

**THE HISTORY OF TICKS AND TICK-BORNE DISEASES IN CATTLE IN NATAL AND  
ZULULAND (KWAZULU-NATAL) FROM 1896 TO THE PRESENT.**

**By**

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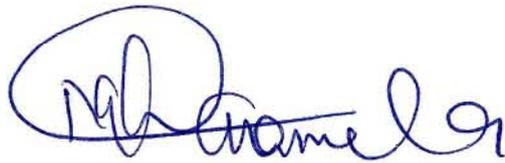
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## DECLARATION

This study represents original work by the author and has not submitted in any form for a degree or diploma to any other University. Where use has been made of the work of others it is duly acknowledged in the text. I also acknowledge the guidance of my supervisors Professors R. Edgecombe and B. Guest Dr H. Seton

A handwritten signature in blue ink, appearing to read 'D. Modikana Solomon Manamela', with a large circular flourish at the beginning.

David Modikana Solomon Manamela

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## ABSTRACT

The main objective of this dissertation was to identify the causes of the rise of the tick population in KwaZulu-Natal in 1999. After 100 years of intensive chemical tick control, tick numbers remain high and the stock losses caused by tick-borne diseases are still significant. In South Africa legislation was introduced to support intensive chemical tick control. Ticks have consistently shown themselves to possess a genetic pool containing the potential to resist a wide range of chemical poisons. The introduction of new chemicals followed by widespread use, has often resulted in the appearance of a tick population resistant to those chemicals. The problem is compounded by the fact that some farmers are also found to be helping ticks to multiply by not following instructions given by the chemical industry on how to use dips. Chemicals which are used to control ticks are also beyond the financial means of many cattle owners especially in resource-poor communities.

Apart from the high cost of intensive tick control, the chemicals that are used to destroy ticks are very poisonous, not only to ticks but to the birds which are natural predators of ticks. The negative effects of these chemicals on the environment combined with the high cost of tick control has forced a revision of intensive chemical tick control strategy. There is now a shift to use methods of tick control which are friendly to the environment and affordable to the resource-poor communities. This dissertation provides a historical overview of the problem in KwaZulu-Natal and recommendations on how to deal with the problem in future.

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### **List of Abbreviations:**

AHA	Animal Health Assistant
ANC	African National Congress
BHC	Benzene Hexachloride
CSO	Colonial Secretary's Office
DDT	Dichloro-diphenyl-Trichloroethane ( Insecticide)
ICS	Imperial Cold Storage Company
IFP	Inkatha Freedom Party
PVS	Principal Veterinary Surgeon
RP	Republic of South Africa
TRC	Truth and Reconciliation Commission
UDF	United Democratic Front
UDM	United Democratic Movement
UG	Union Government

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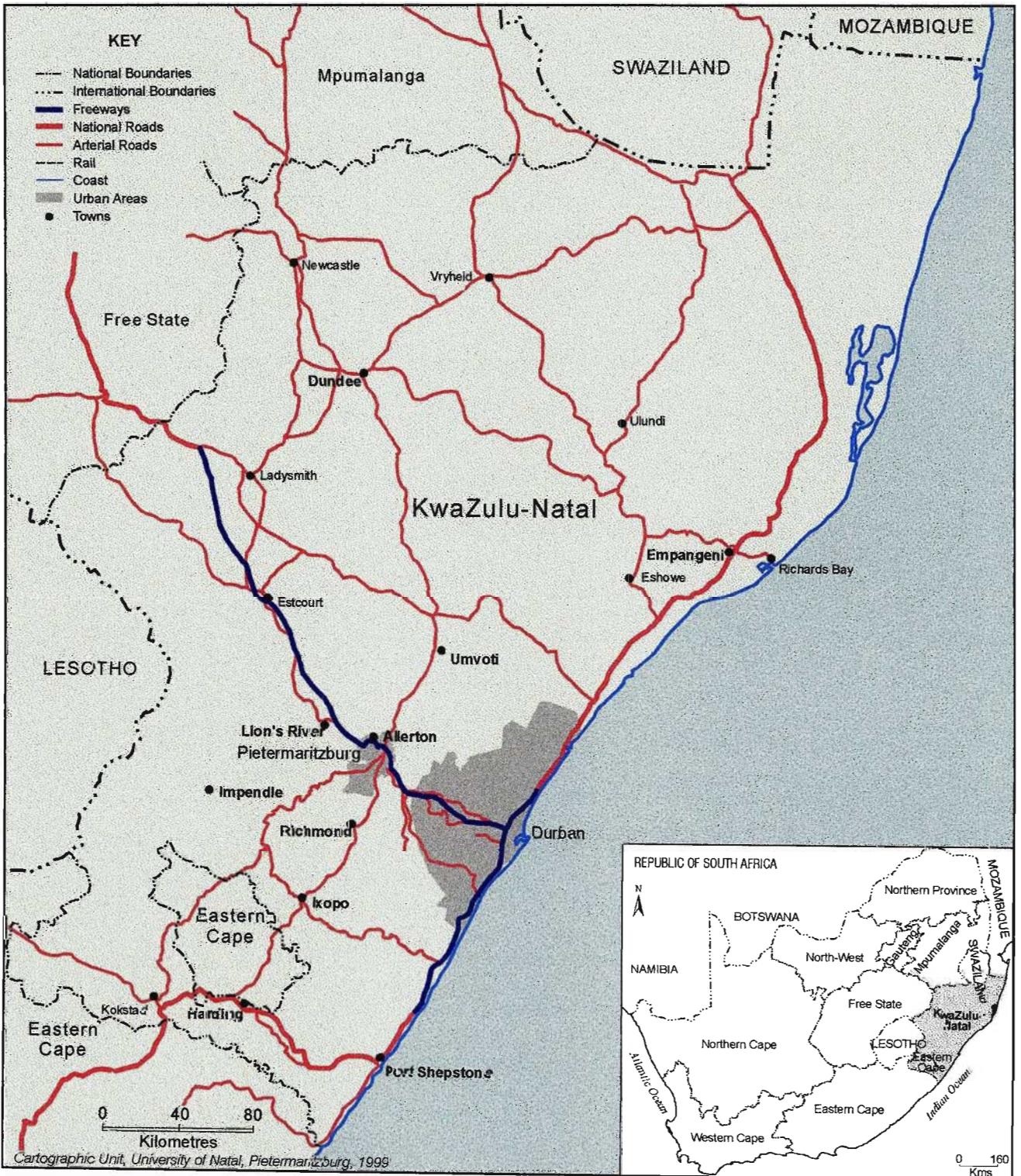


Figure 1.1: Map of KwaZulu-Natal

## INTRODUCTION

The main objective of this dissertation was to explain why there was phenomenal increase in the tick population in KwaZulu-Natal in the summer of 1998/9 and what can be done about it. After 100 years of intensive tick control, tick numbers remain high and stock losses caused by tick-borne diseases are still significant. In South Africa legislation was introduced to support intensive chemical tick control. Ticks have consistently shown themselves to possess a genetic pool containing the potential to resist a wide range of chemical poisons. The introduction of new chemicals followed by widespread use, has often resulted in the appearance of a tick population resistant to those chemicals. Chemicals which are used to control ticks are also beyond the financial means of many cattle owners especially in resource-poor communities.

Apart from the high cost of intensive tick control, the chemicals that are used to destroy ticks are very poisonous, not only to ticks but to the birds which are natural predators of ticks. The negative effects of these chemicals on the environment combined with the high cost of tick control, has forced a revision of intensive chemical tick control strategy. There is now a shift to use methods of tick control which are friendly to the environment and affordable to the resource-poor communities.

The understanding of a contemporary problem requires exploring its roots in the past, and the extent to which we achieve this understanding will make it possible to adopt more effective remedial action in the future. What happened in the past profoundly affects all aspects of our lives in the present and will, indeed, affect what happens in the future. By exploring the phenomenon of ticks and tick-borne diseases over time, it will be possible to discern the various factors at work in the dynamics of tick populations and the disease implications thereof.

The methodology of historical writing involves identifying the widest possible range of sources that can throw light on the subject. These sources embrace printed material such as the annual reports of magistrates, government departments such as agriculture and veterinary services, the records of commissions of inquiry, official and private correspondence, diaries, journal and newspaper reports. Another important source of information is provided by oral evidence obtained from farmers, veterinarians and government officials among others.

These sources have to be weighed and checked against one another. These sources will enable a coherent narrative to be constructed over time and trends to be identified and analyzed. The technique of inference is also used in enquiring into the past, present and future. An important task in interpreting these trends is understanding the social and political context in which they emerge, the role of climate and other ecological factors as they affect tick populations, and developments in the scientific understanding of ticks and tick-borne diseases.

The ideal approach would have been to make a region by region analysis of KwaZulu-Natal because of the relationship between climate, topography, vegetation and tick species, and the implication for different kinds of farming such as beef and dairy farming. I had to abandon the idea when it became clear that magisterial records of the chosen areas were not readily available. The difficulties of obtaining adequate information for a district by district analysis forced me to focus on the broad overview of the issue as a foundation for future research. This dissertation provides a historical overview of the problem of ticks and tick borne diseases in kwaZulu-Natal and recommendations on how to deal with the problem in future, as a starting point for a more rigorous regional analysis.

## CHAPTER ONE

### Ticks and the Control of Tick-Borne Diseases

#### 1.1 Introduction

Ticks are an important part of the ecosystem. Under extensive veld grazing, unadapted and sick animals tend to carry heavy tick burdens. Under these circumstances, tick-borne diseases serve as a process of natural selection. It is also desirable to retain a certain percentage of ticks in order to perpetuate immunity to tick-borne diseases. However, ticks transmit many devastating diseases to livestock which cause high mortality. Ticks also cause severe damage to hides and skins as well as teats and udders, resulting in big losses in milk and revenue. The problem is further aggravated by the high costs involved in purchasing acaricides. Despite many decades of intensive chemical control, ticks still remain a problem to the livestock industry in Natal and Zululand, or KwaZulu-Natal, as the province is now known. The cost to individual farmers and the government of preventing tick damage and tick-borne diseases is also considerable.

#### 1.2 Ecology of Ticks

Tick activities are determined by climate, but host factors also play an important part when dealing with an ectoparasite.<sup>1</sup> Within overall climatic constraints, host susceptibility and abundance can have dramatic effects on tick population dynamics.<sup>2</sup> The chief factor in the distribution of ticks is the

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<sup>1</sup>R. J. Tatchel, 'Ecology in Relation to Integrated Tick Management', in Insect Science Application, Vol. 13, No. 4 (1992), pp.551-561.

<sup>2</sup>Ibid. p.552.

physical character of the vegetation layer and the basal mat of the vegetation.<sup>3</sup> Tick species distribution differs with different climatic zones. Some species are adapted to cool, very moist environments, while others are adapted to dry, hot climates. Tick species differ in their habits, life cycles and distribution, and some areas are suited for the establishment of more than one species. In general, climatic zones grade into each other producing areas where the climatic suitability is decreasing for one tick species, and increasing for the other<sup>4</sup>. The success of both groups depends on their ability to survive and reproduce within the habitat of the animals they parasitise and from which they draw nutrients in the form of blood and other fluids.<sup>5</sup> The natural incidence and spreading of tick species in an area is determined by these ecological limitations.

Just as in the case of tick distribution, tick abundance may vary in response to climatic changes thereby altering the balance between tick species, so changes in tick abundance may be brought about by indirect human activities.<sup>6</sup> Tick abundance is helped by high stocking and susceptible breeds in the environment. The success of the trade-off between conservation and active host-seeking determines the success of tick populations in a particular environment.<sup>7</sup>

### 1.3 Different Types of Ticks

Ticks are divided into two main groups according to their feeding habits and development- single-host ticks and multi-host ticks<sup>8</sup> (see table 2.1 on page 8). The feeding and development of a single

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<sup>3</sup>S. F. Barnett, The Control of Ticks on Livestock (Food and Agriculture Organization of the United Nations, No. 54, Rome 1961), p.12.

<sup>4</sup>Tatchel, 'Ecology and Tick Management', p.552.

<sup>5</sup>Prepared by Members of the Cooper Research Organization: Cattle Tick Control (Berkhamsted, Cooper McDougall & Roberts, Ltd, No date), p.3.

<sup>6</sup>Ibid.

<sup>7</sup>Ibid. p.553.

<sup>8</sup>Newsletter of the Livestock Health and Production Group of South African Veterinary Association, Vol. 1, No.2, 1998.

host tick (Blue tick) takes place on a single host animal. The life cycle of a single- host can be completed within a very short period of about three weeks. The life cycle of the multi- host on the other hand is different in the sense that every different development stage of ticks involves engorging on a different animal. The life cycle of the multi- host ticks can take a full year to be completed, as in the case of the Bont tick (*Amblyomma hebraeum*). At every developmental stage of their life cycle, ticks feed only once and the blood meal is sufficient for moult to occur to the next stage<sup>9</sup>. Some species feed on almost any kind of animal. Others are host specific, and may only be found on one kind of animal. The rate at which ticks survive through these development stages influences their population levels and structure. The table below shows the different tick species and the types of diseases that they bring and their symptoms.

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<sup>9</sup>Ibid.

**Table 1.1.** The ticks which are classed as economically important in beef and dairy production in KwaZulu-Natal due to the diseases they transmit, and the production losses incurred due to direct parasitic action. Adapted from Richard Carter, 'Ticks, Resistance and Integrated Tick control', Cedara Farmers Day 1997. p.1.

	Common Ticks in KwaZulu-Natal	Main Problems
1.	Common blue tick ( <i>Boophilus decoloratus</i> ) 	African Redwater, anaplasmosis, bloodloss?
2.	Pantropical blue tick ( <i>Boophilus microplus</i> ) 	{European { Asiatic & African Redwater, anaplasmosis, bloodloss?
3.	Bont tick - ( <i>Amblyomma hebraeum</i> )	Heartwater, severe damage, bloodloss
4.	Brown ear tick ( <i>Rhipicephalus appendiculatus</i> )	Ear damage, bloodloss, suppresses immunity, (Corridor disease from buffalo in Zululand)
5.	Red legged tick ( <i>Rhipicephalus evertsi evertsi</i> )	bloodloss, anaplasmosis, (African Redwater?)
6.	Bont legged ticks ( <i>Hyalomma truncatum</i> , <i>H. marginatum turanicum</i> and <i>H.m. rufipes</i> )	hide damage, sweating sickness ( <i>H. Truncatum</i> ), anaplasmosis ( <i>H.m.rufipes</i> )

#### 1.4 Tick-borne Diseases

Ticks throughout the world transmit various diseases to man and animals. Many of these are caused directly by living organisms such as protozoa, bacteria, rickettsias and viruses carried by the tick<sup>10</sup>. Ticks are vectors of devastating parasitic diseases of livestock that cause great economic losses. The

<sup>10</sup>B. F. Stone and I. G. Wright, 'Tick Toxins and Protective Immunity', in Tick Biology and Control, eds. G. B. Whitehead and J. D. Gibson (Grahamstown, Tick Research Unit, 1981), pp. 1-5.

most important diseases are East Coast Fever, Anaplasmosis, Heartwater and Redwater.

Anaplasmosis, commonly known as gallsickness, is a tick-transmitted disease of cattle caused by a rickettsia-like organism which occurs in the red blood cells of infected animals<sup>11</sup>. The disease is characterised by a variable fever, anaemia, jaundice, rumen stasis and constipation. In dairy cows, a drop in milk yield may precede any of these symptoms. The one-host blue tick (*Boophilus decoloratus*) is regarded as the most important vector of *A. marginale*.<sup>12</sup> Anaplasmosis is often diagnosed by farmers. However, such diagnosis is frequently incorrect because farmers confuse the disease with other diseases, for example, redwater, three-day stiff sickness and atony of the forestomachs.

Two species of the causative organism occurs, namely *Anaplasma marginale* and *Anaplasma centrale*. The former is by far the most important, often causing serious diseases and mortality in susceptible cattle. *A. centrale*, on the other hand, tends to be less harmful.<sup>13</sup> Once animals are infected with *A. marginale* or *A. centrale*, they probably remain carriers of the parasite for life. Although ticks are the most important vectors of anaplasmosis, the disease can also be transmitted mechanically by blood-sucking flies, which often feed intermittently on a number of different animals, and can transmit the infection among cattle via their mouth parts<sup>14</sup>.

On the other hand Babesiosis, commonly known as redwater, is a tick-transmitted disease of cattle caused by a protozoal organism which occurs in the red blood cells of infected animals.<sup>15</sup> The disease is characterised by a high fever, a light to dark red or brown discolouration of the urine, anaemia and

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<sup>11</sup>D. T. de Waal, W. H. Stoltz and M. P. Combrink, Anaplasmosis, Onderstepoort Veterinary Institute, (1998), p.2.

<sup>12</sup>Ibid.

<sup>13</sup>Ibid.

<sup>14</sup>Ibid.

<sup>15</sup>D. T. de Waal, W. H. Stoltz and M. P. Combrink, Babesiosis, Onderstepoort Veterinary Institute, (1998), p.1.

even jaundice in advanced cases. Two important species of the causative organism are *Babesia bigemina*, which causes African redwater, and *Babesia bovis*, which causes Asiatic redwater<sup>16</sup>. Once the animal is infected by either of the two organisms they become carriers of the parasite for different periods. Under natural conditions babesiosis is transmitted only by ticks. Cattle usually begin to show signs of disease 2 to 3 weeks after exposure to infected ticks. The course of the disease is rapid, and the animal will die if not treated in time. For the treatment of both diseases, different drugs are available without prescription.

Heartwater is caused by the organism *Cowdria ruminantium* and is restricted to areas where the environment is favourable for the development and survival of the vector bont tick, *Amblyomma hebraeum*<sup>17</sup>. This is a three host tick whose life cycle under optimum conditions can be completed within five months, although it might take longer. The outbreaks of heartwater occur when susceptible animals are unwittingly introduced into an enzootic heartwater area.<sup>18</sup> Certain game species are also known to act as vectors of the diseases and thus become a constant source of infection.

East Coast Fever is a very virulent and highly fatal protozoal disease of cattle (*theileriosis*), characterized by focal hyperplasia of the lymphatic tissue.<sup>19</sup> East Coast Fever is transmitted by brown ear ticks (*R. appendicatus*). The brown tick needs three separate hosts to complete its life cycle ( see table 2.1 on p.8). The adult brown tick can live in the hungry state for about four months. If, after that period, they have not found a suitable host they die of starvation. There are two ways in which the brown tick can transmit East Coast Fever. (a) if a larva sucks blood on an infected animal it imbibes the parasite with the blood and becomes infected. After moulting the nymph retains the

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<sup>16</sup>Ibid.

<sup>17</sup>C. J. Howell, A. J. de Vos, J. D. Bezuidenout, F. T. Potgieter and P. R. Barrowman, 'The Role of Chemical Tick Eradication in the Control or Prevention of Tick-transmitted Diseases of Cattle' in Tick Biology Control, eds. G. B. Whitehead and J. D. Gibson, ( Grahamstown, Tick Research Unit Rhodes University, 1981), p.61- 66.

<sup>18</sup>Ibid.

<sup>19</sup>M. W. Henning, Animal Diseases in South Africa ( Pretoria, Central News Agency, Ltd, 1949) , p. 415.

infection, and if this nymph attaches itself to a susceptible animal, it can transmit the parasites through its salivary gland to that animal; (b) similarly if the nymph sucks the blood of an infected animal, it may become infected and, after moulting, the adult may be able to transmit the disease<sup>20</sup>.

East Coast Fever was not known in South Africa before 1902. The disease was believed to have been introduced from Tanganyika (Tanzania) by cattle which became infected along the coast before shipment to Lourenco Marques (Maputo).<sup>21</sup> The outbreak of the disease in Natal led the colonial government to adopt strict measures for the suppression of the disease. Early attempts at vaccination by eminent microbiologist, Robert Koch, and later by Sir Arnold Theiler, were unsuccessful<sup>22</sup>. However, it was shown by Lounsbury that the disease was introduced by the brown tick, *R. appendiculatus*. This knowledge led to the restriction of cattle movements, compulsory monitoring of all deaths by the submission of smears, and wholesale slaughter of infected herds, and starving out of infected ticks on pastures. The government also embarked on compulsory fencing of lands within the colony of Natal. Despite government measures to prevent the scourge of the disease, it brought untold sorrow to the farming communities before it could be eradicated. The table below shows different species and their favoured host. It also shows the life cycles of different tick species. By knowing the life cycle of a particular tick species, cattle farmers will be able to achieve better tick control management.

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<sup>20</sup>S. B. Woollatt, East Coast Fever ( Pietermaritzburg, P. Davis & Sons, 1906) ,p.4.

<sup>21</sup>Ibid. p.417.

<sup>22</sup> Norval, 'Vectors: Ticks' , p.19.

**Table 2.1.** Tick-borne diseases that affect cattle. Adapted from Carter, 'Integrated Tick Control', p.5.

Disease	Tick Vector	No. of hosts	Favoured host
African Redwater ( <i>Babesia bigemina</i> )	African and pantropical blue tick	one host tick	large herbivores
European Redwater ( <i>B. bovis</i> )	pantropical blue tick	one host tick	large herbivores
Anaplasmosis (tick borne gall sickness) ( <i>Anaplasma marginale</i> )	African and pantropical blue tick, red-legged tick, bont-legged tick	one host tick two host tick two host tick	large herbivores small/large herbivores, hares
Heartwater ( <i>cowdria ruminantium</i> )	bont tick	three host tick	small mammals, birds, large herbivores
Corridor disease ( <i>Theileria parva lawrencei</i> )	brown tick	three host tick	small and large ruminants, hares, mongooses
Sweating sickness	bont- legged tick	two host tick	small mammals, large herbivores

### 1.5 Methods of Control - Change Over Time

The indigenous cattle found in South Africa during the latter part of the 18<sup>th</sup> century were adapted to ticks and tick-borne diseases. The indigenous animals had the opportunity, over hundreds of years, to adapt to their environments, and to the many infectious agents and ecto- and endoparasites known to be prevalent in the tropical, subtropical, and even the temperate regions.<sup>23</sup> These adaptations provided them with a natural resistance to most of the indigenous diseases and pests of Africa. Conversely, there had also been ample opportunity for pathogens to adapt to those hosts to ensure their survival. During that time, there were no dips but cattle were able to survive, and ticks were not a

<sup>23</sup> R. D. Bigalke, 'The important role of wildlife in the occurrence of livestock diseases in South Africa', in *Infectious Diseases of Livestock*, eds. J.A.W. Coetzer, G.R. Thomson, R.C. Tustin (Oxford, Oxford University Press, 1994), pp.152-155

very serious problem to livestock owners. A great tragedy struck with the rinderpest epidemic of 1896 which decimated about 70-80% of the South African cattle population. Cattle were imported mostly from Europe to replenish the local cattle population. The imported cattle were highly susceptible to local ticks and tick-borne diseases.<sup>24</sup>

Prior to the introduction of chemical compounds for tick control, certain cultural or traditional practices, such as hand-picking of ticks, hand-spraying with residues from charcoal, application of plant preparations, burning of ticks with hot iron, burning of grass, and the use of certain hedge plants repellent, were widely used by cattle keepers in resource poor communities.<sup>25</sup> Plant materials have been in use longer than any other group, with the exception of sulphur. In addition, tobacco, camphor, pyrethrin, derris and turpentine were some of the important natural products in use before the organized search for synthetic insecticides had begun.<sup>26</sup>

Control measures against ticks and tick-borne diseases were only applied on a large scale in southern Africa following the introduction of East Coast Fever from East Africa. Prior to that, tick-borne diseases had not been reported as problematic in indigenous cattle (ticks had acted as a means of getting rid of weak, sick, unadapted cattle and game), although losses caused by *babesiosis* and heartwater had been experienced in imported cattle.<sup>27</sup> The first tick control trials with dipping in South Africa started in 1893, shortly after the discovery in the United States of America in 1899 that the causal piroplasm of redwater in cattle was transmitted by ticks<sup>28</sup>. In 1909 Watkins- Pitchford was

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<sup>24</sup>Ibid. p.48

<sup>25</sup>K. Dreyer, 'Occurrence and Control of Parasites on Cattle in Peri-urban Environments with Specific Reference to Ticks' ( MSc thesis, University of Orange Free State, 1997), p.1.

<sup>26</sup>C.K. Kaposhi, 'The Role of Natural Products in Integrated Tick Management in Africa' in Insect Science Application, Vol. 13, No. 4 (1992) , pp.595-598.

<sup>27</sup> R. A. Norval, 'Vectors: Ticks', in Infectious Diseases of Livestock , ed. J.A.W. Coetzer, G.R. Thomson, R.C. Tustin (Oxford, Oxford University Press, 1994), pp.1-21.

<sup>28</sup>G. Whitehead and J. D. Gibson, eds. Tick Biology and Control: Proceedings of an International Conference held from 27-29 January ( 1981), (Tick Research Unit, Rhodes University Grahamstown, South Africa, 1981) p .xiv

the first to succeed in controlling ticks with applications at 5-day intervals.<sup>29</sup> Today in Baynesfied stands a monument of the first dipping tank in KwaZulu-Natal. The discovery made by Watkins Pitchford led to the arsenic compounds used to control ticks from 1910 to 1940. After 30 years it was discovered that the blue ticks had developed resistance to the arsenic compounds.

In 1937 arsenic-resistance was found in South Africa, Australia and South America. The resistance problem was averted with the discovery of the first chlorinated hydrocarbons, benzene hexachloride (BHC) and dichloro-diphenyl-trichloroethane (DDT) which gave successful control of arsenic-resistant tick strains. However, the effectiveness of the products were short-lived, and after 18 months and 5 years respectively, blue ticks again showed resistance.<sup>30</sup> Resistance to ixodicides involves the development of a strain of ticks with the ability to tolerate doses of toxicans which would prove lethal to the majority of individuals in a normal population of the same species.<sup>31</sup> The ability of ticks to avoid the toxic effects of acaricides is genetic, and can be passed on to the next generation. Resistance occurs because chemicals cannot kill 100% of the ticks on an animal, and is exacerbated by dipping cattle in under strength and wrongly applied dips.

The high costs of dip-tank and spray race construction, compounded by the recurrent annual cost of chemicals, have stimulated concern among international organizations, national governments and the public.<sup>32</sup> The further constraint is the development of resistance by ticks to acaricides. Acaricides can also be toxic to non-targeted organisms including man, domestic and wild animals, and even organisms regulating tick populations, for example, oxpeckers.<sup>33</sup> In view of the difficulties encountered with intensive tick control methods, other methods which utilize natural factors together

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<sup>29</sup>Ibid.

<sup>30</sup>Ibid.

<sup>31</sup>Barnett, Control of Ticks, p.12.

<sup>32</sup>A. A. Latiff and R. G. Pegram, 'Naturally Acquired Resistance in Tick Control in Africa', Insect Application, Vol. 13, No. 4 (1992), pp.505-513.

<sup>33</sup>G. P. Kaaya, 'Non- Chemical Agents and Factors Capable of Regulating Tick populations in Nature: A Mini Review', Insect Science Application, Vol. 13, No. 4, 1992, pp. 587-594.

with limited use of acaricides, have been sought. They include release or conservation of biological control agents, e.g. parasitoids, predators and pathogens, anti-tick grasses and pasture spelling<sup>34</sup>. It has been recognized that different breeds of cattle differ in their response to tick infestations. Some breeds have the ability to reduce the number of ticks they carry and they are considered resistant, while others cannot control the ticks they carry and are referred to as sensitive breeds<sup>35</sup>. Zebu, *Bos indicus* types of cattle are regarded as more resistant to tick infestations when compared to European breeds, *Bos taurus*,<sup>36</sup> mainly due to their thicker, looser and mobile skin covering.

## 1.6 Key Issues of Control Today

Despite decades of debate, tick control remains a contentious issue with vehement proponents of enzootic stability at one extreme, and of intensive tick control at the other. Various sweeping statements have been made by both sides in an attempt to justify their views<sup>37</sup>. The former argue that the cost of intensive tick control is very high, and decreased use of acaricides will lead to higher immunity status in cattle. The presence of animal hosts, tick vectors, and pathogens in an area create an enzootic stability in which predictable interaction may occur, and in which, under natural conditions, a state of enzootic stability may develop between the animal and its diseases<sup>38</sup>. Enzootic stability is defined as the condition where there is frequent transmission of diseases, and infection of

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<sup>34</sup>Ibid.

<sup>35</sup>Y. Rechav, 'Naturally Acquired Resistance to Ticks- A Global View', in Insect Science Application, Vol. 13, No. 4, 1992, pp. 495-504.

<sup>36</sup>Ibid. p.496.

<sup>37</sup>P. Oberem, Intensive tick Control and Enzootic Stability, Hoechst Animal Health (Pty) Limited South Africa ( No date).

<sup>38</sup>C. J. Howell, A. J. de Vos, J. D. Bezuidenout, F. T. Potgieter and P. R. Barrowman, 'The Role of Chemical Tick Eradication in the Control or Prevention of Tick-transmitted Diseases of Cattle' in Tick Biology Control, eds. G. B. Whitehead and J. D. Gibson,( Grahamstown, Tick Research Unit Rhodes University, 1981), p.61..

animals occurs within the period that young animals are still naturally protected.<sup>39</sup> This may be achieved by using fewer chemicals to control ticks, and by allowing animals to be exposed to ticks at a very early stage of their life. The proponents of intensive tick control argue that ticks and tick-borne diseases can be eliminated by well managed intensive tick control and that the measure is also good for business. Intensive tick control was encouraged by companies that marketed acaricides, and some frequently informed farmers that failure to do so would result in serious production losses through tick- borne diseases.<sup>40</sup>

In recent years integrated tick control is seen by many as a better measure against ticks and tick-borne diseases. Integrated tick control advocates the use of chemical and natural factors to control the effects of ticks and tick-borne diseases. It calls for the breeding of resistant cattle, strategic dipping, use of tick-borne disease vaccinations, use of natural predators like oxpeckers, and careful pasture management. Pasture management involves rotational grazing and burning of the veld. Scott listed four objectives in using fire in grass management. These are (a) to burn off unpalatable growth left over from the previous season's growth which would be unacceptable to livestock and which, if not removed, would tend to smother the plant so that it would become moribund; (b) to stimulate growth during seasons when there is little young forage available on the veld and thus to provide green feed for stock at a time when it does not occur naturally; (c) to destroy parasites, and particularly ticks, and to control the encroachment of undesirable plants in the veld.<sup>41</sup> However, the season in which the veld is burned remains a matter of controversy in many areas, largely because the objectives of burning are often in dispute.

Despite the approaches mentioned above, there are farmers who prefer to make their own pour-ons as another controlling measure. The making of pour-ons is motivated by the high costs involved in purchasing acaricides. In order to cut costs farmers deliberately reduce the quality of acaricides in

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<sup>39</sup>Ibid.

<sup>40</sup>Norval, 'Vector: Ticks', p.19.

<sup>41</sup>J.D. Scott, 'Veld Management in South Africa' in Veld and Pasture Management in South Africa, ed. N. M. Tainton (Pietermaritzburg, Shuter & Shooter, 1988), p.365

order to save money. The deliberate use of low acaricidal concentrations helps to create ideal circumstances for the selection of resistance by ticks. The problem is compounded by the fact that farmers do not heed the advice given by veterinary services. In terms of the Fertilizers, Farm Feed, Seeds and Remedies Act No. 36 of 1947, the making of pour-ons is illegal. The Act was passed to ensure that no product which is inferior or may endanger life, will appear on the market. In order to protect the buyer, a close check is kept on claims made by manufacturers. The products concerned need to be tested and approved before they can be used. The registrar has to be satisfied that the remedies being approved are such that there is not the slightest chance of treated parasites being able to build up resistance quickly.<sup>42</sup>

The problem is further compounded by the fact that the Animal Disease Act No. 35 of 1984, does not make dipping compulsory, notwithstanding the fact that there are very good reasons for dipping. Moreover the state is not obliged to provide or subsidize dipping although it did continue to provide dip in black farming areas. The responsibility is left to individual farmers to clean their cattle. It is also difficult, if not impossible, to monitor what happens on each and every farm. Farmers do not follow instructions which are given by the chemical industry on how to use the dips<sup>43</sup>. Farmers are supposed to dip every three weeks but some choose to dip after four or five weeks.

In communal areas tick control is dependent on state provision to supply dip. Despite the free dipping available, there has been a drop in the number of cattle being dipped in recent years.<sup>44</sup> This was due to a number of factors, for example, most children now attend school and can no longer, as in the past, take their parents' cattle to the dips. The government's policy to provide free stationary at primary and secondary schools has encouraged many children in resource-poor communities to go to school. The majority of these children were out of school because they could not afford to buy books. When they were not attending school they helped to look after the cattle and taking them to be dipped. Because children are now at school, elderly people are unable to herd the cattle and to travel long distances

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<sup>42</sup>The Natal Witness 14 May 1999.

<sup>43</sup>Personal Interview with C. Byford-Jones, 06 September 1999, Lions River.

<sup>44</sup>The Natal Witness, 2 October 1998.

to bring them to be dipped. While most people welcome the new education system it has, however, impacted negatively on tick control measures. The fact that the government does not have enough resources to continue with dipping in communal areas also poses a threat to many cattle-owners. If the government decides to withdraw the dipping scheme the situation may be more chaotic.

## **Conclusion**

Ticks are an important part of the ecosystem. However, ticks transmit many devastating diseases to livestock which cause high mortality and great economic losses. Ticks are divided into two main groups according to their habits and development. Tick species distribution differs with different climatic zones. Some species are adapted to cool, very moist environments, while others are adapted to dry, hot climates. Prior to the introduction of chemical compounds for tick control, certain cultural or traditional practices were used by cattle owners. Following the introduction of East Coast Fever in South Africa in the early twentieth century, chemical compounds became widely used to control ticks. However, in recent years intensive tick control by chemicals has been condemned by environmental activists. They argue that this practice contaminates the environment, while those who favour it argue that it is good for socio-economic reasons. The high costs of dip-tank and spray race construction, compounded by the recurrent annual cost of chemicals, have stimulated concern among international organizations, national governments and the public.

In view of the difficulties encountered with intensive tick control, methods which utilize natural factors with little or no acaricides have been sought.

## CHAPTER TWO

### **The Impact of Rinderpest and East Coast Fever in Natal and Zululand: 1896-1910**

Before 1894 ticks and tick-borne diseases were not a serious problem to cattle farmers in Natal and Zululand. In 1894, of all people interviewed from different districts by the Scab and Stock Diseases Commission, only farmers in Richmond were reported to have a problem with ticks. The problem of ticks became more serious with the introduction of imported cattle into the district because insufficient efforts were made to ensure that they were resistant to ticks and tick-borne diseases.<sup>45</sup> Tick populations can increase to enormous densities in the presence of susceptible cattle. Where humans have introduced tick species with cattle, goats and sheep the number and varieties of ticks on both wild and domestic animals may increase. Prior to that tick-borne diseases had not been reported as problematic in free ranging indigenous cattle, although losses caused by babesiosis and heartwater had been experienced with imported cattle<sup>46</sup> and weak and sick animals.

The incidence of ticks and tick-borne diseases was compounded by the rinderpest epidemic of 1896. The rinderpest, which is not a tick-borne disease, killed most of the indigenous cattle which were immune to ticks and tick-borne diseases, and this resulted in the importation of cattle which were susceptible.

The demand for meat in the gold mining industry during this period also encouraged the importation of cattle. The imported cattle became a source of concern as many could not adapt well to the new environment. The cattle easily succumbed to redwater which was severe in the Natal colony between 1900 and 1904 because they were kept intensively and high production was expected without adaptation to parasitist diseases in this foreign environment.

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<sup>45</sup>Pietermaritzburg, Archival Repository Depot, Colonial Secretary 's Office ( henceforth CSO), Scab and Stock Diseases Commission Evidence 2801 (1894) , p. 3655.

<sup>46</sup>Norval, 'Vector: Ticks', p.19

In order to understand why imported cattle easily succumbed to East Coast Fever it is important to understand how cattle react to infection in a new environment. There is a marked variation in the susceptibility of cattle to infection. The development of resistance in cattle to *R. appendiculus* follows repeated exposure and probably also affects transmission of *T. parva parva* by impairing feeding of ticks.<sup>47</sup> Infection rates in ticks feeding on cattle with a high degree of resistance are likely to be low and the severity of clinical disease in resistant cattle exposed to infected ticks is likely to be reduced.

Normally, significant numbers of clinical cases of East Coast Fever only occur in endemic areas when susceptible cattle are introduced and allowed to become infested with ticks. This occurs particularly where attempts are made to upgrade the productivity of cattle in the area by the introduction of improved beef or dairy breeds.<sup>48</sup> Unless the cattle can be kept tick-free, East Coast Fever proves to be a major limiting factor to their introduction. Epidemic East Coast Fever occurs where infection is introduced into a previously disease-free area with a fully susceptible cattle population. Effective transmission can take place despite relatively low tick populations of less than five ticks per head. Mortality in the absence of control may exceed 90 per cent. Such situations may arise when infected cattle are introduced into an environment which is free from East Coast Fever but in which *R. appendiculatus* is prevalent.<sup>49</sup> It can also occur when ticks reinvade a location, which has been kept tick-free by acaricide for a number of years, after effective tick control has been discontinued.

Before the region's cattle herds could recover from the rinderpest, a new deadly tick-borne disease, East Coast Fever, arrived in 1904. East Coast Fever is a tick-transmitted disease that affects only

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<sup>47</sup>B.H. Fivaz, R.A. Norval and J.A. Lawrance, 'Transmission of *Theileria parva bovis* (Boleni strain) to cattle resistant to the brown ear tick *Rhipicephalus appendiculatus* (Neumann)' in Tropical Animal Health and Production, 21, 1989, pp. 129-134.

<sup>48</sup> J.A. Lawrance, A. J. de Vos and A.D. Irvin, 'East Coast Fever' in Infectious Diseases of Livestock, eds. J.A.W. Coetzer, G.R. and Thomson, R.C. Tustin (Oxford, Oxford University Press, 1994), pp.309-325.

<sup>49</sup>G.H. Yeoman, 'Field vector studies of epizootic East Coast fever. A quantitative relationship between *R. appendiculatus* infestation and the epizootic East Coast fever', in Infectious Diseases of Livestock, eds. J.A.W. Coetzer, G.R. Thomson and R.C. Tustin (Oxford, Oxford University Press, 1994), pp.309-325.

animals belonging to the bovine family, such as cattle and buffalo. Animals other than cattle do not carry the disease, for the reason that an infected tick loses its infection once it bites another animal, and as other animals are not susceptible to East Coast Fever, the tick cannot re-acquire the infection from animals other than cattle<sup>50</sup>. East Coast Fever is caused by blood parasites belonging to the genus *Theileria*. It is taken up by ticks feeding on cattle that are already infected with the protozoal parasite. The parasite *Theileria parva parva* undergoes multiplication in the tick, which passes the parasite to the next bovine host on which it feeds.<sup>51</sup> The parasite develops mainly in the lymph glands and spleen. It can, however, develop in other organs. *Theileria parva parva* is composed of plasma bodies found in the blood stream. These plasma bodies are known as Koch Bodies, named after their discoverer, Robert Koch, and are recognizable in smears examined under a microscope.

East Coast Fever was known in East Africa for a long time. It first became the subject of investigation when Koch observed the disease at Dar-es-Salaam in 1897<sup>52</sup>. From his early observations he was led to regard the disease as being identical with Texas fever or redwater. From 1898 until 1901, the disease attracted no special attention. In 1901 infected cattle were landed at Beira from German East Africa and forwarded by rail to Umtali, some of them being later sent to Salisbury (Harare). As a result of this movement both these commonages became infected. The increased mortality, which was not heavy at first, was attributed to ordinary gallsickness and redwater. A later shipment of Australian cattle was sent to Rhodesia via Beira where the cattle had to be detained for some time. During their stay a heavy mortality ensued, which again was thought to be gallsickness and redwater<sup>53</sup>. The remnants of these herds were moved to Umtali where mortality continued until very few cattle were left. During the following year, local cattle were allowed to graze over the area on the Umtali commonage where the Australian cattle had died, and they too began to die. All attempts to control the disease failed and infection spread rapidly within Rhodesia (Zimbabwe) through the medium of

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<sup>50</sup>Ibid. p.6.

<sup>51</sup>A. J. de Vos, 'The identity of bovine *Theileria spp* in South Africa' ( unpublished M.V.Sc. thesis, University of Pretoria, 1982) , p.2.

<sup>52</sup> Henning, Animal Diseases in South Africa , p. 416.

<sup>53</sup>Ibid.

transport oxen.

East Coast Fever had a devastating effect on local cattle herds with the mortality rate reaching 95 percent. This is why it attracted great attention from farmers, veterinarians and government officials when it appeared in southern Africa in 1901.<sup>54</sup> In South Africa, East Coast Fever was first recognized in May 1902. The first outbreaks of East Coast Fever in the Transvaal occurred at Komatipoort and Nelspruit. The outbreaks in the Northern Transvaal were due to infection directly from Rhodesia. In November 1902 the disease reached Pretoria, from where it was spread to the surrounding districts<sup>55</sup>.

The introduction of East Coast Fever into Natal occurred via Swaziland at the beginning of 1904. It first appeared in the extreme north of Zululand in the Ingwavuma District.<sup>56</sup> It was first discovered at the traditional homesteads in the district. In order to prevent further spread of the disease, the colonial veterinary and agricultural authorities erected fences, established border guards to restrict cattle movements into clean districts, and adopted a policy of moving all infected herds to clean veld through a series of temperature camps, under the control of trained officers. Despite these measures, the disease spread to the Mahlabatini and Nongoma Districts. The disease was first reported in March 1904 amongst cattle belonging to an African Chief, Tshanibezwe, on the border of these two districts.<sup>57</sup> Benefitting from the experience already gained in Rhodesia and the Transvaal, the authorities in Natal adopted very stringent measures for the suppression of the disease. By restricting cattle movements and moving all healthy animals from infected to clean veld through a series of temperature camps, the disease was temporarily restricted.

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<sup>54</sup> U G 17/1944 Report of East Coast Fever Commission ( Pretoria, Government Printer 1944) , p.5.

<sup>55</sup>Ibid.

<sup>56</sup>I. S. Schellnack, 'The Control of East Coast Fever in Natal from the Early 1900s to 1957', (unpublished B.A. Hons. thesis, University of Natal, Pietermaritzburg, 1991) p.2.

<sup>57</sup>Ibid.

The limited knowledge on the part of European settlers of African animal diseases, together with the limited degree of veterinary and scientific research work that had been done in the nineteenth century, caused a delay in the recognition of East Coast Fever as a specific disease.<sup>58</sup> When scientific knowledge was improved the disease had already killed large numbers of cattle. The reason why it took a long time for scientific research to recognize East Coast Fever as a specific disease is that its symptoms resemble many other diseases in the colony like gallsickness and redwater. Infected animals do not show, in the majority of cases, any very characteristic symptoms, high temperature being the first evidence of the disease.<sup>59</sup> The animals continue to feed as normal, and display few signs until the disease is well advanced. It is due to this continued feeding that many cases are overlooked in the early stages. Dullness, drooping of the ears, falling in the flanks, discharge from the nose, eyes and mouth, a weakness of the loins, a pronounced loss of eye sight, staggering gait with a tendency to lag behind the herd, constipation followed by diarrhoea, blood in the faeces, and the eyes appearing sunken, are the visual symptoms of East Coast Fever in cattle. The animal continues to feed until rumination ceases and appetite is lost.<sup>60</sup> Animals that manage to recover from the disease develop an immunity which persists for years. However, relapses may develop when the animal suffers from other diseases. Although these animals have recovered from East Coast Fever, they still remain a vector of the disease and thus remain a potential threat to uninfected cattle in the herds.

Unlike redwater, East Coast Fever is not transmitted from the adult tick through the egg to the larva. The progeny of infected adults are non-infective, unless they themselves become infected by sucking diseased blood.<sup>61</sup> *Theileria parva* is obtained by larva or nymph which suck blood from sick bovines, but it is transmitted only when the infected tick sucks blood from susceptible animals during the next stage of its life-cycle, that is after it has moulted. Transmission is effected only when the adult tick has become infected during its nymphal stage. When an infected tick has once sucked blood, either from

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<sup>58</sup>Ibid.p.8.

<sup>59</sup>S.B. Woollatt, East Coast Fever, ( Pietermaritzburg, P.Davis & Sons, 1906), pp.2.

<sup>60</sup>Ibid.

<sup>61</sup>Henning, Animal Diseases in South Africa, p. 424.

a susceptible or non-susceptible animal, it loses its infection and cannot transmit the disease any longer<sup>62</sup>. The disease is only carried by cattle suffering from East Coast Fever distributing the infected ticks where they go, or where they die.

East Coast Fever was a disease that was particularly prevalent in the lower-lying eastern regions of Africa where heavy concentrations of ticks existed. In the Natal and Zululand area, the ideal conditions were present for East Coast Fever to cause extensive damage to the cattle industry. From the beginning of the twentieth century onwards, Natal's cattle population was distributed in three zones. First, in order of density, is the 'midlands', which is situated near the main urban markets. This region comprises the Pinetown, Camperdown, Pietermaritzburg, Lions River, Estcourt, Ixopo, and Richmond districts. The 'midlands' region was mainly concerned with dairy production. The second is the 'northern districts' where beef and butterfat are produced. 'Northern districts' comprise the Vryheid, Newcastle, Dundee, and Klip River districts. The third zone is Zululand which was the least developed area because of the prevalence of 'nagana.'<sup>63</sup> 'Nagana' is a cattle-disease, the vector of which is the tsetse fly. In Zululand, however, tsetse is confined to the borders of the country or deepest river valleys.<sup>64</sup>

Shortly after the outbreak of East Coast Fever, an Inter-Colonial Conference was convened which held sittings at Bloemfontein in December 1903, and at Cape Town in May 1904. In addition to the four pre- Union Colonies, the British Protectorates, German South West Africa and Portuguese East Africa were represented at this conference.<sup>65</sup> The conference, among other things, discussed the different methods which had been tried in the respective territories with a view to the eradication and prevention of East Coast Fever. The government Entomologist in the Cape colony, C. P. Lounsbury, was the first

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<sup>62</sup>Ibid.

<sup>63</sup>N. Hurwitz, Agriculture in Natal, 1860-1950. Natal Regional Survey, Vol. 12. (Cape Town, Oxford University Press, 1957) , pp.87-90.

<sup>64</sup>J. Guy, The Destruction of the Zulu Kingdom: The Civil War in Zululand, 1879-1884, (London, Longman Group Limited, 1979), p.7.

<sup>65</sup>U.G.17/ 1944. p.7.

to prove that East Coast Fever was transmitted by the brown tick (*R. appendiculatus*). This was confirmed by Sir Arnold Theiler, and several other tick species were then found to transmit the infection. The following resolutions were adopted by the Conference:-

- (a) Fencing was regarded as the best method of preventing the disease and governments were advised to instal fences immediately on all farms where the disease had broken out.
- (b) Movement Control was adopted to retard the spread of the disease, all reasonable measures were to be taken to check movements of cattle.
- (c) Slaughter it was seen as an effective way of eradicating the disease in infected areas, after which such areas were to be left free of cattle for a period of not less than eighteen months.
- (d) Dipping was aimed at direct destruction of the parasite by use of arsenical dipping fluids.
- (e) Burning of the grass was recommended in all cases as an auxiliary to purification of the veld.

Natal also implemented the resolutions adopted at the Inter-Colonial Conference. The colonial government passed a number of Acts, regulations, and orders to help fight the disease. It made money available for the erection of fences. Act No.6 of 1907 provided for compulsory fencing of the lands within the colony of Natal. The costs of erecting any fence along the boundaries of any farm were in the first instance defrayed out of monies voted for by parliament. Such costs were eventually to be paid by farmers together with interest thereon at the rate of five per cent per annum, by thirteen yearly instalments, the first payable two years after the fence was completed.<sup>66</sup> Well- to -do white farmers took advantage of the offer by the government. Their farms were the first ones to be fenced, which helped to stop the disease from spreading rapidly. In a number of cases some white farmers were taken to court for refusing, or failing, to erect fences around their farms. Black farmers could not afford to pay as the majority of them were impoverished by the rinderpest epidemic. The African system of land tenure and usage in colonial Natal also put them at a further disadvantage as they grazed their cattle together on large communal pastures, and this fanned East Coast Fever through their herds much faster than through white owned cattle which were separated into smaller herds on individual farms that were mostly fenced.

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<sup>66</sup>Department of Agriculture, Colony of Natal East Coast Fever Acts, Regulations And Orders in Force ( Pietermaritzburg, Times Printing & Publishing Co. Ltd, 1908) ,p.7.

Dipping of cattle as a preventive, or an eradicated, measure against East Coast Fever was started soon after the first appearance of the disease in South Africa. In the Cape, a farmer named Douglas started dipping his stock in about 1898, while in Natal Joseph Baynes built a dipping tank in 1901.<sup>67</sup> At the time a dipping interval of 14 days was resorted to, and it was generally believed that it was neither safe nor practical to dip cattle at shorter intervals. In 1905 the Principal Veterinary Surgeon Officer of Natal referred officially to dipping or spraying as a method of dealing with East Coast Fever, but considered it of value only as a preventive measure before the disease had actually broken out on a farm. However, it was realized that, with an interval of 10 to 14 days, dipping could not be relied upon to destroy all ticks on an infected animal. In spite of this disadvantage, the Minister of Agriculture of the colony of Natal issued an order in May 1908, to the effect that all cattle in the Richmond infected area had to be dipped at fortnightly intervals.<sup>68</sup>

The first attempts to immunize cattle against East Coast Fever were made by Robert Koch at the beginning of this century, and again in 1908. He tried repeated injections of small quantities of blood from infected cattle. The results in the laboratory seemed promising, but in the field the method proved a failure. Koch also tried to use hyper-immune serum. Large quantities of blood, or spleen emulsion, from infected cattle were injected into immune cattle and their serum used in an attempt to control East Coast Fever. The serum was considered promising, but the method proved to be unsatisfactory and had to be abandoned.<sup>69</sup>

In June 1908, Watkins-Pitchford commenced his work on the dipping of cattle. He tested certain dipping fluids and proved that by using certain strengths of arsenite of soda, a dipping interval of five days could be maintained with safety to the animals, while at the same time the dip was found to be effective in destroying ticks. Watkins-Pitchford's dip was found to be stronger than that employed by Baynes, and consequently special treatment to inaccessible parts, for example, ears, was done by Baynes. Practical experience with Watkins-Pitchford's five-day interval dipping showed that

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<sup>67</sup>Ibid.

<sup>68</sup>Ibid. p.10.

<sup>69</sup>Norval, 'Vector: Ticks', p.20.

subsequently there was a continuation of infection on East Coast Fever farms, in spite of the short interval dipping. Thus some ticks were found to be escaping destruction by the dip. Watkins- Pitchford reduced the dipping interval further, and as a result of further experiments proved that dipping at three-day intervals could be adopted with safety by reducing the arsenical strength of the dip. The fluid was found to be still effective in destroying larval and nymphal as well as most adult ticks. This system of dipping was also found to be effective in preventing infected ticks from dropping off sick animals while still alive. Pitchford's method of dipping was then adopted as an officially recognized method of dealing with East Coast Fever in the colony of Natal and, later, in the Union of South Africa.

When the colonial government realized the effectiveness of dipping in preventing and eradicating East Coast Fever, the public was encouraged to dip their cattle. The government made a scheme available for the erection of dipping tanks. The tanks were to be erected by the farmers' associations, but the government contributed towards its cost on the pound for pound system. The associations undertook the entire management and dipping. However, only three associations and private individuals took advantage of the government's offer<sup>70</sup>.

The policies which were implemented to control and eradicate East Coast Fever were discriminatory policies which not only differentiated between black and white farmers, but also between rich white farmers and poor white farmers. The policies benefitted the richer white farmers in the colony of Natal and later in the Union of South Africa. The scheme to erect dip tanks further disadvantaged poor white farmers and black farmers. Black farmers could not benefit from the scheme as they did not have associations. Thus the distribution of resources was channeled into white areas through the influence of the associations. There were no dipping tanks in black areas, and as a result they were forced to use a spraying method which was seen by many to be not as effective as plunge dipping.<sup>71</sup> With sprays a large herd of cattle could take a long time to treat. The exercise is also fatiguing, while with plunge dipping the whole body of the animal is immersed into a dip solution. As a result of the ineffective

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<sup>70</sup>U.G.17/ 1944. p.7.

<sup>71</sup> Pietermaritzburg Archives Repository Depot Minute Papers Principal Veterinary Surgeon(henceforth PVS).161 , 1911, pp. 1609-1998.

spraying method to control and eradicate ticks; black farmers had to urge the government to erect dipping tanks in black areas. Blacks complained to the magistrates that they would not be able to pay taxes and continue to purchase dip at the same time, either the taxes would be badly paid, or cleansing would be badly carried out.<sup>72</sup> Before dip tanks could be erected the disease had already killed untold numbers of cattle.

The control of ticks and tick-borne diseases was problematic due to the fact that not all farms were well fenced, especially in black areas where cattle movement was difficult to control. White farmers on the other hand, could afford the scheme provided by the colonial government to fence their farms. The majority of them took advantage of the government scheme. However, the scheme did not benefit the blacks in communal areas.<sup>73</sup> The biased scheme disadvantaged blacks, and East Coast Fever spread rapidly in communal areas. This resulted in high cattle mortality rates in black areas.

People in communal areas were also not convinced that dipping their cattle would help in controlling and eradicating the disease. Many believed that dipping was a ploy of the government to reduce their wealth in order to absorb them into wage labour<sup>74</sup>. Their experience of losing large herds during the rinderpest epidemic, while white farmers only lost relatively few herds, made them believe that East Coast Fever was also introduced by whites to make them subservient to white rule. This suspicion resulted in blacks not co-operating with the authorities. However, their resistance to dipping their cattle worked against them because their cattle died in big numbers. Widespread resistance to dipping measures further undermined the control strategies employed by the government. Over time, however, the majority of people came to understand the advantage of dipping their cattle.

Transport was a major problem as most farms were too far apart for inspectors to visit them regularly. Qualified people in the field of Veterinary Services were also few, and they were not adequately paid by the colonial government. Due to the long distances which the Inspectors had to travel, they were

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<sup>72</sup>Ibid

<sup>73</sup>PVS162 , 1911, pp. 2002-2299..

<sup>74</sup>PVS169 , 1911, pp. 3606-3992.

reported not to be carrying out their duties. Farmers did not see the value of veterinary service because communication was very difficult during this period. If farmers needed help they were supposed to write a letter to the Veterinary Surgeon, and letters took a long time before they could reach their destination. Claims such as “If you have a sick beast and write to Maritzburg for the Veterinary Surgeon, the animal is dead before the man arrives and besides the expenses of getting him is often more than the value of the beast itself”<sup>75</sup> were common.

Dipping played little or no part in the prevention of East Coast Fever until Watkins-Pitchford started his work in 1908 which showed the benefits of short-interval dipping. Until then there were comparatively few dipping tanks. Pitchford’s work restored the confidence of the cattle owners, and the erection of dipping tanks took place on a large scale. Before Pitchford’s work, short-interval dipping was almost characteristic of alternating optimism and pessimism. Official phrases such as “just when you think you have beaten the disease that is the time to expect East Coast Fever” and “there is something we still have to learn about East Coast Fever”,<sup>76</sup> were in daily use.

The burning of grass as a method of eradicating ticks had little effect on tick populations, although stages of the ticks which are on the grass at the time of burning are destroyed. If grass is burnt at the time when certain stages of the tick life cycle are most active, it can play a very small part in tick control<sup>77</sup>. However, in areas which experience rainfall throughout the year the strategy of burning grass, is ineffective. The method could not be successful where it was the sole form of tick control. The limited understanding on the part of farmers and scientific researchers at the time concerning the ecology of ticks also was another shortcoming. The fact that the period of 1895 to 1910 was characterised by drought meant that burning could not be done on a large scale because grazing was very scarce in some parts of the colony. The cattle would have had to be provided with alternative grazing which was not possible during this period because of the severe drought.

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<sup>75</sup>CSO 2801 (1894) , p. 35840-3581.

<sup>76</sup>A. M. Diesel, ‘Campaign Against East Coast Fever in South Africa’, The Onderstepoort Journal Of Veterinary Science and Animal Industry Vol. 23, Nos.1 and 2, 1948) , pp.19-31.

<sup>77</sup>Barnett, ‘Control of Ticks’, p.12.

The slaughter method could not be pursued for a long time by the colonial government for a number of reasons. Firstly the government was not in a good financial position to pay adequate compensation to cattle owners. The drought had crippled the economy and in some areas led to famine. Because of the state of the economy the majority of blacks could not pay their hut tax which was used to prevent East Coast Fever by erecting dip tanks and maintaining them. The Anglo-Boer War also contributed to the poor financial position of the colony as many resources were used in the war. The recession experienced in Natal from 1903 to 1909 was partly due to the decline of war-time expenditure in the colony and to the termination of the inflow of imperial funds which had previously been directed towards the reparation and resettlement of refugees<sup>78</sup>. In addition to these depressed trade conditions, public revenues were further reduced and administrative costs increased by East Coast Fever, followed by the Bambatha "Rebellion" in 1906. The rebellion stretched the colony's military resources to the limit. There was a slight improvement in the economic conditions of the colony in 1906/7, but this tendency was abruptly reversed by the world-wide recession in 1907, after which the local depression deepened<sup>79</sup>.

The policy of slaughtering infected cattle had serious shortcomings. Apart from the government's financial situation, there were often disputes between it and cattle owners with regard to the amount to be given as compensation. The government found itself surrounded by controversy concerning compensation. As a result an Act was passed which placed a limit of £11 for a cow. The applicant was to be paid the value of the animal immediately before it was killed provided that the amount did not exceed £11. In estimating the amount to be paid, the animal's health was to be taken into account at the time of slaughter. The Act deterred many cattle owners from pursuing a slaughtering policy as a method of eradicating the disease. They would rather see their cattle die of the disease than see their cattle being shot for a small amount of money. Because compensation was seen by many farmers as inadequate, some farmers preferred not to report outbreaks of the disease, and tried to cure the disease

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<sup>78</sup> Andrew Duminy and Bill Guest 'The Anglo-Boer War and its Economic Aftermath 1899-1910', in Natal and Zululand from Earliest times to 1910, (eds) Andrew Duminy and Bill Guest, (Pietermaritzburg, University of Natal Press, 1989), p.345-367.

<sup>79</sup>Ibid. p.357.

themselves. Theoretically, slaughtering seemed a sound method of approach. The cattle farmers were, however, not to be readily persuaded into such a policy. From their point of view, “ the regulations were worse than the disease,” and in their opinion “ the government should relinquish all restrictions, let the owner who values his cattle look after them, and let the rest die”.<sup>80</sup>

Reporting the disease was seen by farmers as a further disadvantage because susceptible cattle were isolated for a long period during which time their movement was prohibited until veterinary authorities were satisfied that they were free from the disease. The farmers could not sell their cattle at auction sales because of the restrictions. Because of the limitations placed on farmers by the methods of eradicating the disease the majority of farmers preferred not to co-operate with the veterinary authorities and this lack of co-operation further helped to spread the disease.

Efforts to stop the disease were also undermined by the outbreak of the Bambatha Rebellion of 1906. The refugees from the Rebellion helped to spread the disease by moving cattle into non-infected areas. The military which was called up to suppress the Rebellion further spread the disease through the use of ox-wagon transport in and around areas known to have been previously infected with the disease. The problem was further compounded by the auction sale in Natal of cattle looted from Zululand during the Rebellion, despite warning from veterinary authorities. By 1910 the disease had spread to the most westerly and southerly reaches of the colony with devastating effects on many farms<sup>81</sup>. The situation was further compounded by the efforts of European speculators to profit from the circumstances created by the disease, by purchasing cattle from the blacks at low prices, and smuggling them into clean areas regardless of the consequences.<sup>82</sup> The Rebellion caused the disease to spread still further, and by March 1910 it had crossed into East Griqualand via the District of Umzimkulu. No Natal districts escaped infection, although the highlands suffered less. The disease also spread into Transkeian

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<sup>80</sup>Diesel, ‘Campaign Against East Coast Fever in South Africa’ , p.23.

<sup>81</sup> Duminy and Guest ‘The Anglo-Boer War and its Economic Aftermath 1899-1910’, p.355.

<sup>82</sup> U.G. 54-1912 Union of South Africa Department of Agriculture Report with Appendices for the period 31<sup>st</sup> May, 1910, to 31<sup>st</sup> December 1911, p.15

territories.

After the Rebellion it became difficult to control the disease. The moving of cattle through temperature camps to clean veld also became difficult on account of lack of clean grazing. The policy of taking cattle through temperature camps was then modified by the adoption of a slaughtering policy applied only in localized outbreaks of small extent.<sup>83</sup> Slaughter poles were also established in the large infected areas, to which animals were moved and slaughtered. Financial considerations necessitated leaving a good deal of this work to private enterprise and also resulted in the reduction of a considerable number of the veterinary staff.

### **Conclusion**

Ticks have always been a problem in Southern Africa. But this problem was exacerbated after 1894 by the importation of cattle which were not resistant to ticks and tick-borne diseases. Rinderpest killed most of the indigenous cattle which had built up a resistance to ticks. Before the region's cattle herds could recover from the rinderpest, a new deadly tick-borne disease, East Coast Fever, arrived in 1904. It had a devastating effect on local cattle herds with high mortality. Shortly after the outbreak of East Coast Fever, an Inter-Colonial Conference was convened which held sittings in Bloemfontein in 1903 and Cape Town in 1904. The conference discussed the different methods of preventing and eradicating the disease. The colony of Natal could not effectively implement measures adopted at the conference due to financial constraints.

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<sup>83</sup>.U.G.17/ 1944. p.12.

## CHAPTER THREE

### The Post-Union Campaign Against East Coast Fever: 1910-1954

After the formation of the Union of South Africa the whole country was treated as one for veterinary purposes. The restrictions that existed before the Union on the movement of cattle from one colony to another were abolished. This permitted people to move cattle all over the country. In August 1910, the Times of Natal published an article which raised very serious concerns about the use of acaricides to control ticks and tick-borne diseases<sup>84</sup>. The paper reported that arsenic had been found in milk and beef after chemical tests by Doctor Allen of Pietermaritzburg. The discovery was made with the aid of Reich's test, one of the most satisfactory and certain methods of qualitative analysis. These tests showed that an exceedingly high percentage of arsenic was found in milk and beef. The paper further reported that in 1901 England had been shocked by the discovery of arsenic even in beer. In that case the poison was not discovered until hundreds of people were laid low. Following this publication, the Board of Health appointed a committee to investigate the validity of Doctor Allen's findings. The committee found that the allegations were unfounded and incorrect, but the publication had nevertheless impacted negatively on the use of acaricides

The measures advocated by the government to eradicate the disease were undermined further by the passing of the 1913 Land Act. From the mid-seventeenth century onwards, black farmers and pastoralists were gradually dispossessed of most their land through armed conquest, spurious treaties and economic pressure.<sup>85</sup> The Land Acts of 1913 and 1936 increased pressure on the 13% of the land reserved for black African use, with disastrous ecological consequences. Marginal land was ploughed by people trying to eke out a living under desperate circumstances, leading to desertification of large parts of rural areas formerly covered by sweetveld.<sup>86</sup> The Land Act deprived cattle owners of grazing

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<sup>84</sup>The Times of Natal, Pietermaritzburg, 2 August 1910.

<sup>85</sup>M. Ramphele, 'New Day Rising' in, Restoring the Land: Environment and Change in South Africa, (eds) M. Ramphele and C. McDowell (London, Panos, 1991), pp. 1-12.

<sup>86</sup>Ibid. p.3.

and blacks resorted to destroying fences in order to get access to grazing on white farms.

When the *amakhosi* complained to the magistrates that they did not have enough grazing land for their subjects, the Commissioner for Native Affairs explained that there was ample ground for the people but that the great trouble was over-stocking.<sup>87</sup> The negative response given by the Commissioner encouraged defiance of the authorities. Constant complaints were being received of damage to farm boundary fences and fence material being stolen by inhabitants in the reserves. Wilful destruction of fences, with the objective of obtaining free grazing on the adjoining land, further contributed to the spread of the disease.

The outbreak of East Coast Fever, which began in 1916, was largely due to the impact of the First World War. Many outbreaks occurred in localities which had been free from the disease for a long time. The outbreak of the war put financial strains on the government. The cost of material for fencing had increased as well as the cost of dipping materials. The shortage of veterinary staff, owing to the absence of officers on active service, constituted a serious obstacle to the elimination of the disease.<sup>88</sup> Many officers in the Veterinary Division were involved on active service, primarily providing veterinary service in South West Africa (Namibia). As a result the veterinary staff could not provide adequate supervision of dipping and cattle movement. There was also an increase in the demand for meat which facilitated many illegal movements of cattle. As a result of the demand for meat and lack of supervision, white farmers did not dip their cattle regularly, and moved their cattle illegally to cattle sales and abattoirs. The veterinary and agricultural authorities complained about the way in which white farmers flouted regulations. Often white farmers were concerned to conceal the presence of East Coast Fever on their farms so that they could escape being quarantined.<sup>89</sup> The cattle of quarantined farms were prohibited from being taken to auction sales. Many of the outbreaks discovered by stock inspectors were on the land of farmers who managed to conceal the presence of the disease. Because

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<sup>87</sup>Minute Papers Principal Veterinary Surgeon. No.169 , 1911, pp. 3606-3992.

<sup>88</sup> U. G. 40-19 Union of South Africa Department of Agriculture Report with Appendices for the year ended 31<sup>st</sup> March, 1919, p33

<sup>89</sup>Ibid p.30.

the Veterinary Service had no knowledge of the disease existing on some farms, no restrictions were placed on them. Illegal movements spread the disease further. There was also a shortage of arsenic and as a result government restricted the sale of dipping material except in seriously infected cases. Only progressive and well-to-do farmers could afford this, but others could not. In 1918 there were 115 outbreaks of East Coast Fever. The majority of the outbreaks occurred in the Vryheid (15) Klip River ( 9), Escourt (12), Ixopo (8), Umvoti (10), Richmond (6) and Lions River (9) Magisterial Divisions, which were the major cattle-holding districts.<sup>90</sup>

In response to the large number of outbreaks during the war period, the government appointed a Select Committee in 1920 to inquire into the unabated spread of East Coast Fever, and to suggest steps for the eradication of the disease. The Select Committee found that the eradication of the disease was hampered by a lack of harmony between the Department of Agriculture and stock-owners, and by the consequent distrust of remedial measures suggested by the government Veterinary Surgeons and other officials.<sup>91</sup> The Committee concluded that the disease was costing the country, and cattle farmers, especially, millions of pounds. The Committee was of the opinion that it would be far better to incur increased expenditure for a shorter period of time, than to allow the scourge to continue unabated. The Committee further recommended strict cattle movement control under a permit system, close supervision of short -interval dipping, and early and definite diagnosis <sup>92</sup>.

Despite the recommendations put forward by the Select Committee, the disease continued to spread in Natal. In 1921 there were 138 outbreaks, 143 in 1922, 153 in 1923 and 118 in 1924. The outbreaks were caused by the post-war boom which faded into recession. During the war South African beef farmers managed to export substantial amounts of beef. At the end of the war, however, Britain released its accumulated war stocks and flooded the market. A recession followed and the South African beef industry was plunged into crisis. Farmers sought ways of maintaining beef prices even

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<sup>90</sup> U. G. 13-21 Union of South Africa Department of Agriculture Report with Appendices for the fifteenth Month from 1<sup>st</sup> April, 1919 to 30<sup>th</sup> June, 1920

<sup>91</sup>U. G. 17/ 1944, p. 8.

<sup>92</sup>Ibid.

as these prices declined.<sup>93</sup> The importation of low- grade beef had the effect of depressing local prices. One way to avoid selling beef locally was to export it. Unfortunately, the international beef markets were also highly competitive for local beef farmers. The demand for beef by the Witwatersrand mines for their compound workers, the attractive prices offered by the Johannesburg meat markets, and increased demand for meat from urban centres, provided local incentives to the cattle farmers<sup>94</sup>.

The incentives offered by the local market encouraged farmers to sell their produce. White farmers started to compete with one another on the market. In the process they fell victims to auctioneers, mine-owners, and the Imperial Cold Storage Company (ICS) which already strongly influenced and controlled the market. Auctioneers were in a position to interfere with sales and depress prices.<sup>95</sup> Farmers' produce was bought cheaply, and sold at high prices. The compound contracts were given to big cold storage companies, even when they charged higher rates than smaller competitors. The contracts were not awarded to small business because mine-owners feared that any hitch in supplying the compounds could have severe consequence. Farmers were critical of auctioneers for the low prices they paid for beef. The beef farmers asked the Smuts government to intervene and protect them against auctioneers, mine-owners, and the Imperial Cold Storage Company who determined prices of beef on the Johannesburg markets. South Africa beef producers had no Colonial Office to provide for protection. The Smuts government was reluctant to intervene as it tended to favour the interests of the Randlords. <sup>96</sup>

During the 1920s restrictions were imposed by the Johannesburg market on the selling of cattle from quarantine areas infected with East Coast Fever. In order to sell quarantine cattle on the Johannesburg

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<sup>93</sup>R. Morrell, 'Farmers, Randlords and the South African State: Confrontation in the Witwatersrand Beef Markets, c.1920-1923', Journal of African History, Vol.27 (1986), pp.513-532.

<sup>94</sup>Ibid.

<sup>95</sup>Ibid. p.516.

<sup>96</sup>Ibid. p.514

market, a farmer was obliged to get a licence to transport the cattle to the Reef<sup>97</sup>. Johannesburg municipal regulations stipulated that quarantine cattle had to be slaughtered within 24 hours of arrival, which meant that animals could neither regain condition, nor be retained until market prices improved. The regulations disadvantaged many cattle owners whose cattle were in quarantine because they were paid less money and thus were working at a loss. Because of these restrictions, farmers resorted to not reporting the outbreaks of the disease on their farms. This failure to report cases further helped to spread the disease.

In 1924 the Minister of Agriculture appointed a Committee under the chairmanship of Mr. G.A. Bridson to investigate East Coast Fever. The Committee visited Pietermaritzburg, Greytown, Richmond, Port Shepstone, Durban, Escourt, Ladysmith, Vryheid and Dundee. The Committee found that the recurrence of the disease in Natal was due to the failure of the government to accept the responsibility of keeping cattle in clean areas free from ticks, to the practice of moving inspectors when infected areas became free from the disease, and to the fact that stock-owners were not shouldering responsibility.<sup>98</sup> It was found that as far back as 1904, it had been the experience that not every stock-owner could be relied upon to look after his or her own interests. Because of this it was felt that it was necessary for the government to maintain some form of control in order to ensure that the disease was not introduced into other regions and that the inspection staff should be increased. Lastly, slaughter with full compensation was recommended in isolated cases where it was warranted by the history of the infection.<sup>99</sup>

The investigation into the persistence of East Coast Fever by the Bridson Committee of 1924 was followed by the appointment of the Viljoen -Goodall Committee in 1926 by the Minister of Agriculture. The recommendations of the Committee further emphasized the need for closer control, both with regard to the counting of cattle, and to the examination of smears from all cattle in areas where the

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<sup>97</sup>Morrell, 'Farmers, Randlords and the South African State', p.522.

<sup>98</sup>U. G. 17/ 1944, p. 8.

<sup>99</sup>Ibid.

disease was likely to appear.<sup>100</sup> The Committee believed that a slaughter policy would reduce the expenses of the Department of Agriculture in controlling the disease. Infected cattle could be slaughtered with the consent of the owner, but no compensation would be paid as the state could not afford it. In 1926 the Department instituted a more intensive system of control which was designed to provide early diagnosis. The aim was to obtain smears from all cattle which had died, or were slaughtered outside recognized abattoirs. It was only after 1930, however, that any real progress was made in this direction, as will be seen from the figures provided in Table 3.1 below with respect to Natal and Transkei.

**Table: 3.1** Increase in Smear Samples taken from Slaughtered Cattle /or Cattle which had died.<sup>101</sup>

	Transkei	Natal
1926-27	---	37338
1927-28	55650	45365
1928-29	82892	67617
1929-30	82649	72267
1930-31	114280	118279
1931-32	119382	287339
1932-33	119664	247737
1933-34	169725	340084
1943-35	120846	268754
1935-36	146190	324715
1936-37	189799	308976

By 1937, improved organization and persistence in the goals which the Department had set itself,

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<sup>100</sup>Diesel, 'Campaign against East Coast fever', p.25.

<sup>101</sup> P.J. Du Toit, 'Protecting the Union 's Livestock Industry' in Farming in South Africa, Vol.X11 December 1937, p525.

however, brought about a consistent improvement in the annual ratio between deaths and smears obtained from microscopic examination. While there was criticism of this campaign as a waste of public funds, and farmers in some cases submitted false smears, the method proved to be very effective over time. The taking of smears helped veterinarians to monitor the existence and the spread of the disease. For the suppression of the disease, once its presence had been established, the Department depended on three methods to eradicate infection. The methods were slaughtering, removal of cattle by quarantine, and dipping. As a method of eradicating East Coast Fever, however, dipping was by no means perfect, largely because of slowness of the process and the constant risk of spreading infection from the infected property.

There had been considerable controversy in regard to the interval at which dipping should be carried out in order to suppress East Coast Fever. There were those who insisted that dipping at a three-day interval would give immediate results in the suppression of infection, and it was even contended that with dipping at this interval, there was no need for any restrictions on the movement of cattle. Experimentally as well as through observation under practical conditions, both contentions were proved to be erroneous. It had been shown that cases of the disease would continue to occur on infected properties so long as there were infected ticks which had access to susceptible cattle. The Department was, however, satisfied that there was very little difference between the effects of three-day and five-day interval dipping, and that whatever difference there might be, it did not justify the extra expense involved, or additional hardships to which the animals were subjected, by three-day dipping as compared with the five-day interval<sup>102</sup>. In these circumstances, the Department had for some years been following the five-day interval, and this policy proved satisfactory, although it was subjected to the inherent imperfections of the dipping system in general. The proposals of the Committee proved to be effective in helping to eradicate the disease. When success seemed at hand, however, the drought and the economic depression disrupted further progress.

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<sup>102</sup>Ibid.p526.

From 1929 to 1933 there was severe drought which was aggravated by economic depression. Grazing was bad, water supplies gave in, and not only was it impossible to dip the emaciated stock regularly, but there was also a shortage of water at dipping tanks. The drought also caused failure of crops in communal areas. In some parts the drought resulted in famine. When drought was followed by floods, farmers did not dip their cattle regularly because of the inconvenience of herding and dipping in the rain. Irregular dipping resulted in an increase in tick populations, which resulted in a number of new outbreaks of East Coast Fever. The Veterinary Services were compelled to reduce field officers, and the amount of travelling performed by veterinary officers was also limited owing to the financial depression. Because of the reduced wartime staff it became difficult to monitor all cases of the disease in the whole province.

In 1936 the Minister of Agriculture called a conference of farmers and cattle owners in Pietermaritzburg. The cattle owners strongly indicated that they desired to be consulted on the measures to be adopted to control and eradicate the disease, so that their application might be arranged to their ultimate advantage and not to their ultimate ruin.<sup>103</sup> The conference emphasized the need for close cooperation between the stock owners and the Department in the fight against the disease. The application of a policy of slaughter was to be carried out on a voluntary basis. It was decided that compensation would be paid for the cattle destroyed. The amount to be paid was based on the commercial value of the cattle. The commercial value was to be determined by the Magisterial Advisory Boards.<sup>104</sup> After 1936 stringent measures (i.e slaughter of infected cattle) were taken and the outbreaks of East Coast Fever started to decline. In 1937, 1938, 1939, 1940 and 1941 the number of reported outbreaks declined to twelve, fifteen, fifteen, eleven, and five respectively.<sup>105</sup> The situation looked very promising that the disease would finally be eradicated.

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<sup>103</sup>Diesel, 'Campaign against East Coast fever', p.26.

<sup>104</sup> Schellnack, 'The Control of East Coast Fever in Natal', p.37.

<sup>105</sup>Diesel, 'Campaign against East Coast fever', p.20.

But the outbreak of the Second World War (1939 to 1945) resulted in increased ticks and tick-borne diseases. Although the war was not waged actively on South African soil, the effects of the war were nevertheless felt. The division of Veterinary Service was affected greatly by the war. A considerable number of officers, both professional and non-professional, enlisted for military service. As a result there was a shortage of staff in the Veterinary Services. The possibility that horses and other animals might play an important role in the war made it imperative to bring into being an organization for the treatment and care of animals, hence the formation of a veterinary corps.<sup>106</sup> This pre-occupation led to inadequate supervision to ensure that regulations to control East Coast Fever were followed. Inadequate supervision resulted in fresh outbreaks of the disease.

There was also a shortage of chemicals, and some chemicals could not be imported because of the wartime restrictions on products, which meant that cattle could not be dipped as regularly as before. Prices for chemicals were also very high. Only wealthy farmers were able to afford to purchase the chemicals. This led to irregular dipping and precipitated an increase in ticks and new outbreaks of East Coast Fever. The Veterinary Division had difficulty in controlling the outbreak of a new cattle disease known as lumpy-skin disease.<sup>107</sup> The remedy for the disease was not available on the market. Because there was no available remedy for the disease, farmers often tried to use DDT. Besides the control of East Coast Fever, DDT was used against tsetse fly to fight malaria and *nagana* in Natal in the 1920s and 1930s. As a result, DDT was in great demand and for that reason inferior DDT had been placed on the market by private enterprise. Because of the process adopted in manufacturing, the grade of purity was not adequate, and in consequence the solution was not strong enough. The product was bought by many cattle-owners, but proved to be ineffective. In retrospect, the choice of DDT was unfortunate since it was known to be relatively ineffective against moulting nymphs and adult ticks, quite apart from its adverse effects on the environment.

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<sup>106</sup>P du Preez, 'Showing the Way in Agricultural Problems and possibilities', Farming in South Africa August, vol 16 (1941), pp.263-264, 290.

<sup>107</sup>Union of South Africa House of Assembly Debates Vol. 58, May18 to June 19 1946,p.9371

The war period also created a market for meat and other produce which again encouraged movements of cattle giving rise to new outbreaks of East Coast Fever. Because of the shortage of dipping material caused by the war, farmers started buying low quality dips which were not registered. At the same time it was discovered that the blue tick had become resistant to B.H.C. At this time (1940-41) nicotine was the only known effective means of eradicating the blue tick. A concentration of at least 0.04 per cent of nicotine was needed as an addition to the ordinary arsenical dip (0.16 per cent  $\text{As}_2\text{O}_3$ ) with weekly dippings. As a result of the scarcity of nicotine extract during the war, the method of leaching tobacco directly into dipping tanks was developed. In order to protect buyers, the Fertilizers, Farm Feeds, Seeds and Remedies Act (Act no. 36 of 1947) was passed to ensure that no product which was inferior, or might endanger life, would be on sale on the market.<sup>108</sup> According to the Act all products had to be registered and tested by the Department before they could be sold to the public.

The fact that the blue tick could no longer be effectively controlled by means of arsenical dips can be attributed to the widespread use of arsenic without consideration of the after effects. Arsenic was used frequently to destroy locusts and other insects which were a problem to most farmers. Locusts were destroying crops in commercial and in subsistence agriculture from the early nineteen hundreds to the late nineteen hundreds. The extensive use of arsenical preparations in the destruction of locusts and as a dipping fluid, led to numerous cases of stock poisoning and contamination of the environment. In 1947 dipping regulations were promulgated as a result of presentations by firms, farmers and veterinarians to do away with arsenical dips.<sup>109</sup>

Before the 1942 outbreak in the Vryheid district, there was infection on the farm Langgewacht 449, in the Babanango district, a white-owned farm that was occupied by blacks. There were 10 deaths from East Coast Fever which occurred between 27 May 1935 and 11 March 1936, and a suspected case occurred on 12 March 1942. Investigations revealed that it was a very poorly managed farm which would naturally tend to harbour infection. Since 1936 the farm had not been under quarantine, but

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<sup>108</sup>P. M. Bekker, 'Blue Tick Resistance to B.H.C, but not Arsenic', in Farming in South Africa, Vol. XXVIII 1953. pp. 119-136.

<sup>109</sup>Ibid. p.121.

owing to staff difficulties, visits to the farm had been very irregular.<sup>110</sup>

In 1943 the East Coast Fever Commission was appointed to investigate new outbreaks of the disease. Factors that led up to the investigations were the apparent inexplicable outbreak of the disease in the Vryheid district, the serious spread of the disease, the demands of the farmers for an explanation for the outbreak, and the desire of the Department of Agriculture and Forestry to have the position clarified in order to enable it to take steps to safeguard the country from being ravaged by the disease in future. The Commissioners started their public sessions in Pretoria on 12 May 1943. In the course of the investigation the following centres were visited: Pietermaritzburg, Vryheid, Dundee, Durban, Empangeni, Port Shepstone, East Komgha, Umtata, Kingwilliamstown, Louis Trichardt, Nelspruit and Johannesburg.

The Commission found that the new outbreaks in Vryheid were related to the high price of beef as a result of war conditions which led to speculation in cattle in the district. The high price of beef caused movement of cattle which led to the spread of the disease. The Commission also examined the books of auctioneers at Vryheid and Eshowe in order to substantiate the view that East Coast Fever was spread through the Vryheid district by excessive cattle movements due to various sales held in Vryheid and surrounding areas. It was found that among the factors that hindered progress in the eradication of the disease were farmers' attitudes. The findings revealed that generally there was a lack of harmony between the Department and stock-owners. Several farmers complained about the inspectors employed by the Veterinary Division. A letter sent to the Farmers' Weekly by the Natal Farmers' Association reported that 'an exasperated Natal farmer once threw a dip inspector into a tank. Another farmer on dipping days would sit on his stoep with a gun between his legs and tell the inspector not to set foot in his house'.<sup>111</sup>

The hostility that existed between stock inspectors and farmers was seen as an obstacle to the control and eradication of the disease. The evidence given by the Vryheid Stock Inspector revealed that the

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<sup>110</sup>U. G. 17/ 1944, p. 12.

<sup>111</sup>Schellnack, 'The Control of East Coast Fever in Natal', p.50.

cattle in the district were extremely tick-infested, which indicated that farmers were not dipping until an inspector arrived in the course of one of his twenty -eight -day rounds. Virtually every farm in the district had more cattle than had been officially recorded.<sup>112</sup> Although some farmers did adhere to regular dipping and hand-dressing procedures, others simply refused to cooperate. Farms were found to be poorly fenced and many of the dipping tanks were in a bad condition.

While the Commission was in progress on 17 August 1943, the Minister of Agriculture issued an order for the destruction of infected cattle in the Vryheid district. The order was unfavourably received by most white and black farmers in the district. The whites were opposed to the order because their livelihood as cattle farmers was being threatened. The blacks resented the order because they regarded the policy of slaughter as a means of robbing them of their wealth and status.<sup>113</sup> The Department of Agriculture appointed more inspectors to ensure that the policy was adequately carried out. Although the slaughter policy was supposed to be implemented on all farms in the Vryheid district, there were variations in the ways in which it was put into effect. For black people, the slaughter policy was made compulsory. The reason for this was that their cattle were believed by the Veterinary Department to be responsible for the outbreaks of the disease.<sup>114</sup> Farms that were owned by whites and occupied by blacks were regarded by the veterinary authorities as reservoirs of East Coast Fever. On the white-owned farms where there were no blacks, the slaughter policy was not so vigorously applied. Some white farmers had the means to bribe the agriculture and veterinary authorities to overlook the fact that their farms were infected.<sup>115</sup>

Despite opposition and criticism from both racial groups, the slaughter policy succeeded in decreasing the number of outbreaks in the Vryheid district. As a result of progress in Vryheid it was agreed by the 1943 Commission that the slaughter policy should be implemented all over the country. An intensive

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<sup>112</sup>Ibid.

<sup>113</sup>Diesel, 'Campaign against East Coast fever', p.20.

<sup>114</sup>Schellnack, 'Control of East Coast Fever' in Natal', p.61.

<sup>115</sup>Ibid.

campaign against East Coast Fever was pursued by the Department from 1944 onwards. Compulsory dipping, which was in force for many years, was once again enforced vigorously. There were smear examining centres at Allerton, Dundee, Eshowe, Escourt, Ixopo and Vryheid since July 1943, as a result of East Coast Fever in the district. As a result of stringent measures taken by the Department, the number of outbreaks of East Coast Fever declined. In the annual report of the Department of Agriculture and Forestry for the year ended 31 August 1946, no fresh outbreaks were reported in Natal.

The decline in the number of outbreaks led to a relaxation of dipping in many areas and tick populations increased with a resultant increase in cases of redwater and gallsickness. A further fact, which is revealed by the Table below shows that if the tick population were allowed to multiply, the danger of a flare-up of East Coast Fever on a large scale was greatly increased. The Vryheid area, for instance, had been regarded as being free from East Coast Fever when the outbreaks occurred, with the result that dipping was carried out in a very haphazard manner, thus paving the way for a large scale East Coast Fever infection. Table 4.1 that follows on page 44 reflects the mortality from redwater and gallsickness as compared to East Coast Fever.<sup>116</sup>

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<sup>116</sup>Diesel, 'Campaign against East Coast fever', p.28.

**Table: 4.1** Comparative Mortality Rates: Redwater/ Gallsickness and East Coast Fever<sup>117</sup>

YEAR	Redwater and Gallsickness Cases.	East Coast Fever Cases
1939 to 1940	2946	43
1940 to 1941	3927	62
1941 to 1942	6307	30
1942 to 1943	6516	2363
1943 to 1944	5571	675
1944 to 1945	7330	68
1945 to 1946	6408	---
<b>TOTAL</b>	39005	3241

In March 1947, however, outbreaks were reported in the Polela district and in December 1947 one outbreak was reported in each of the districts of Vryheid, Pinetown and Pietermaritzburg<sup>118</sup>. The cattle which were infected were slaughtered and the districts became clean again, and the farms were placed under quarantine for eighteen months. Only three centres were infected by the end of 1947. These were Pietermaritzburg, Vryheid and Impendle. In April 1948, the Smuts government discussed the slaughter policy and the amount of compensation to be paid. It was suggested that the state should offer market value for infected cattle that were slaughtered. It was felt that this would serve as an incentive for farmers to offer to slaughter their infected cattle. The slaughter policy, however, was to be enforced on black cattle owners and compensation was not to be higher than the slaughter value of the cattle. The implementation of the slaughter policy was regarded as a means of reducing the costs incurred by the government in the fight against East Coast Fever.

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<sup>117</sup>Diesel, 'Campaign against East Coast Fever' 27.

<sup>118</sup>U G. 19-1946 Department of Agriculture . Annual Report of the Secretary of Agriculture for the year ended 31<sup>st</sup> August 1946. P.185.

Despite the good intentions behind the slaughter policy in the final eradication of the disease, the Smuts government was reluctant to implement the policy even though it was in a good financial position to do so. The government was reluctant to implement the policy before the general election in that year because it feared losing the farmers' vote. In May 1948 the National Party came into power. The Nationalists were committed to the general improvement of the white agricultural sector. Unlike the Smuts government, which tended to favour the interests of the mining and manufacturing sectors, the Nationalists were committed to improving the lot of white farmers, with whose support they had come to power.

In the period from September 1948 to the end of August 1949, nine outbreaks of East Coast fever were reported in the Vryheid and Pietermaritzburg Districts. As a result of the outbreaks from 1949 onwards, the slaughter policy was vigorously applied in all infected areas, and was made compulsory. The proposals suggested by the East Coast Fever Commission of 1943 were implemented. The Veterinary Division employed more stock inspectors to facilitate the smooth implementation of these proposed measures. In 1954 it was reported that the disease has been finally eradicated in Natal and the whole Union of South Africa.

## **Conclusion**

After the formation of the Union of South Africa, the whole country was treated as one for veterinary purposes. The restrictions that existed before Union on the movement of cattle were abolished. The outbreak of the two World Wars retarded progress made in stamping out the disease. During the two wars prices for purchasing dips were very high and many farmers could not afford to buy them. There was lack of harmony between the farmers and the Department of Agriculture. The government often took decisions without consulting cattle-owners. In 1948 the National Party came into power, and it was committed to the general improvement of the white agricultural sector. The National Party implemented the slaughter policy and it was made compulsory. The slaughter policy proved to be effective against the disease and in 1954 the disease was reported to have been eradicated in South Africa.

## CHAPTER FOUR

### The Control of Tick-Borne Diseases After 1954, and their Impact on Farming Communities

After the eradication of East Coast Fever in 1954 farmers made no effort to dip their cattle despite the fact that the government was still providing dipping material to black farmers. The cattle farmers started dipping less regularly, and in some cases with under-strength dipwashes.<sup>119</sup> The majority of farmers lost sight of the fact that failing to dip their cattle regularly was helping ticks to multiply. This outcome is suggested by the history of the KwaZulu-Natal province from 1904 to 1954, showing that healthy cattle depended on intensive tick control. It is important that all cattle on a farm be dipped once a week throughout the year, including the winter. If animals are introduced into such an area or farm they must be dipped immediately on arrival. They should not be allowed on to the veld before they are dipped. This practice is to make sure that they are clean and that no other tick species are introduced into the area.

The disadvantage of this method of tick control, however, is that it results in the loss of immunity of cattle to tick-borne diseases owing to the lack of natural challenge. Thus intensive dipping prevents the development of natural immunity to ticks and tick-borne diseases which could potentially create herds of cattle with little or no such immunity. The cattle owners in KwaZulu-Natal were faced with a similar situation because cattle were used to the intensive tick control of five-day interval dipping advocated by Watkins-Pitchford. Any relaxation of dipping cattle resulted in a huge increase in ticks and tick-borne diseases.<sup>120</sup> Table 4.1 on page 44 reflects such a situation in the early 1940s. After East Coast Fever was brought under control farmers stopped dipping their cattle. This shows that if regular dipping is suddenly disrupted, cattle could die in large numbers such as what happened in Zimbabwe during the pre-independence war in the mid 1970s. Large epidemics of tick-borne diseases occurred, and losses over a five year period amounted to more than a million head, which was one

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<sup>119</sup>U.G.13/1960 Union of South Africa Department of Agriculture Annual Report of the Secretary of Agriculture Technical Services for the period 1<sup>st</sup> July, 1958 to June, 1959 p.26

<sup>120</sup>Personal interview with Dr. Weaver 30 August 1999, Allerton

third of the cattle owned by traditional farmers.<sup>121</sup> The losses caused the Zimbabwe veterinary authorities to re-evaluate their national policy on ticks and tick-borne diseases. After Zimbabwe gained independence in 1980, dipping was reintroduced in traditional farming areas.

The decline in dipping cattle could also be attributed to the fact that dipping was imposed on people especially blacks, who were not invited to meetings when major decisions which affected them were taken. It was also evident in the evidence of most commissions held between 1920 and 1943, that white farmers complained that they were not consulted when decisions were taken. The attitude displayed by the Smuts government caused a rift between the farming communities and veterinary authorities. Thus the policies employed to fight East Coast Fever were also not favoured by most people. Because East Coast Fever was no longer a problem, farmers stopped dipping their cattle regularly. This resulted in an increase in ticks and tick-borne diseases.

In 1961 there was a tick flare-up which gave rise to tick borne diseases like redwater and gallsickness. The flare-ups were related to resistance to dipping by the black population, especially in the vicinity of Durban and Pietermaritzburg, which continued in spite of every effort to regain co-operation.<sup>122</sup> Redwater caused large scale cattle mortality in black areas. At Eshowe, for instance, 1,228 cattle died from this disease, while mortality at Ixopo was 600, and that for Nongoma over a thousand<sup>123</sup>. The contributory cause was the fact that in many instances stock owners failed to maintain the organic dip in their dipping tanks at the required strength. The situation was compounded by the fact that there was not enough rainfall during the year, which in some districts had led to drought. The droughts were followed by floods which disrupted dipping.

Drought, on the other hand, weakened cattle and caused diseases. If cattle are stressed this can result in a weakened immune system and cattle become vulnerable to the diseases. The disease or parasite

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<sup>121</sup>Norval, 'Vector: Ticks', p.20.

<sup>122</sup>R.P.25/ 1963 Republic of South Africa Department of Agriculture Technical Service Annual Report 1st July 1961 to 30th June, 1962, p.87

<sup>123</sup>Ibid.

may escape the control of the immune system and cause clinical diseases.<sup>124</sup> The nutritional value of the grass consumed by cattle plays an important role in maintaining the resistance acquired by the hosts against ticks. The protein deficiency in the diet of cattle affects the development of ticks and reduces the level of resistance of cattle to ticks. There is a significant reduction in the resistance of cattle to ticks during autumn and winter, and this is linked to a deterioration in the nutritional value of the grass that was available during these seasons<sup>125</sup>.

While undoubtedly ticks and tick borne diseases continue to cause concern in the latter half of the 1960's and the first half of the 1970's, the paucity of official records for this period preclude detailed analysis.<sup>126</sup> In 1976 further outbreaks of ticks and tick-borne diseases were brought about by weather conditions. Climatic conditions and abundant rain favoured the breeding of ticks. There were extraordinarily good rains which interrupted dipping and led to an increase in the incidence of tick-borne diseases. It was frequently impossible to dip because of rainfall. Redwater took a heavier toll than usual. It was this disease that was responsible for the highest percentage of deaths in cattle. These diseases appeared even in the areas where they are usually unknown. The task of Veterinary Services in controlling the diseases was also made considerably more difficult by the ignorance and poor co-operation of some farmers and speculators.<sup>127</sup>

The formation of the KwaZulu government (homeland) in the early nineteen seventies also contributed to the problem. The KwaZulu government failed to persuade people to dip their cattle regularly. Although the homeland government continued with unpopular compulsory dipping, it was unable to

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<sup>124</sup>Y.Rechav 'Acquired resistance to ticks', Insect Science Application. Vol. 13, No.4 (1992) pp495-500.

<sup>125</sup>Ibid. p.497.

<sup>126</sup>Neither the libraries of the Natal Society nor the Cedara Agricultural College in the greater Pietermaritzburg area have copies of annual reports of the Department of Agriculture for the period 1964 - 1977. Because the Natal Society Library is a legal deposit library it is possible that reports were not published for those years.

<sup>127</sup>Republic of South Africa Department of Agriculture Technical Service Annual Report 1st July 1975 to 30th June, 1976, p.99.

carry out the dipping scheme programme in some areas because of problems such as poor road conditions and inadequate transport. The provision of suitable vehicles to reach some areas where there were virtually no proper roads remained a problem. Road conditions vary greatly in KwaZulu-Natal and influenced the extent of stock inspection services rendered. In wet weather, travelling in the outlying areas proved difficult, and a number of disease control programmes had to be cancelled or rearranged for a later date<sup>128</sup>. In such situations diseases go unnoticed until they reach high magnitude. There was also a shortage of senior staff in the field and adequate instruction and supervision was not always possible.<sup>129</sup>

Tick-borne diseases such as gallsickness, heartwater and redwater were not extensively reported to the KwaZulu government for reasons that are not entirely clear. It is inconceivable that these diseases were not a serious problem but it could be the case that they were not well recognized. Many cattle introduced from other parts of South Africa, however, succumbed to these diseases. Most Zulu farmers did not differentiate between redwater and gallsickness and therefore did not report them as separate diseases<sup>130</sup>. Because of this, and because the number of positive cases recorded by the smear examiners was low, it was thought that the disease was of very little significance in KwaZulu.<sup>131</sup> Exact numbers were difficult to ascertain, however, as few animals were either slaughtered or treated with vaccines. Despite the fact that cattle owners generally knew the indigenous names and symptoms of the diseases, there was among them a general lack of knowledge about the epidemiology of the diseases and measures to prevent them. The effect of parasites on animal health was also poorly understood.

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<sup>128</sup>.KwaZulu Department of Agriculture and Forestry Veterinary Services, Annual Report, 1 April 1988- 31 March 1989, p.15.

<sup>129</sup>Ibid

<sup>130</sup>KwaZulu Department of Agriculture and Forestry Veterinary Services, Annual Report, 1 April 1984- 31 March 1985, p.25.

<sup>131</sup>.KwaZulu Department of Agriculture and Forestry Veterinary Services, Annual Report, 1 April 1986- 31 March 1987, p.14.

The outbreaks in 1983 were attributed to drought and poor management on the part of cattle farmers. In Natal the drought stricken districts of Magudu, Mount Currie, Newcastle and Utrecht were declared disaster areas, and farmers were granted loans in terms of the Agricultural Credit Act of 1966. The water supply position had deteriorated to such an extent that a restriction of 60% had to be imposed to ensure the availability of water until the end of October 1983. Durban, Pietermaritzburg and other consumers of the Umgeni Water Board were also requested to effect a 30% saving.<sup>132</sup> Farmers failed to follow dipping procedures and neglected to vaccinate their cattle. Usually this is done out of ignorance. Some farmers believed that a natural immunity would be cultivated in the animals by not dipping them. According to them, by protecting the animals against diseases by artificial means, one is, in fact, weakening the resistance of the animals. They regarded the protection the animals gain by the administration of certain vaccines as being merely an additional cost factor, something which could have been prevented by correct breeding. Hence the question remained whether or not it was really necessary, and how to combat animal diseases in the province and the whole of South Africa.

Farmers did not want to consult with veterinarians when there was a need to do so. Many farmers complained about the consultation fees charged by veterinarians. It is estimated that the veterinarians currently charge about ninety rand for consultation. The consultation fee does not include the travelling expenses which are based on the kilometers travelled. If a cattle owner stays far away from town, or where veterinarians live, the cattle owner ends up paying a large sum of money. The drugs which are administered by veterinarians are also said to be expensive. Labour costs involved in attending cattle for frequent treatments are considered prohibitive by many cattle owners and the farmer's input costs escalate, while his income remains constant.<sup>133</sup>

People in communal areas discontinued taking their cattle for regular dipping. People had many reasons for not taking their cattle for dipping. They claimed that when their cattle are taken for dipping they were also being vaccinated and in the process some of their cattle die. As a result some people

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<sup>132</sup>Republic of South Africa House of Assembly Debates (Hansard) Vol. 106, 1983, 21 March to 13 May, p.4336.

<sup>133</sup>Personal interview with D. Williams, 18 October 1999, Lions River

prefer not to take their cattle for dipping in fear of similar consequences. In Richmond, in particular, some cattle owners complained that dipping and vaccination was meant to reduce their stock. Some complained that at weekly intervals dipping was fatiguing and cattle that were dipped were still infested with ticks within few days after they were dipped. It was felt that it was better not to dip cattle regularly since intensive tick control would mean a loss of immunity in the herd to the protozoal diseases that ticks transmit. It was also argued that if cattle were able to survive before the introduction of chemicals (dips), why then should this costly exercise be pursued while nature has offered an alternative solution. Walking animals to distant dipping places as well as the dipping process itself and the physical effect of some dips, are stressful and result in animal production losses. The continued decline in dipping aggravated the situation. The tick-borne diseases began to rise and heartwater caused numerous deaths in many areas.

In 1984 the Animal Diseases Act No. 35 (of 1984) was implemented. The Act did not make dipping of animals compulsory, though the responsibility of cleansing animals lay with the individual stock owners. Compulsory dipping of animals had met with contempt from many quarters and its removal from the statute books encouraged farmers not to make an effort to dip their cattle. Because of the Act, farmers could not be compelled to clean their animals. The passing of the Act can also be seen as a contributory factor. Notwithstanding the lack of compulsory dipping in the Act, however, the government did continue to supply black communal farmers with free dipping material and at least some dipping continued. Cattle were regularly inspected to ensure that they were free of ticks and were healthy.

The government took a decision to phase out compulsory dipping since it was putting a financial strain on government finances. Annually the state spends millions of rand on extension services and research to achieve maximum production and optimal utilization. Many farmers, however, displayed recklessness or carelessness in dealing with animals. Farmers wait until the animal is seriously ill, and then think the vaccines must make the animal well again.<sup>134</sup> By neglecting their responsibility, they give the state the responsibility to care for their animals, which is not in the public's interest.

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<sup>134</sup>Republic of South Africa House of Assembly Debates (Hansard), Vol 112, 1984 27 January to 9 March, p.2392.

Technological advances achieved in South Africa in combatting the animal diseases, provided another reason for doing away with compulsory dipping. A degree of success had already been achieved in eliminating contagious diseases like rinderpest, East Coast Fever and others. The other diseases were combatted in different ways, and they did not cause serious losses, although in isolation they could be serious in restricted areas.

From 1985 violence erupted in many parts of KwaZulu and Natal, especially in the former KwaZulu government territories. The routine dipping and vaccinations were disrupted by political unrest. Reports indicated that flare-ups of tick-borne diseases were generally associated with disruptions to dipping activity.<sup>135</sup> Political violence undermined all efforts by the former KwaZulu government to control ticks and related diseases. Fundamentally this violence was caused by conflict between supporters of the Inkatha Freedom Party (IFP) and the United Democratic Front (UDF) which later became identified with the African National Congress (ANC). The escalation of the violence was aggravated by the failure of the police to arrest and root out the perpetrators of violence and was largely responsible for the disruptions to tick control measures in many areas. Police officials were also found to be part of the problem as they were involved in the killings. The Truth and Reconciliation Committee (TRC) hearings revealed that a state secret police hit-squad activity was responsible for many deaths of UDF activists in collaboration with the IFP. The 'Inkathagate' scandal that came to light in 1991, revealed extensive state funding for the IFP. The causes of violence in KwaZulu-Natal were many and complex. The violence spread like wildfire and untold numbers of people lost their lives, thousands of people fled their homes, and became refugees elsewhere in the province. The violence resulted in movements of cattle from one district to the other as people fled from the violence flash points. The movements of cattle also helped to spread different tick species into new environments.

Freund provided three explanations for violence in KwaZulu-Natal. The first explanation is said to be derived from white 'common wisdom' that the violence was a 'black on black violence', endemic

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<sup>135</sup>KwaZulu Department of Agriculture and Forestry Veterinary Services, Annual Report 1 April 1986 - 31 March 1987, p.14.

in the culture of black people<sup>136</sup>. The explanation is however, denounced by revelations in the TRC findings. The second explanation is closely linked to the IFP, that violence emanated from the struggle over resources. One group, or community, denies access to another to basic needs like water, land, schooling, transport access because of scarce resources. Lastly, there is an explanation associated with the ANC and its sympathisers, blaming the violence on 'apartheid', in particular, on state policy and state connivance<sup>137</sup>. The causes of violence and their interpretation remain contentious issues in South Africa today.

Because of violence people feared congregating at dipping tanks.<sup>138</sup> Absenteeism at dipping tanks was also due to people moving away as a result of unrest and violence. In Richmond, in particular, people still did not trust that the violence had ended, and very few people turned up for dipping. The violence also made it impossible for people to move far away from home to look for their cattle in the veld. In such situations stock owners could only wait for cattle to return back to drink water if there were no streams where they grazed in the veld. The violence continued even after the democratic elections in April 1994. While it is not within the scope of this thesis to investigate the causes of violence, the violence clearly impacted negatively on government extension services, dipping of livestock being but one example.

The current tick population explosion is due to excellent rains in 1997/98 and the warm winter experienced in most parts of the province. The excellent rains played an enormous role in supporting the tick populations and attendant tick-borne diseases.<sup>139</sup> Almost all of the state veterinarians have continued to report outbreaks of tick-borne diseases well into the winter months. The wet season, fairly warm winter conditions, and a reduction in dipping have been responsible for extended tick

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<sup>136</sup>B. Freund, 'The Violence in Natal 1985-1990' in Political Economy and Identities in Kwazulu-Natal Historical and Social Perspectives, (ed) Robert Morrell, (Durban, Indicator Press, 1996), pp.179-193.

<sup>137</sup>Ibid.p185.

<sup>138</sup>Ibid.p.15.

<sup>139</sup>KwaZulu-Natal Department of Agriculture, Annual Report 1998. p.29.

activity. Dipping in poor weather conditions demoralized stock owners. Poor dipping tank facilities meant that in many areas cattle could not be dipped.

The transition in South Africa, which led to a democratically elected government in 1994, has been hailed by the international community as very successful. The amalgamation, restructuring and rationalization of government departments, however, has not been without difficulty. The merging of different departments was a disadvantage for some, and advantageous for others. Those who felt threatened by the new developments in the country resorted to resigning their posts. The resignations have left a vacuum in some departments and threatens to affect service delivery. Furthermore, the problems which existed in the former homeland governments were inherited by the newly elected government.

Besides difficulties encountered in the restructuring process, the government faced serious financial constraints because of the legacy of apartheid. The severe financial constraints placed on the Veterinary Directorate have made disease control and surveillance difficult, mainly because of the curtailment of dipping programmes in communal areas, and the severe restrictions placed on the use of state transport.<sup>140</sup> Besides problems faced in agriculture there was also massive unemployment which the government had to provide jobs for. The levels of crime and domestic violence were also issues which needed urgent government attention. Government resources had to be channelled where they were most needed. The government has offered Animal Health Assistants (AHA) severance packages, since it was reported that they were paid full salaries while they work only three or four days in a month, because dipping is only done once or twice a month in many communal areas.<sup>141</sup> Communities had to elect a representative(s) who would replace the AHA. The community representatives are offered guidance by the Department of Veterinary Services as to how to manage and utilise the chemicals (dips). The success of tick control will depend largely on cooperation among subsistence farmers. The government's decision to withdraw the dip subsidy however, has come at a time when the tick population is reaching alarming proportions.

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<sup>140</sup>Ibid. p.29.

<sup>141</sup>Personal interview with Dr. Weaver, 30 August 1999, Allerton.

Dipping of cattle has dropped further since 1994 due to the fact that the majority of children who are able to herd cattle and take them to dip are attending school. The new government made it a priority that in the rural areas schools are built, and as a result the number of children who are going to school has affected dipping. Aged people cannot travel long distances to get animals to the dip. The number of people who are getting state pensions has also increased. If the old age pension pay days coincide with those of dipping, the majority of people do not show up for the dipping. Able men are working far away in cities like Durban, Johannesburg and other places and they only come home at weekends or when firms have closed.<sup>142</sup> When they return home they often find their cattle heavily infested with ticks.

Migrant workers and others who do not bring their cattle for dipping help ticks to develop resistance to acaricides. Grenade is a head count system chemical used in many communal areas. A head count system allows a certain number of cattle to be dipped. The dipping compound is replenished according to the number of cattle dipped. If cattle are dipped without the knowledge of a dip technician, or AHA, when the compound is replenished he will obviously not know exactly how many cattle were dipped and this results in the strength of the compound being reduced.<sup>143</sup> When dips are used only infrequently or become excessively fouled, chemical oxidation is likely to occur.<sup>144</sup> If the practice goes unnoticed for a long time, the resistance problem might get out of control. In order to prevent illegal dipping on Saturdays, a chain is used to block the dip tank to ensure that people do not dip without permission.

Apart from illegal dipping during the weekends in the area, there is also the problem of people not registering their stock after buying cattle elsewhere in the province, or cattle that are acquired through the system of 'lobola.' Cattle are supposed to be registered with the authorities, and a permit given to prove that the stock is healthy and has not been acquired fraudulently. However, people choose not to report and register their cattle. Tick infestation of cattle forces people to bring their cattle for dipping and that is the time when the Animal Health Assistant will notice that there is unregistered

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<sup>142</sup>Personal interview with E. McCullough 06 October 1999, Richmond.

<sup>143</sup>Barnett, Control of Ticks, p.81

<sup>144</sup>Ibid.

stock in the dip tank.

The fact that not all cattle are dipped at the same time undermines dipping as a method of tick control. After dipping, the cattle that have been treated still mix with those which did not go for dipping. Mixing of cattle from different areas also causes a problem because it helps to transfer and introduce new tick species into the environment. The new tick species are able to transmit diseases and build resistance to dips.<sup>145</sup> Dipping the cattle in such a situation is a waste of time and resources. For dipping as a tick control measure to be effective, all cattle in the area should be dipped. Those cattle which are not dipped will still infect clean ones with ticks and these might also help ticks to become resistant to acaricides.

The political violence that swept through the province prior to the 1994 democratic election continued in some areas. When it is thought that the violence has stopped, it resurfaces again. Because of violence and so called 'faction fights' some people avoid congregating at public places. The violence and 'faction fights' disrupted dipping of cattle in many areas like Richmond.

Commercial farmers complain about the high cost involved in purchasing acaricides. Farmers use different chemicals. These depend on the individual farmer's choice and financial position. In order to save on the costs involved in purchasing acaricides, some farmers dilute the chemical or make their own pour-ons. Most farmers in commercial areas use pyrethroids because of low toxicity to mammals, birds and non-targeted insects, cost and control management. Farmers do not always follow instructions which are given by the chemical industry on how to use dips. They either use a weak solution or too strong a solution when dipping their cattle<sup>146</sup>. As a result of incorrect use of dips, ticks become resistant to many remedies. Farmers are supposed to dip more frequently than the four or even five week intervals that seem to be their chosen practice.

The making of home made pour-ons is a criminal offence according to the Fertilizers, Farm Feeds,

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<sup>145</sup>Personal interview with Dr. Edwards, 24 August 1999, Allerton Laboratory

<sup>146</sup>Personal interview with Charles Byford Jones, 06 September 1999, Lions' River.

Seeds and Remedies Act No. 36 of 1947. The formula of the pour-on has to be tested and approved by the Registrar according to the Act before it can be used. The widespread use of home-made pour-ons helps ticks to become resistant. It is also difficult to police what farmers are doing on their farms. The attitude displayed by farmers makes the control of ticks and tick-borne diseases very difficult.

Farmers can hardly make the correct decisions when faced with an acute shortage of information, especially in the context of the complex husbandry issues they have to keep up with.<sup>147</sup> A field survey found ignorance about ticks and tick-borne diseases pervasive in small-farm areas. Farmers were still using different chemicals despite the fact that veterinary services had advised them to use one chemical or dip for a long time (four to five years) or until ticks develop resistance. But the farmers were doing the opposite. Farmers also have different reasons for using one type of chemical over a long period, or using a chemical for a short period. They change different acaricides within a short space of time. One farmer explained that by changing chemicals within a short time “we want to take ticks by surprise. Ticks will think that we will use the same dip they are used to, only to find that we use a new chemical”<sup>148</sup>. By so doing it is believed that many ticks will be eliminated in the process. Changing of different acaricides is due in part to lack of understanding of different tick species found in a particular area, the ecology of ticks and their life cycles. If a cattle owner knows what tick species are found in his or her area, controlling measures can be best employed based on the tick’s life cycle.

The acaricide preferences of farmers are influenced by many factors. These preferences are most probably due to a combination of factors, including product strategies by chemical companies, relative price and efficacy spectra of the individual acaricides concerned, traditional tick control techniques and other unidentified producer attitudes towards tick control<sup>149</sup>. The main reasons for changing acaricides is the price and also ignorance among some of the farmers. The chemical industries charge exorbitant prices for acaricides and it is also expensive to develop new chemicals. Some acaricides

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<sup>147</sup>J.E. George, ‘Acquired immunity of cattle to ticks’, Insect Science and Its Application, 7, (1986), pp. 642-645.

<sup>148</sup>Personal interview with D. Williams, 18 October 1999, Lions River

<sup>149</sup>Ibid.

available commercially are used at effective levels, others are recommended at sub-optimal strength because of possible toxicity hazards and of cost. Farmers deliberately reduce the quality of dip concentration for the purpose of saving money. The deliberate use of low acaricidal concentrations creates ideal circumstances for selection of resistance.<sup>150</sup> Ignorance, apathy and poverty contribute most to tick resistance.

The high cost involved in consulting with veterinarians also contributes to the problem. Farmers often find themselves taking wrong decisions which have disastrous effects due to lack of information. Farmers do not want to consult with veterinarians. They complain that to consult with vets is too expensive. One farmer exclaimed “to call a vet is worth more than one cow.”<sup>151</sup> The fact that farmers do not want to consult with veterinarians is aggravating the problem by using tick control measures that are very detrimental to the environment.

At the same time, beef producers are running at a loss because of the importation of cheap meat from overseas which reduces local beef prices. The fact that South Africa competes on an international market where meat is available at a low price disadvantages many farmers who want bigger profits. The fact that some farmers do not understand how the international market operates further puts them at a disadvantage. The problem is compounded by the fact that farmers do not want to reform. Farmers use old methods of farming even when the methods do not yield good results. The old methods and poor management on the part of farmers result in big losses. Thus poor management helps the ticks and tick-borne diseases to multiply. Reliance on chemical agents to manage problems in the livestock industry is also being questioned in many quarters. Thus the present problem of ticks and tick-borne disease control requires that farmers make a paradigm shift and make use of methods of tick control that are less expensive but friendly to the environment<sup>152</sup>. In recent years there has been an increased interest in alternative tick-control methods that are environmentally friendly, relatively cheap, and can involve farmers directly in tick management.

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<sup>150</sup>Barnett, Control of Ticks, p.110.

<sup>151</sup>Personal interview with H. Anderson, 14 October 1999, Harding

<sup>152</sup>Natal Witness, October, 01, 1999

There are various predators of ticks, with birds being the most common. Oxpeckers, lizards, cotton rats, mice and domestic chickens predate on various tick species. The main food for oxpeckers are ticks and flies. Oxpeckers play an important role in the relationship between wild ungulates and their external parasites. They also predate on ticks found on donkeys, cattle and horses. The relationship between mammals and oxpeckers is a symbiotic one. Oxpeckers help to keep their ungulate host alive, for they reduce their tick burdens by eating the ticks.<sup>153</sup> Thus they play an important role in nature by suppressing tick populations. There are two species of oxpeckers in Africa and southern Africa, the red-billed oxpeckers and yellow-billed oxpeckers<sup>154</sup>. The latter is extinct in South Africa. The introduction of chemicals (dips) in the 1890s to control ticks after the rinderpest epidemic severely reduced oxpecker populations. The destruction of many large trees to clear the forests for agricultural purposes, and for firewood, also limited the number of natural tree cavities in which oxpeckers could build their nests. The use of arsenic-based dips to control ticks for many years poisoned oxpeckers<sup>155</sup>. Surviving oxpeckers are now confined to game reserves where they are not exposed to toxic substances to the same degree as in agricultural areas.

There are now suggestions that oxpeckers should be reintroduced into agricultural areas to reoccupy the ecological niche from which they were expelled at least partly by man's agency. Given that the cost of dips is escalating rapidly, and many stock farmers in resource-poor communities cannot afford to buy dips, the establishment of oxpecker population could lead to financial saving for stock farmers. Besides this positive financial implication, the presence of the oxpeckers would remove the need to use poisonous chemicals in the environment.<sup>156</sup> Oxpeckers could also reduce the tick-borne diseases associated with stock losses. However, there are contradictory opinions of the bird held by husbanders of domestic livestock. Some welcome the birds, while others complain that the birds peck holes in their donkeys and cattle. But it has been shown that oxpeckers started their perforations from saddle-

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<sup>153</sup> P.Mundy, 'The Oxpeckers of Africa' in African Wildlife Vol.37, No.3 pp.111-117.

<sup>154</sup>Ibid.p.111.

<sup>155</sup> J. Glen-Leary, 'Oxpeckers Revival' Farmer's Weekly May 11,1990, p.30.

<sup>156</sup>M. Anderson, M. Knight and M. Berry 'Redbilled Oxpeckers re-established in the Kimberley area' in African Wildlife, Vol. 51, No.2 (1997) p.13.

sores and similar injuries.<sup>157</sup>

Besides oxpeckers, chickens can also be used as a biological tick control method. Domestic chickens have been reported to predate on ticks in cattlesheds and they remove ticks from the ears of cattle when lying down at rest. The indigenous African chickens prove to be the most effective.<sup>158</sup> The use of chickens is seen by many as preferable to spending money on tick dips, which are regarded as being a negative approach, because dips release poison on the grass and kill insects, especially dung beetles. The dung beetles play an important role in improving the veld by putting manure into the soil to make it immediately available as fertilizers<sup>159</sup>. Chickens could be used to control ticks on livestock in resource-poor urban environments.<sup>160</sup> It is important that dips should not be used where chickens and oxpeckers are used as a method of tick control because they will be poisoned. The disadvantage of this method of tick control is that predators such as jackals, mongoose and snakes, particularly puff adders and cobras, find the chickens to be easy prey. The problem of predators means that owners of cattle should always be on guard to ensure the safety of their chickens in the veld.

The use of anti-tick grasses provides an exciting opportunity for tick control. The use of anti-tick grasses reduce the cost of raising livestock, and also limits money spent on importing or buying chemicals. Plant materials have been in use longer than any other group as many farmers and villagers in Africa traditionally used various plants extracts in fight against crop and stock diseases and pests.<sup>161</sup> There are some farms where anti-tick grasses are grown, for example *kikuyu* grass. *Kikuyu* is grown widely in commercial farms in Lions River to support dairy cattle. The *kikuyu* grass however, has

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<sup>157</sup>P.Mundy, 'The Oxpeckers of Africa' pp.111-117.

<sup>158</sup>G.P. Kaaya, 'Non-chemical agents and factors capable of regulating tick populations in nature: a mini review' in Insect Science Application, Vol.13, No. 4, (1992) pp.587-594.

<sup>159</sup>C. Gittens 'De-ticking goes fowl' in Farmers Weekly July,3 1998, p9.

<sup>160</sup>K. Dreyer, L.J. Forie and D.J. Kok. 'Predation of livestock ticks by chickens as a tick-control method in a resource-poor urban environment' in Onderstepoort Journal of Veterinary Research, Vol.64 (1997), pp.273-276.

<sup>161</sup>C.K.M. Kaposhi, 'Natural products in tick management' in Insect Science Application, Vol.13, No. 4, (1992) pp.595-598.

been reported to be invaded by army worm which causes outbreaks of a disease in cattle.<sup>162</sup> This species also uses a lot of water. The causes of the worm outbreaks have not yet been known.

The wide spread introduction of *Bos taurus* cattle which are more susceptible to ticks and tick-borne diseases, has exacerbated the problem of tick control. In view of the many difficulties encountered with the present methods of tick control, exploitation of tick-resistant cattle breeds appear to provide an alternative approach to intensive chemical tick control. It has been shown that zebu, *Bos indicus* and *B. indicus x B. taurus* breeds of cattle become more resistant to most of the economically important African ticks than do *B. taurus* breeds.<sup>163</sup> Indigenous cattle have evolved in close contact with large tick populations and they are more resistant than imported cattle. Commercial farmers are now reported to be breeding tick-resistant cattle in view of the shortcomings of intensive chemical tick control and the losses associated with imported cattle.<sup>164</sup> Although breeding of tick-resistant cattle to replace susceptible stock takes time, it is perceived as a rational approach to the present tick control problem.

## Conclusion

The eradication of East Coast Fever in 1954 led many farmers to relax dipping their cattle regularly or in some cases to dip with under-strength dipwashes. Relaxing dipping helped ticks and tick-borne diseases to multiply. Political violence and 'faction fights' also disrupted dipping in many areas. The migrant labour system further undermined intensive tick control measures. The Animal Diseases Act of 1984 did not make dipping a compulsory requirement. Apart from conducive weather conditions, ticks and tick-borne diseases are now on the increase because of budgetary constraints which further limit the efficiency of the department to deal with the problem. The farmers' tendency not to follow

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<sup>162</sup>S.J. Newsholme, T.S. Kellerman, G.C.A. Van Der Westhuizen and J.T. Soley 'Intoxication of cattle grass following army worm (*Spodoptera exempta*) invasion' in Onderstepoort Journal of Veterinary Research, No, 51, (1983), pp.157-167.

<sup>163</sup>I.A. Norval 'Host susceptibility to infestation with *Amblyomma hebraeum*' in Insect Science Application, Vol.13, No. 4, (1992), pp.489-494.

<sup>164</sup> Telephone Interview with Dr. Edwards 06 April 2000.

the advice given by the veterinarians further undermines tick control measures. In recent years there has been an increased interest in alternative tick-control methods that are environmentally friendly and relatively cheap.

## CHAPTER FIVE

### Conclusion

Ticks are divided into two main groups according to their habits and development, namely single-host and multi-host. Ticks transmit many devastating livestock diseases which cause high mortality. Tick activities are determined by climate<sup>165</sup>. Their distribution differs with climatic zones. Some species are adapted to cool, very moist environments, while others are adapted to dry, hot climates. Tick abundance may be brought about by indirect human activities, such as high stocking and the introduction of susceptible breeds.

Control measures against ticks and tick-borne diseases were only applied on a large scale following the introduction of East Coast Fever. The first tick control trials with dipping in South Africa started in 1893, shortly after the discovery in 1899 in the USA that the causal piroplasm of redwater in cattle is transmitted by ticks.<sup>166</sup> In 1909 Watkins Pitchford was the first in South Africa to succeed in controlling ticks with applications at five-day intervals. Resistance to ixodocides and the high cost of chemicals stimulated concern, and tick control methods remained a contentious issue with the proponents of enzootic stability situated at one extreme, and those of intensive tick control at the other.

Before 1894 ticks and tick-borne diseases did not bother cattle farmers in KwaZulu-Natal much, but they were there and acted as a form of natural culling. The problem of ticks however became more serious with the importation of cattle. Prior to that ticks and tick-borne diseases had not been reported as a problem in indigenous cattle, although losses caused by babesiosis and heart water had been experienced in imported cattle.<sup>167</sup> The incidence of ticks and tick-borne diseases was compounded by the rinderpest epidemic of 1896. The rinderpest killed most indigenous cattle, which were immune to

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<sup>165</sup>Tatchel, 'Ecology and tick management', p.552.

<sup>166</sup>Whitehead, Tick Biology and Control, p.15.

<sup>167</sup>Norval, 'Vectors: Ticks', p.19.

ticks and tick-borne diseases and in order to replenish the lost stock, susceptible cattle were imported. The imported cattle easily succumbed to tick-borne diseases.

Before cattle owners could recover from the scourge of rinderpest, a new deadly tick-borne disease, East Coast Fever, arrived in 1904. It posed a serious problem for the cattle industry until it was finally eradicated in 1954. East Coast Fever was prevalent mainly in low-lying and coastal areas.<sup>168</sup> The essence of the problem was how to control and ultimately eradicate the disease. The limited knowledge on the part of European settlers of African animal diseases, together with the limited degree of veterinary and scientific research work that had been done in the nineteenth century, delayed the recognition of East Coast Fever as a specific disease.

In the early years of its diagnosis, much confusion existed since many other stock diseases with similar symptoms were present, and European settlers had little or no knowledge of how to differentiate between them. The similarity to other stock diseases made it difficult for veterinary researchers and agricultural authorities to understand the disease and find a suitable method of controlling it. East Coast Fever was first recognized by Robert Koch, a veterinarian working in Tanganyika in 1897. After extensive research by Transvaal veterinarians Theiler, Gonder and Koch between 1903 and 1907, it was conclusively proved that the protozoal parasite was that of East Coast Fever.<sup>169</sup>

Shortly after East Coast Fever was first reported in South Africa in 1902, an Inter-Colonial Conference was convened which held sittings at Bloemfontein in December 1903 and Cape Town in May 1904<sup>170</sup>. The purpose of the conference was to discover possible ways of preventing and eradicating the disease. The conference was of the opinion that the only effective way to eradicate the disease was to kill all cattle in infected areas and quarantine the infected areas for a period of not less than eighteen months. The colonial government of Natal, however, did not have the financial means to pay adequate compensation to cattle owners. As a result a slaughter policy could not be implemented, except in the

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<sup>168</sup>Diesel, 'Campaign against East Coast fever', p.20.

<sup>169</sup>Henning, Animal Diseases in South Africa, p.416.

<sup>170</sup>U.G. 17/1904, p.3.

case of cattle found straying in infected areas. Stringent measures were adopted to prevent the spread of the disease. These measures included control of cattle movements, quarantine camps, fencing of farms and dipping.

The proposed measures to control and eradicate the disease were undermined by the Bambatha uprising of 1906. Refugees from the rebellion helped to spread the disease by moving cattle into non-infected areas. The colonial government was weakened financially by both the Anglo-Boer War and the Rebellion. Because of financial constraints the colonial government could not effectively implement the proposed measures to control and eradicate the disease.

Dipping played little or no part in the prevention of East Coast Fever until Watkins Pitchford started his work in 1908. Until then there were comparatively few dipping tanks. He showed that five-day dipping could destroy ticks. His work restored the confidence of cattle owners and the erection of dipping tanks took place on a large scale.<sup>171</sup> After the formation of the Union of South Africa the whole country was treated as one for veterinary purposes. The restrictions that existed before the Union in controlling the movement of cattle from one colony to another were abolished. This permitted people to move cattle all over the country and the free movement of cattle helped to spread the disease.

The outbreak of the First World War further undermined the progress made in controlling the disease. During the war the cost of fencing increased as well as the cost of dipping materials.<sup>172</sup> There was also a shortage of veterinary staff, who were on active service. Because of a lack of adequate supervision to control cattle movements, the disease was able to spread further to non-infected areas.

In 1920 a Select Committee was appointed by the government to inquire into the unabated spread of the disease and to suggest steps to eradicate it. The Committee found that the eradication of the disease was hampered by a lack of harmony between the Department of Agriculture and stock-owners, and by the consequent distrust of remedial measures suggested by the government veterinary surgeons and

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<sup>171</sup>Ibid. p.5.

<sup>172</sup>U.G.40-1919, p.33.

officials.<sup>173</sup> The committee was of the opinion that it would be far better to incur increased expenditure for a short period than to allow the scourge to continue to spread.

In 1924 the Bridson Committee was appointed to investigate the persistence of the disease. This Committee was followed by the Viljoen-Goodall Committee in 1926. Both committees emphasized the need for closer control with regard to the counting of cattle and examination of smears. The proposal by both committees proved to be effective in helping to eradicate the disease. However, when success seemed at hand the drought and economic depression in 1929-33 disrupted measures to eradicate the disease.

The outbreak of the Second World War was followed by a rise in ticks and tick-borne diseases. The division of Veterinary Services was affected greatly by the war. A number of officers enlisted for military service and, as a result, there was a shortage of staff in veterinary services. There was also a shortage of chemicals and these could not be imported because of the wartime situation.<sup>174</sup> A shortage of chemicals meant that cattle could not be dipped regularly.

In 1943 an East Coast Fever Commission was appointed to investigate a new outbreak of the disease. The factors that led to the investigation were the apparently inexplicable outbreak of the disease in the Vryheid district, the serious spread of the disease and the insistence of the farmers on an explanation for its outbreak<sup>175</sup>. The commission found that the new outbreaks in Vryheid were due to the high price of beef as a result of war conditions which led to speculation in cattle in the district. It was also found that among other things progress in the eradication of the disease was hindered by farmers' attitudes. The findings revealed that generally there was a lack of harmony between the Department and stock-owners. The Commission proposed that a slaughter policy should be implemented. The slaughter policy was opposed by both black and white farmers but it did help to reduce the disease. In March 1947 there was an outbreak of East Coast Fever in the districts of Polela, Vryheid, Pinetown and

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<sup>173</sup>Ibid.

<sup>174</sup>Diesel, 'Campaign against East Coast fever', p.20.

<sup>175</sup>U.G. 17/1944, p.12.

Pietermaritzburg.<sup>176</sup> In 1948, the Smuts government discussed the slaughter policy and the amount of compensation to be paid. The Smuts government was, however, reluctant to implement the slaughter policy before the general election in that year because they feared losing the farmers' vote. In May 1948 the National Party came into power. The National Party was committed to a general improvement of white agriculture. The Nationalists implemented the slaughter policy in all affected areas and it was made compulsory. More resources were channeled into veterinary services to fight the disease. In 1954 it was reported that the disease had been finally eradicated in Natal and the whole of South Africa

After the eradication of East Coast Fever in 1954, farmers relaxed dipping and this resulted in an increase in ticks and tick-borne diseases. In 1961 there was a tick flare up which was related to the resistance to dipping by the black population. Stock owners also failed to maintain the organic dip in their dip tanks at the required strength. The formation of the KwaZulu Bantustan in the early seventies also contributed to the problem. The Bantustan government failed to persuade people to dip their cattle regularly. Poor road conditions and inadequate transport made dipping impossible in some areas. In wet weather travelling in the outlying areas proved difficult and a number of disease control programs had to be canceled

The Animal Disease Act No 35 of 1984 did not make dipping of animals a compulsory requirement. Since the passing of the Act, dipping started to decline because farmers could not be forced to dip their animals. The political violence and 'faction fights' also disrupted dipping in many areas. The violence continued even after the democratic election in 1994.

The current tick population explosion is due to excellent rains in 1997/98 and a warm winter experienced in most parts of the province. The excellent rain played an enormous role in supporting the tick population and tick-borne diseases. The situation is compounded by the fact that cattle farmers are not following the advice given by the chemical industry and veterinary services. The government's financial position also adds to the problem. The number of children who attend schools in communal areas has increased, which means that they are not available to take their parents' cattle to be dipped. Violence and 'faction fights' have also disrupted dipping in many areas.

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<sup>176</sup>Ibid.

## Recommendations.

It was evident throughout this dissertation that there was little or no consultation by government with farmers when decisions which affected their livestock were taken. When East Coast Fever and Rinderpest were first discovered in Natal in the early 1900, the government introduced slaughter policy as a method of controlling and eradicating the disease. While government had good intentions with this policy, however farmers were not consulted about the policy. This tendency by government not to consult with all stakeholders made farmers reluctant to co-operate with government. It is important that government consult thoroughly with all stakeholders in formulating and implementing policies to control ticks and tick-borne diseases. This tendency of not consulting with farmers is still continuing even under the new dispensation. The spread of Foot and Mouth disease in the year 2000 is one example that shows government's lack of taking the initiative in consulting with farmers. When the Foot and Mouth disease was discovered in the province, the government without consulting farmers imposed quarantine and slaughter policy in infected areas. The spread of the disease shows that cattle owners were evading this imposed policy. This also shows that farmers who moved their cattle from quarantine areas were not well informed about the consequences of their actions.

An analysis of the options available for tick control indicates that reliance on any one method of control would not be particularly effective. Widespread use of acaricides has failed to control ticks and bears no relevance to the socio-economic and socio-cultural realities of the livestock production systems in many communities. An integrated tick control approach should be considered for different climatic conditions and tick species. Control measures should differ according to local conditions. The integrated approach could include:

1. Breeding of tick resistant cattle. Intensive tick control is costly and beyond the means of many cattle owners. Because of the high costs involved, the use of resistant cattle could be used as an alternative method of tick control. The Nguni, Zebu and Zebu crosses carry fewer ticks than exotic breeds. The Zebu breeds have co-existed with ticks in the environment since the beginning of livestock domestication.<sup>177</sup> This parasite-host relationship has enabled the indigenous Zebu cattle to adapt to the

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<sup>177</sup>F.Fasanmi and V.C. Onymia, 'Tick Management in Nigeria' Insect Science and Its Application, 7, (1986), pp. 616-619.

presence of the tick burden. Tick-resistant cattle are considerably more resistant to babesiosis and the transmission of theileriosis pathogens are also reduced.<sup>178</sup>

2. The use of acaricides only when cattle are heavily infested with ticks, or when tick life is most active i.e. September to February to reduce the damage done by ticks.

3. Biological control. Cattle owners should be encouraged to use domestic chickens. Chickens can be efficient tick control agents. They have been shown to eat up to over 80% of engorged female ticks in the vegetation. Cattle also allow chickens to pick ticks off their bodies.<sup>179</sup> Oxpeckers are also predators of ticks. People should be encouraged not to kill them and should be informed about their role in controlling ticks.

4. Bush burning and rotational grazing. Bush burning is aimed at killing all stages of ticks on grazing land. It also helps to replace old dried pasture with new grasses. However, the practice has to be evaluated in relation to the vegetation in the area. Pasture spelling can control tick populations by denying hosts to free-living larvae and nymphs.

5. Livestock owners must know the tick species found on their grazing and obtain advice on best times for “strategic” dipping. Local weather changes will also influence dipping times.

6. An integrated tick control approach will only be successful if it is “properly” managed especially when cattle are grazed intensively or even semi-intensively.

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<sup>178</sup>Ibid.p.618.

<sup>179</sup>Farmer’s Weekly, July 1998

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