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THE POPULATION DYNAMICS OF *PORCELLIO SCABER*, LATR. (CRUSTACEA : ISOPODA) IN WASTE GRASSLAND IN NEW ZEALAND.

A thesis presented in fulfilment of the
requirements for the degree of
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TABLE OF CONTENTS

Page

FRONTISPIECE

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF PLATES

ABSTRACT

ACKNOWLEDGEMENTS

1. INTRODUCTION 1

2. THE STUDY AREA 3

3. METHODS 4

3.1 Sampling 4

3.2 Sample Analysis 5

3.3 Growth Study 6

3.4 Desiccation Experiments 7

3.5 Measurement of Calcium 8

4. AGE STRUCTURE 11

4.1 Introduction 11

4.2 Size structure 11

4.3 Discussion 14

Frequency distribution 15

Longevity 15

"Random" and "nonrandom" samples 16

Abundance of P. scaber 18

4.4 Conclusions 19

Page

5. SEX RATIO 20

5.1 Introduction 20

5.2 Results 20

5.3 Discussion 22

Overall sex ratio 22

Causes of mortality 23

Seasonal variation 24

General discussion 25

5.4 Conclusions 26

6. REPRODUCTIVE BIOLOGY 28

6.1 Introduction 28

6.2 The breeding season 28

Results 28

Discussion 29

6.3 Fecundity and fertility 32

Results 32

Discussion 34

6.4 Natality 38

6.5 Mortality 39

6.6 Conclusions 40

7. GROWTH OF P. scaber 41

7.1 Laboratory cultures 41

7.2 Effects of density 42

Results 42

Discussion 43

7.3 Effects of food quality 44

7.4 Measurement of size 45

Results 45

Discussion 46

Page

7.5 Conclusions 46

8. MEASUREMENT OF CALCIUM 48

8.1 Introduction 48

8.2 Results 48

8.3 Discussion 50

8.4 Conclusions 51

9. SUMMARY 52

10. REFERENCES 54

FIGURES

		After Page
Fig. 1	Diagram of apparatus used in desiccation experiments. The flow rate through the system was 1.2 l./min.	8
Fig. 2	Chamber which contained one P. scaber individual during the desiccation experiments.	8
Fig. 3	Size class distribution of P. scaber taken in successive samples from April, 1971, to December, 1971. "Random" and "nonrandom" data are pooled at 4-weekly intervals.	11
Fig. 4	Monthly size class distribution of P. scaber taken in successive "random" samples.	13
Fig. 5	Monthly size class distribution of P. scaber taken in successive "nonrandom" samples.	13
Fig. 6	Size class distribution of P. scaber collected in (i) "Random", and (ii) "Nonrandom" samples, from April, 1971 to December, 1971, at head width intervals of 5 m.u.	13
Fig. 7	Breeding periodicity of P. scaber in relation to rainfall, temperature, and daylength. Weather data were taken from the "Ministry of Transport", Meteorological Observations, for D.S.I.R. Grasslands, Palmerston North, beginning August, 1969. Daylength data were obtained from the "Tide Tables" of the N.Z. Nautical Almanac, 1971.	28

After Page

Fig. 8 The relation of number of (i) ova, (ii) larvae, and (iii) young, to head width (m.u.) of the P. scaber female. Linear regression equations for each set of data are:-

(i) $y_1 = 1.3x - 68.8$

(ii) $y_2 = 0.9x - 37.6$

(iii) $y_3 = 0.4x - 1.0$ 32

Fig. 9 Mortality of laboratory reared P. scaber. Graph of survival (%) versus age (weeks). The value of 100% is equivalent to 665 young, from a total of 22 broods. 39

Fig. 10 Increase in head width among P. scaber individuals, showing growth of animals of maximum and minimum size, as well as mean growth of all individuals studied. 41

Fig. 11 The relation of body length to head width, in 100 P. scaber individuals. The linear regression equation describing the relationship is: $y = 0.15x - 1.33$ 45

Fig. 12 The relation of body width to head width, in 100 P. scaber individuals. The linear regression equation $y = 0.06x - 0.72$, describes the relationship. 45

Fig. 13 The relation of (i) fresh weight, and (ii) dry weight, to head width in P. scaber 45

Fig. 14 The relation between amount of calcium (ppm.) and head width, in 18 gravid and 95 nongravid P. scaber individuals. The linear regression equation for the nongravid slaters is:

$y = 4.4x - 243.7$

The gravid individuals are shown by circles on the graph. 48

Fig. 15 The relation between amount of calcium (ppm.) and dry weight (mg.), in 18 gravid and 95 nongravid P. scaber individuals. The linear regression equation for nongravid slaters is:

$y = 6.3x + 34.0$

The gravid animals are shown by circles on the graph. 48

TABLES

		After Page
Table I	Sex distribution of *P. scaber* from 4-weekly samples in 1971. "Random" and "nonrandom" samples are combined.	21
Table II	Sex distribution of "nonrandom" samples.	22
Table III	Sex distribution of "random" samples.	22
Table IV	Reproductive status of *P. scaber* individuals collected in "random" samples.	29
Table V	Reproductive status of *P. scaber* individuals collected in "nonrandom" samples.	29
Table VI	Effects of density and container size on growth of *P. scaber* young.	42
Table VII	The relationship of weight gain to leaf matter consumed in *P. scaber* pairs, after a 6 day experimental period.	49

PLATES

		After Page
Plate I	General view of study area, taken in March, 1971, showing the poplar boundary, the nature of the wasteland, and the pegs which mark each 1 x 6 m. unit.	3
Plate II	Detailed view of several study area units. The galvanised iron fence was used to help delimit the boundary of most units. Five cryptozoa boards are shown.	4
Plate III	External sexual dimorphism in male (right) and female (left) P. scaber. The pleopods (ventral surface structures behind the last pair of legs) of the male are pointed, whereas those of the female are blunt.	6

ABSTRACT

The dynamics of an isopod (*Porcellio scaber*) population in waste grassland are described. Three different generations can be distinguished on the basis of size distributions. A difference in age structure and sex ratio is seen in two areas of the study region. Overall there are more females than males. A cohort of 1000 individuals can produce 6000 young in a year, but only 10% of these survive to become sexually mature. Isopods provide a significant reservoir of calcium in the environment.

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1. INTRODUCTION

Terrestrial isopods occupy a unique place in the Crustacea, being the only representatives of the class which have successfully invaded the land. For this reason, a comprehensive literature on many aspects of their biology has developed. With few exceptions however, early research has concentrated on physiological or anatomical features (Herold, 1913; Vandel, 1925; Gunn, 1937; and Edney, 1951). The pioneer life history studies of Collinge (1915) and Verhoeff (1917) have not, until recently, been followed by demographic work on natural populations. Hatchett (1947) and Brereton (1956, 1957) completed investigations of the age structure and reproductive activity of Cyclisticus convexus, and Porcellio scaber, respectively. Several studies in Californian grassland on Armadillidium vulgare (Paris, 1963, 1965; Paris and Pitelka, 1962), and one by Sutton (1968) in which the population dynamics of two Oniscoid species (Trichoniscus pusillus pusillus and Philoscia muscorum) are compared, complete the major reviews known to the author.

New Zealand, including the subantarctic islands, has 48 species of Oniscoidean isopods (Hurley, 1950). A limited literature is available on these species but is almost completely restricted to descriptive and classificatory reviews (Chilton, 1901; Jackson, 1941; Hurley, 1950, 1961). Population studies are nonexistent, and previous ecological work on the four introduced species (Porcellio scaber, Armadillidium vulgare, Porcellionides pruinosus, and Ligia exotica) has been confined to Europe and North America. Therefore, investigation of the Southern forms is of value.

Porcellio scaber was first recorded in New Zealand in 1847 as P. graniger (Thomson, 1922). It is now common over the country especially near dwellings and other places of habitation, but not in

the untouched native bush. The orientation responses to direct light, contact and humidity, contribute to the gregarious patterns of distribution exhibited by slaters. They occur in large numbers under boards, in grass clumps, and in crevices on trees.

The relative ease with which slaters can be cultured in the laboratory makes them ideal animals for scientific study.

The present thesis is the result of field and laboratory studies conducted on a natural population of P. scaber in Palmerston North. The aim was to build up a dynamic description of the population from data on age structure, sex ratio, breeding and mortality, obtained from one year's sampling in the study area. As well as this, the role of the population as a calcium reservoir in the community was investigated.