

MOVEMENTS AND SOCIAL BEHAVIOUR OF THE OPOSSUM,
TRICHOSURUS VULPECULA KERR, IN A MIXED
SCRUB, BUSH AND PASTURE HABITAT

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ABSTRACT

The movements of Australian brush-tailed opossums, *Trichosurus vulpecula*, were studied in a mixed bush, scrub, and pasture habitat on Banks Peninsula by live-trapping and spotlighting over a period of six months from February to July 1971. Thirty-four opossums were marked. Estimates of the size of ranges in the pasture (0.8 ha males; 0.3 ha females) were smaller than those found elsewhere, probably because of the restricted habitat. Range sizes of animals resident in the bush were considerably altered by their movements to seasonal food sources in the pasture. Male opossums did not hold territories as described in some studies. In this mixed habitat opossums may move between scrub, bush and pasture to obtain food and shelter.

INTRODUCTION

Since their liberation in New Zealand in the 19th Century opossums, *Trichosurus vulpecula*, have increased in numbers enormously and are now widespread and abundant. They are found in native bush, pasture land and exotic forest and because of their abundance and feeding habits are regarded as a pest in all three habitats.

Previous work on movements and social organisation in Australia (Dunnet 1956, 1964) and New Zealand (Tyndale-Biscoe 1953, Winter 1963, Kean 1967, Crawley 1973) has provided variable results, probably mainly because of differing habitats and opossum densities. For this reason the principal aim of this study was to examine movements and social behaviour in an area where native forest, scrub and pasture adjoined. Considerable crop losses can occur where scrub and bush offer shelter to opossums which can feed in nearby pastures or orchards.

METHODS

STUDY AREA

The study area was in Birdlings Valley on the western side of Banks Peninsula. It consisted of two patches of native bush each of about 2 ha, surrounded by gorse and broom scrub, and an area of pasture of about 5 ha.

TRAPPING

Cage traps were baited with apple or carrot but no lure

was used because this can draw in animals from a considerable distance (Pracy and Kean 1949). Since only a few traps were available they were set at sites most likely to catch opossums rather than in a grid pattern.

Trapped animals were immobilized with ether, marked with individually colour-coded ear tags ('Roto-tag' sheep tag) and examined. Sub-adult males were classified as those caught separately from their mothers but with testes length of less than 21 mm. Insufficient females were caught to separate adult and sub-adult age groups reliably. Therefore sub-adult females were distinguished by comparing their head lengths with those of sub-adult males. Further categories were made according to sex, pregnancy, presence of pouch young or lactation.

ESTIMATION OF MOVEMENTS

After initial marking, observations of opossums' movements were made by spotlighting and following the animals after release, in addition to recapture results which are inadequate on their own (Sanderson 1966). Observed movements were then plotted on maps and range lengths and individual ranges estimated from measurements made on the ground using a measuring wheel. The term 'individual range' as used by Dunnet (1956) is better defined in this habitat as that areas occupied and traversed by an established individual in the course of its normal activities of food gathering, sheltering, mating and caring for its young.

RESULTS

TRAPPING AND SPOTLIGHTING RETURNS

In 224 trap nights between 19 February and 25 July 1971, 64 captures were made and 34 opossums marked. Twenty-one (12 males; 9 females) of these were adult and 13 (9 males; 4 females) sub-adults. Nine (4 males; 4 females; 1 unsexed) pouch young were also found. During 16 hours of spotlighting 23 marked animals were identified in 135 sightings.

SEX RATIO AND BREEDING

Although more males than females were caught the difference was not statistically different. All but one of the 7 females caught after 1 May, including two sub-adults, reproduced in autumn, but births also occurred in October and December 1970.

MOVEMENTS

Size of Range

The individual ranges of the most frequently observed opossums were tentatively estimated (Figs 1 and 2). Traps in the bush did not provide an adequate estimation of individual ranges as after release most animals ran into the surrounding scrub. Since spotlighting was not possible in the scrub, and released animals could be followed to dens on only four occasions, ranges in bush or scrub are underestimated.

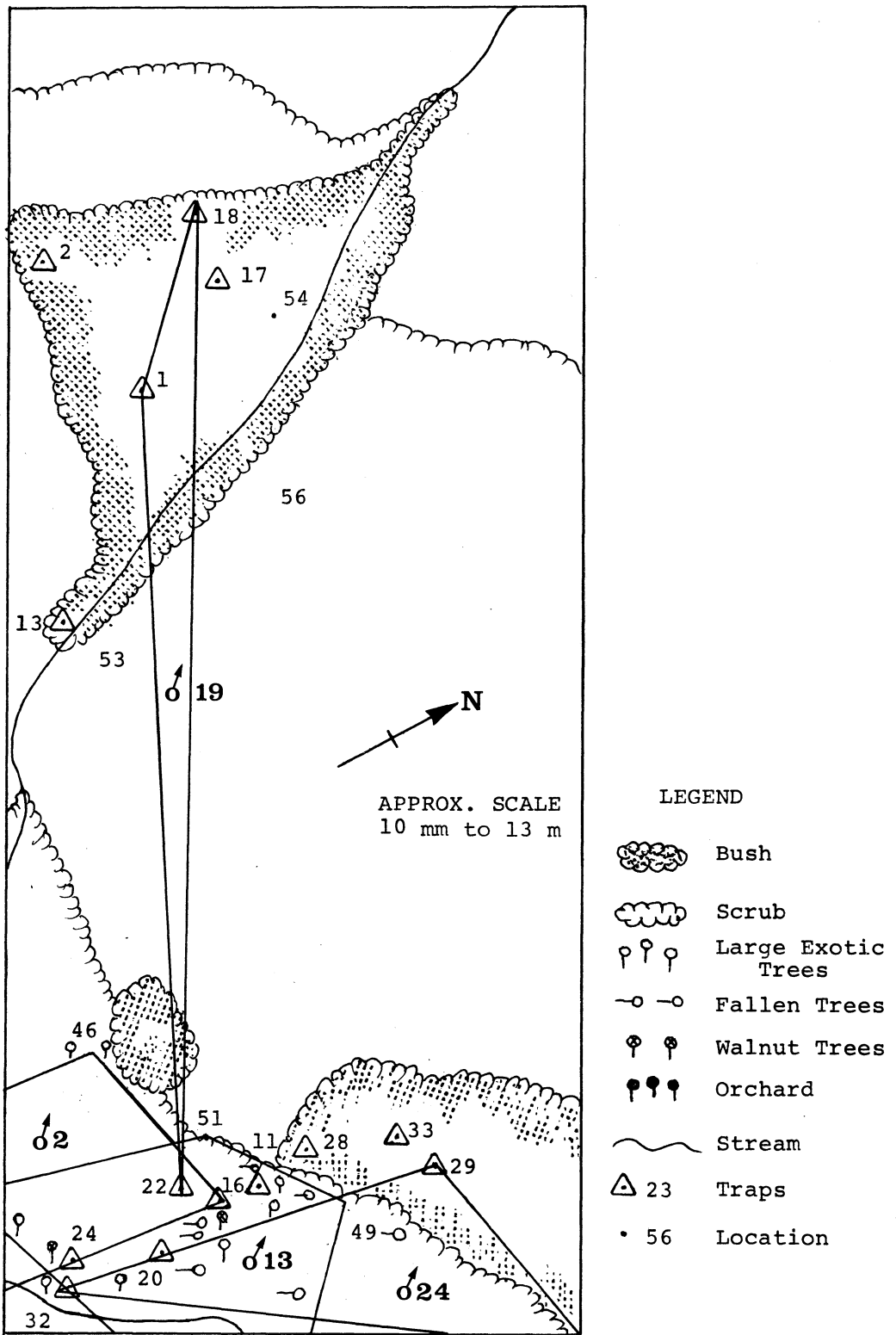


Fig. 1. Bush area A and pasture showing important landmarks, trap locations, and individual ranges of the most frequently observed male opossums.

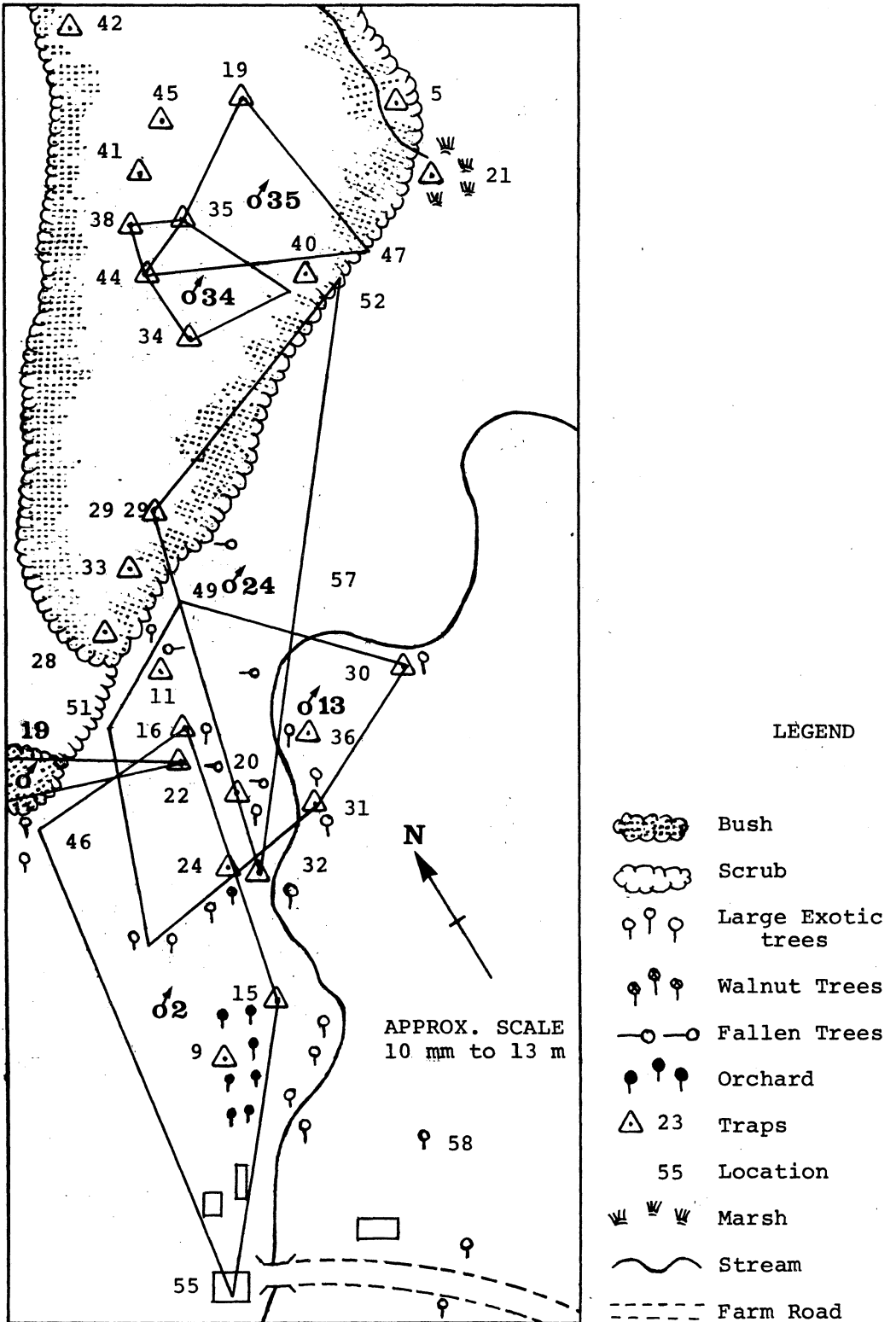


Fig. 2. Bush area B and pasture showing important landmarks, trap locations, and individual ranges of the most frequently observed male opossums.

The average range lengths and areas of the most frequently observed animals in the pasture were 143 m and 0.8 ha for males, and 104 m and 0.3 ha for females. Both male 2 and male 13 (Fig. 2) were sighted four times during a two month gap in their capture records but did not move far out of their trap-revealed ranges. Similar gaps occurred in the trapping histories of other animals.

Several opossums, of which at least three males could have been resident in the bush, were observed to move from the bush areas to seasonal food sources in the pasture. These animals seemed to have range lengths of 300 m or more. Longer movements are likely but the data were insufficient to reveal them conclusively.

Seasonal Influences on Dispersion

When the study commenced numerous opossums were seen feeding in an apple orchard in the study area. However, only the resident male was seen there after the apples had gone. At the end of July many opossums were seen feeding on the male cones of pine trees in neighbouring Price's Valley. Five weeks later no pollen remained and only two opossums were seen in these trees. During autumn, when the nuts were ripe, up to nine opossums at a time were seen feeding in or beneath each of the two walnut trees in the paddocks. Thus, although the trees were within the ranges of resident males 2 and 13, male 19 who was probably resident in bush area A (Fig. 1), and male 24, who seemed to be resident in bush area B (Fig. 2), as well as many other transient or unmarked animals, also used them as a food source.

Resident males 2 and 13 in the pasture and resident males 2 and 34 in the bush appeared to share part of their ranges simultaneously and without the influence of any obvious seasonal food sources such as walnuts.

Use of Shelters and Tracks

Holes in branches of exotic trees and roofs of sheds were used as shelters in the pasture. In bush and scrub opossums sheltered in thickets, holes in the ground and dense masses of lianes in trees. Within the range of resident male 13, adult male 10 and resident female 40 were observed to use the same shelter but at different times. Males 5 and 34 twice used the same shelter in the bush, On the second occasion they shared the shelter after being released from traps 40 m apart.

Released opossums usually ran to shelters along apparently familiar tracks. One track, started near the walnut trees and ran up through the bush for about 100 m before interweaving with others. It was so distinct during the fruit season that only numerous opossums could have maintained it but afterwards it became overgrown.

DISCUSSION

RANGE SIZE

Range lengths and areas in the pasture (143 m and 0.8 ha, males; 104 m and 0.3 ha, females) were much smaller than those found by Dunnet (1956) (370 m and 3 ha, male; 230 m and 1 ha, female) in an apparently similar habitat in Australia. This did not seem to be a result of trap addiction of animals at Birdlings Valley, since spotlighting observations over two months after their last capture did not suggest that the ranges were larger. Smaller ranges probably resulted from population pressures within the only region of habitable pasture with exotic trees in the valley.

SEASONAL INFLUENCES ON MOVEMENTS

The results of this study suggest that an opossum normally resident in one area will move a considerable distance out of that area for seasonal food sources. In some habitats opossums may obtain an almost complete cycle of seasonal foods.

In this type of habitat the concept of individual range should cover these seasonal movements since they are part of food gathering. This results in very different range sizes in different places, and emphasizes the need to consider range use as well as size (Sanderson 1966).

SOCIAL BEHAVIOUR

Dunnet (1964) found that male opossums generally held block territories in that the ground over which each ranged was exclusive to other resident males. Conversely, he found that female ranges overlapped. Winter (1963) believed that in his study area territories were in the form of interlocking tracks. Crawley (1973), however, found extensive overlap of the range of male opossums in indigenous forest near Wellington. Kean (1967) noted that in bush, where densities are high and routes are three dimensions, an individual cannot hold a large territorial space. In both bush and pasture in Birdlings Valley opossums did not appear to hold territories since ranges overlapped and tracks and dens were used communally.

Nevertheless, it is unlikely that opossums can tolerate unlimited densities. Above a threshold frequency of neighbour contact an individual's aggression may prevent further contraction of his territory (Calhoun 1963). There may also be a temporal separation between individuals using common ground similar to that found by Leyhausen (1965) for cats (*Felis catus*). Male territoriality in some populations is not necessarily incompatible with an overlap of ranges in others. Fisler (1969) stressed that mammal organisational systems are flexible and dynamic, allowing adaptation to changing environmental and population conditions. A population clearly benefits if it can capitalise on seasonal food sources such as walnuts. Work is continuing at Birdlings Valley to elucidate further the opossums' social behaviour, especially with regard to seasonal changes.

USE OF THE HABITAT

In this study area, where bush, scrub and pasture closely adjoin, there are various possibilities for opossum utilization of these different zones. The bush provides most of the food and some shelter for opossums in the area. The scrub is mainly a shelter area; its residents usually feeding in the bush or possibly on the grassland hilltops. This is supported by Gilmore (1966) who found that in scrub only gorse and broom flowers were consumed and even these infrequently. At least some of the animals with shelters in the scrub or bush travel to pastoral areas for seasonally abundant foods, probably returning to rest in the scrub or bush at the end of each night. Opossums resident in the pasture obtain food and shelter there but may make sorties from area to area as different food sources become available.

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