be ewes or rams/whethers.

Reason to Drench Help:

Reason to Drench

Select the list item that best describes the reason for considering drenching at this time.

- Scouring, the reason you are considering drenching the animals is that they are scouring.
- Programme, the animals concerned are due to be drenched as part of a internal parasite prevention programme.
- Shifting, the mob in question is about to be shifted onto a new paddock or block. This would often be an area that has a low level of infective larvae.
- Ill Thrift, the animals in the mob do not appear to be doing well yet they have plenty of good quality feed.
- Traditional, it is usual to drench this mob at this time.
- Ret./New, refers to animals that have either been away from the property grazing and are now returning, or to animals that have been recently purchased and are about to be introduced to the flock.

Faecal Egg Count Help:

Faecal Egg Count

Select the list item that best describes the faecal egg count (FEC) value for the mob in question. Faecal egg counts involve taking about 10 fresh dung samples from a mob of sheep/lambs. The samples are sent to the MAF Animal Health Lab or your vet where the number of parasite eggs are counted.

- Low (<250 eggs/g), the fec value is less than 250 eggs per gram of dung. It is not usual to drench with a low value.
- Ave (250-500 eggs/g), there is an average number of eggs in the dung sample. Animals are drenched based on their condition.
- High (> 500 eggs/g), there are a lot of eggs in the dung sample and animals are usually drenched.
- No FEC Value, faecal egg count have not been done for these animals.

Internal Parasite Prevention Programme Help:

Internal Parasite Prevention Programme

Select the list item that best describes the lambs status in relation to an internal parasite prevention programme.

- Due, means that the animals are currently on a prevention programme and they are due to be drenched.
- Not Due, the animals are under an internal parasite prevention programme but are not due to be drenched at this time.
- No Programme, the animals are not involved with a prevention programme.

Condition of Stock Help:

Condition of Stock

Select the list item that best describes the condition of the animals in the mob. The 'Indepth' button beside the 'Help' button in this window can help you answer this question. It will ask you questions to allow the system to determine the condition of the animals in the mob.

- Good, the overall condition of the animals in the mob is good.
- Average, the condition of the animals in the mob is average.
- Poor, animal condition is poor.

The system considers whether or not the animals are scouring, wool condition, and body condition.

Feed Stress Help:

Feeding Related Stress

Select the list item that best describes the stress the animals are under due to feed availability. The 'Indepth' button beside the 'Help' button in this window can help you answer this question. It will ask you questions to allow the system to determine the feed stress of the animals in the mob.

- High, stress placed on the animals is high do to lack of feed and/or poor quality.
- Moderate, feed stress is moderate.
- Low, the animals in the mob are not under pressure due to the feed on offer. They have been offered reasonable quantity of quality feed.

You should select appropriate farming strategies to keep animals well fed and in good health. Healthy stock are less susceptible to internal parasite challenge.

Safe Pasture Help:

Safe Pasture

Select the list item that best describes the safety of the pasture the animals will be grazing after being drenched. The 'Indepth' button beside the 'Help' button in this window can help you answer this question. It will ask you questions to allow the system to determine how safe the pasture is.

- Safe, the pasture the animals are going to be grazing after being drenched has a low level of infective larvae.
- Safer, the pasture the animals are going to be grazing after being drenched has a moderate level of infective larvae on it.
- Unsafe, the pasture the animals are to be put on after drenching has a high level of infective larvae on it.

Stocking Rate Help:

Stocking Rate

Select the list item that best describes the stocking rate of the mob on the pasture prior to being drenched.

- High (>15), the stocking rate on the paddock the animals have been on was greater than 15 su/ha.
- Ave (10-15), the stocking rate on the paddock the animals have come from was 10 to 15 su/ha.
- Low (<10), the stocking rate on the paddock the animals have been on was less than 10 su per hectare.

The size of the parasite problem is largely density dependent. The higher the stocking rate for a particular stock class the potential parasite problem.

Type of Pasture Help:

Type of Pasture

Select the list item that best describes the type of pasture that the animals will be going onto after drenching.

- New Pasture, these are pastures that have been sown down and as a result have not had stock on them for a number of weeks. They are considered to be safe.
- Forage Crops, also considered to be safe pastures. These are paddocks that have been ungrazed for a period of time while the crop grows.
- Crop Residues, also known as stubble paddocks. They are considered safe because they have not been grazed for some time.
- Cut for Hay/Silage, since they have been shut up for a period of time they are also considered to be safe pastures.
- Pasture, is any other pasture.
- Chicory/Lucerne, these are separated from ryegrass based pasture because they inhibit larvae survival in the sward.

Grazing History Help:

Grazing History

Select the list item that best describes the grazing history of the pasture that the animals will be going onto after drenching.

- spelled < 12 wks, paddocks that have been spelled but for less than 12 weeks.
- spelled > 12 wks, paddocks that have been spelled for longer than 12 weeks. It takes at least this long for the larval level to drop significantly.
- The last six list options (1-4 weeks down to 21-52 weeks) refer to the period that the pastures has been grazed prior to the mob in question being grazed there. If the paddock has been grazed by several mobs of animals of the same class, species and age then they can be added together.

Species Help:

Species

Select the list item that best describes the species of the animals that last grazed the paddock the animals in question will go onto after being drenched. These are the animals that grazed the pasture for the time specified in the previous question.

Age of Last Grazer Help:

Age of Last Grazer

Select the list item that best describes the age of the animals that last grazed the paddock the animals in question will go onto after being drenched.

- Adult, all animals that are over 2 years old that are not lactating.
- Lactating, lactating animals are considered to be susceptible so have to be separated from adult animals
- < 2 yrs, young animals are considered susceptible and as a result continually return parasite eggs to the pasture. When older than two years they have built up sufficient resistance to be considered resistant.

Season Help:

Season

Select the list item that best describes the season in which the last grazer grazed the pasture in question.

Some seasons are less conducive to larval survival than others. While the cool temperatures of winter may slow larval development few are killed. Dry and hot periods will kill many larvae. The warm and moist condition of spring and autumn allow larvae to survive for many weeks in the sward.

Pasture Height Help:

Pasture Height

Select the list item that best describes the height of the pasture the animals in question will be going onto.

- Short, short pastures such as those of a summer drought.
- Average, pastures of average height.
- Rank, pastures such as those in spring and autumn.

Because larvae are concentrated in the area around the base of the plant animals grazing close to the ground are more likely to ingest significant numbers of infective larvae. Therefore rank pastures can mean that stock are not exposed to high numbers of infective larvae.

Scouring Help:

Scouring

Select the list item that best describes the animals in the mob in question with regard to scouring.

- Severe, most of the animals in the mob are scouring badly.
- Moderate, some individuals in the mob are scouring badly while most are not, or animals are scouring but not badly.
- Not Scouring, in general the animals in the mob are not scouring.

Condition of Wool Help:

Condition of Wool

Select the list item that best describes the condition of the wool of the animals in the mob in question.

- Bright/Good, in general the wool of the animals in the mob is bright and of good quality.
- Dull/Poor, in general the wool of the animals in the mob is poor and dull in appearance.

Body Condition Help:

Body Condition

Select the list item that best describes the body condition of the animals in the mob in question over time.

- Increasing, over time the body condition of the animals is increasing.
- Stable, body condition is stable over time.
- Decreasing, over time body condition is decreasing.

Quantity of Available Feed Help:

Quantity of Available Feed

Select the list item that best describes the quantity of feed that has been available to the animals in the mob. This should be similar to the quantity of feed available in the future.

- High, the quantity of feed available to the mob has been and will be high.
- Medium, the quantity of feed available to the mob has been and will be about average.
- Low, the quantity of feed available to the mob has been and will be about low. The animals are being fed at around maintenance.

Quality of Available Feed Help:

4

Quality of Available Feed

Select the list item that best describes the quality of feed that has been available to the animals in the mob. This should be similar to the quality of feed available in the future.

- Good, the quality of feed available to the mob has been and will be good.
- Average, the quality of feed available to the mob has been and will be about average.
- Poor, the quality of feed available to the mob has been and will be poor.

į,