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Size Variations in Tasmanian Rabbits

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(WITH 2 TEXT FIGURES)

ABSTRACT

In Tasmania, the great differences in relief and climate within comparatively small tracts of country, gave rise to considerable size variation in the rabbits, *Oryctolagus cuniculus* (L.). According to extensive counts, four main types of size could be found. Males show considerably greater variation in size than females, their final development depending mainly on the availability of herbage and the absence of frosts in the earliest stages of their development.

(*a*) INTRODUCTION

The number of rabbits, *Oryctolagus cuniculus* (L.), in Tasmania, was estimated at 40 million in 1953 (Hughes, 1953). Of these, over one-third lived on the plains between Hobart and Launceston, comprising the Midland area, where rabbits first became established over a hundred years ago. They built up their greatest numbers on and around the levees bordering the rivers and water-runs and in marginal agricultural country, where cultivated land gives way to bush.

Next to the Midlands, the rich Tertiary basaltic soils on the north coast of Tasmania, supported the most important concentrations of rabbits. However, these basaltic flows cover climatically and in relief vastly different areas, varying from the rich and almost frostfree farming country at Forth and Wynyard, to the most rugged and dense rain forest regions, with over 80 inches annual precipitation and frequent frosts for eight months of the year, e.g., at Waratah.

Rabbits, with their great capacity to adapt themselves to totally different environments, seemed to follow the well-drained, thick basaltic soils, as next to the availability of herbage, the choice of warrens and hideouts seem to be the main factor in determining the lines of migration.

It is only natural that there is considerable diversity in size and colour in different geographical regions, as this prolific and quickly maturing animal adapted itself within a short period to various environmental conditions.

Some of these local variations were long known to be in existence, but it was only recently that H. N. Barber and his party started to examine critically the colour mutations (Barber, 1954).

(*b*) RESULTS

Here I endeavour to give a record of the diversity in size, of which there are four main types in the State:

A. *Midland Rabbits.* Characteristics: early breeding, late development and sexes being scarcely distinguishable by size.

B. *North Coast Rabbits.* Characteristics: early breeding, early maturing and distinctive difference between the size of sexes.

C. *Scrub Rabbits.* Characteristics: late, but prolific breeders, late maturing, no marked difference between the size of sexes, both being relatively small.

D. *Highland Rabbits.* Characteristics: late, but prolific breeders, quick maturing, average sized males, but relatively small females.

A. *Midland Rabbits.*

The largest concentration of Midland Rabbits are found around Ouse, Hamilton, Jericho, Oatlands and Nile, all in typical pastoral country with 18-25 inches annual precipitation. Spring frosts are frequent and the average minimum temperature is close to 35° F. in July, August and September, i.e., at the beginning of the breeding season. During these three months night frosts followed by sunny days are the rule, the latter being inducive for early breeding. Having a new litter of 4-5 kittens in each forty days cycle, from July onward, the number of rabbits builds up rapidly during the spring, competing with the sheep for the normally not too dense pastures. It must be the combined effect of frosty spring nights and the nature of pasture that produced in the Midlands the finest wool and the most highly priced rabbit fur in Australia, off a sheep and rabbit which are relatively small in size.

Observations carried out at the export works of Brooks & Co. Pty. Ltd. at St. Leonards, show that 2400 rabbits from this area, cleaned and packed in fur between February and April, 1954, averaged 2·3 lbs. each, the males weighing 2·38 lbs. and the females 2·23 lbs. All weights mentioned in this paper refer to cleaned (gutted) rabbits in fur.

As these figures indicate, there is rather small difference in size between males and females. Compared with other varieties, the smallness of the males becomes evident. This is brought about, presumably, by the cold weather and sparseness of food during the gestation, suckling and early growing periods.

B. *North Coast Rabbits.*

The North Coast of Tasmania, Scottsdale, Forth, Ulverstone, Burnie, Myalla and their inland districts used to support the largest rabbit populations before the advent of myxomatosis and large scale poisoning with sodium fluoracetate ("1080"), the latter starting in April, 1954. The rabbits around Myalla had the fame of being the second largest rabbits in Australia, next only to those of the Mildura district in the Murray Valley.

Myalla's and Burnie's average minimum temperature in July, August and September is almost 10° F. higher at 44·5° F. than that of Oatlands. The coastal strip is almost frost free. The young rabbits are well-protected by deep burrows in the ideally drained loamy soil and there is no shortage of early herbage. Rabbits in this region have every chance to reach the maximum of their innate potential for growth. In February, March and April, 1954, 2400 rabbits from the Myalla district were weighed. They averaged 2·80 lbs., the females being 2·56 lbs. and the males 2·98. However, to get a clear picture, we must take it into account that some old males frequently weighed up to 4 lbs. Among young rabbits, weighing less than $2\frac{1}{4}$ lbs. cleaned, there were 53 per cent females and 47 per cent males, indicating that at this stage of their development, there was yet no marked difference between the size of sexes.

A separate observation has been designed to obtain data on the rate of growth of the young rabbits. On three different properties, burrows were ripped up and the young rabbits marked by clipping the ears. Trapping followed at monthly intervals, when the marked rabbits caught were separately measured and weighed. The results always confirmed that there is no decisive difference in the size and weight between sexes, before reaching maturity at 5-6 months of age. From this age onward, the males show a quicker and more prolonged rate of growth than the females (see also fig. 2).

TABLE No. 1.

The growth rate of rabbits as shown by recaptured individuals.

Age of rabbits	Date of Capture	1st plot (181 rabbits)		2nd plot (98 rabbits)		3rd plot (242 rabbits)	
		♂	♀	♂	♀	♂	♀
3 months	Feb. 20-25	1·38	1·36	1·45	1·46	N.a.	N.a.
4 months	March 18-25	1·79	1·78	1·91	1·91	1·65	1·63
5 months	April 20-24	2·15	2·12	2·28	2·26	1·98	1·97
6 months	May 20-25	2·22	2·20	2·48	2·40	2·18	2·15
7 months	June 16-24	2·28	2·21	2·62	2·50	2·23	2·18

c. *Scrub Rabbits.*

The Scrub Rabbits are found mainly around the small clearings carved from the rain forests and bush on the slopes of the foothills bordering the plains and occasionally following the roads and river valleys. Upper Blessington, on the way to Ben Lomond, and Liffey, at the foot of the Western Tiers, the high lying mining towns of Moina and Mathinna in the North, and Bronte in the South, are typical examples.

All these places support large populations of small rabbits in over-grazed, frequently isolated patches. The long winters, with not infrequent snow, as late as November, and the short growing season are inducive neither for early breeding, nor for quick or full development. Rabbits were measured and weighed from Upper Blessington, Liffey and Moina. In each case, the sample taken was 250 rabbits and the average cleaned weight in fur was 2·30 lbs. in April, 1954. Weights of males and females

did not show any marked difference. There is no data available from the spring period, but it appears that during the short summer growing season, the mature females reach a size approaching that of females from the Midlands, while males remain comparatively small, never reaching their full growing potential.

D. *Highland Rabbits.*

Rabbits in Tasmania also successfully colonized parts of the over 2000 feet high North-western and Central Plateaux.

In the North-west they followed the volcanic soil on the sheltered side, where it projects deep in the mountains, as at Wilmot-Nietta or Parrawe-Waratah. In these districts better soil makes for better undergrowth in the rain-forest, which is also intersected by semi-cleared (often burnt) strips of cattle grazing country. The rabbit thrives even in areas of 85 inches annual precipitation, adapting itself quickly to the abundant pasture growth of the short summers. Breeding season at Parrawe lasts from October to February. But while the number of young is averaging 5-6 in the coastal areas, litters of 10-11 seem to be the rule in the Highlands.

It has been suggested that large litters result in smaller rabbits. However, this is contradicted by the fact that Highland Rabbits are somewhat larger than Scrub Rabbits and that adult males among them are usually more heavily built than the females.

Large colonies of rabbits also exist around the Great Lakes on the Central Plateau. While they are just as prolific breeders as those of the North-western Highlands, and their females resemble in size the Scrub Rabbits, males seem to vary in size according to soil and vegetation in different localities.

An important characteristic of Highland Rabbits is the sturdy, thick-set character of the males compared with the Midland counterpart.

There are opinions that Tasmanian rabbits might not all come from the original stock, which was well established around Hobart as early as 1827 (Colonial Times, 1827). However, the most remarkable size variations, namely, those around the North Coast, were the results of comparatively recent migrations. Rabbits spread over the North Coast only during the last 50 years. Seventy years ago they were rare around Deloraine, forty years ago only kept as pets around Burnie, and they appeared in the Circular Head district not more than 15 years ago. In the last half century it has been illegal to introduce them and the control was adhered to strictly. The original stock migrated in waves from place to place, following the lines of settlement and—as in the case of Circular Head—the new railway lines.

The rabbit remains in its area if not disturbed. Floods, droughts and large scale destruction are the usual factors forcing it to migrate. Only this year, the government's poisoning campaign caused them to withdraw from certain districts overnight. After migration, the surviving members of a new generation start to form a new strain, which is better adapted to the new environment.

Studying their variations in size, the most remarkable features are:

(1) The growth of males responds to weather conditions and the quantity of available food during the *early* stages of their development. Where adverse conditions prevail during this period, males do not develop to a large size. (See fig. 1.)

(2) Females are still able to reach approximately 90 per cent of their potential size, if conditions improve at a later stage of their development.

(3) Short growing seasons result in smaller rabbits. (See fig. 2.)

(4) The size of litter does not seem to affect growth.

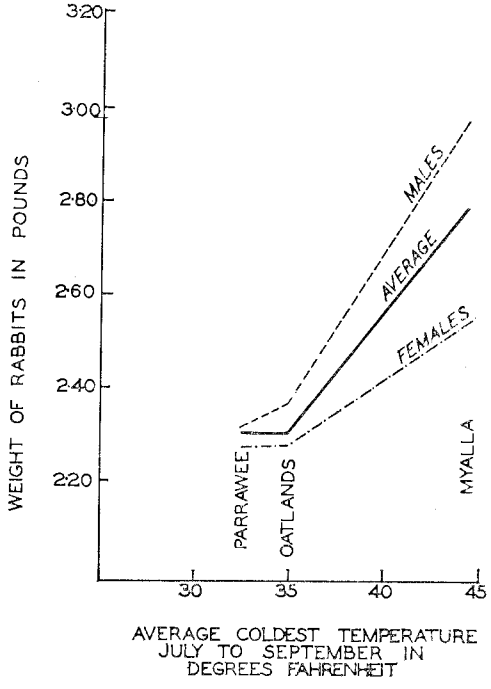

FIG. 1.—With minimum temperatures during the early breeding season, the average size of mature rabbits increases. This increase is more regular in males.

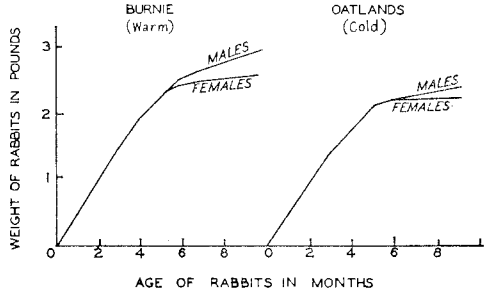

FIG. 2.—The growth of rabbits in warm and cold spring climate.

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