

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

THE ROLE OF CLOVER AS A FACTOR AFFECTING THE
SUMMER DECLINE IN THE VITAMIN A POTENCY OF
NEW ZEALAND BUTTERFAT.

by

NEIL ADRIAN WORKER.

Being a thesis submitted in partial fulfilment of
the requirements for the degree of
Master of Agricultural Science
of the
University of New Zealand.

Massey Agricultural College.
March 1955.

.....

LIST OF CONTENTS.

CHAPTER ONE - REVIEW OF LITERATURE.

	<u>Page.</u>
INTRODUCTION	1
THE ISOLATION AND IDENTIFICATION OF VITAMIN A	2
PROVITAMIN ACTIVITY	6
THE CONSTITUTION OF CAROTENE.....	9
VITAMIN A IN THE ANIMAL BODY.....	11
FUNCTIONS OF VITAMIN A AND SYMPTOMS OF ITS DEFICIENCY IN THE ANIMAL BODY.....	
(a) Functions of Vitamin A.....	24
(b) Symptoms of deficiency.....	27
VITAMIN A REQUIREMENTS	29
THE ESTIMATION OF VITAMIN A AND ITS PRECURSORS.....	
(a) The Biological Method.....	33
(b) Physical and Chemical Methods.....	40
THE EFFECT OF THYROID FUNCTION ON CAROTENE AND VITAMIN A METABOLISM.....	45

CHAPTER TWO - THE VITAMIN A CONTENT OF BUTTER

I. REVIEW OF LITERATURE.....	54
II. EXPERIMENTAL.....	
INTRODUCTION.....	65
NOTE ON THE MANAGEMENT OF THE DAIRY RESEARCH INSTITUTE HERD.....	66
METHODS AND MATERIALS.....	
(a) Pasture Analysis.....	67
(b) The Determination of Carotene and Vitamin A in Butterfat.....	69

(c) The Determination of Tocopherol in Butterfat.....	73
(d) The Determination of the Iodine Value of Butterfat.....	74
(e) The Determination of Unsaturated Fatty Acid Constituents of Butterfat.....	75
(f) The Determination of Vitamin A Alcohol in Butterfat.....	75
(g) The Determination of Carotene in Pasture.....	76

CHAPTER THREE - RESULTS AND INTERPRETATION

I. RESULTS.....	
(a) Section I.....	77
(b) Section II.....	
(i) Pre-treatment Period.....	80
(ii) Period 1.....	81
(iii) Period 2.....	81
II. INTERPRETATION.....	83

<u>CHAPTER FOUR - DISCUSSION.....</u>	86
CONCLUSION.....	93
SUMMARY.....	94

<u>BIBLIOGRAPHY.....</u>	95
--------------------------	----

APPENDICES

Appendix 1	
"	2
"	3
"	4

LIST OF FIGURES.

<u>FIGURE.</u>	<u>PAGE.</u>
1.....	5a
2.....	10a
3.....	38a
4.....	41a
5.....	55a
6.....	59a
7.....	59b
8.....	70a
9.....	71a
10.....	77a
11.....	77b
12.....	81a
13.....	81b
14.....	81c
15.....	81d
16.....	81e
17.....	81f
18.....	81g
19.....	81h
20.....	81i
21.....	81j
22.....	81k
23.....	81l
24.....	81m
25.....	81n
26.....	81o
27.....	81p
28.....	81q
29.....	81r
30.....	86a

.....

LIST OF TABLES.

<u>TABLE.</u>	<u>PAGE.</u>
1.....	28
2.....	29
3.....	55b
4.....	59c
5.....	59d
6.....	77c
7.....	77d
8.....	78a
9.....	79a
10.....	81s
11.....	81t
12.....	81u
13.....	81v
14.....	81w
15.....	81x
16.....	81y
17.....	81z
18.....	114
19.....	116a
20.....	116b
.....	