AUTUMN FOOD OF THE BRUSH-TAILED OPOSSUM, (*TRICHOSURUS VULPECULA* [*KERR*]), IN THE OTARI RESERVE, WELLINGTON

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SUMMARY: The stomach contents of 34 opossums collected from Otari reserve, Wellington, New Zealand, were examined and fragments of leaves and leaf cuticles were identified. Leaves were the main food though flowers, fruit and at least one insect were also taken. The main species eaten were kohekohe *(Dysoxylum spectabile)*, pohuehue *(Muehlenbeckia australis)*, hinau *(Elaeocarpus dentatus)*, climbing rata *(Metrosideros fulgens)*, five-finger *(Pseudopanax arboreum)*, tawa *(Beilschmiedia tawa)* and lawyer *(Rubus cissoides)*.

INTRODUCTION

Since its introduction in about 1840 the brush-tailed opossum *(Trichosurus vulpecula)* has greatly increased in abundance and has spread to most parts of the country (Pracy 1974). Food studies have shown that opossums eat a variety of introduced plants (Pracy and Kean 1949, Wodzicki 1950), indigenous trees and shrubs (Kean and Pracy 1949, Mason 1958, Harvie 1973) and grasses (Gilmore 1965, 1967, Harvie 1973). They damage poplars *(Populus sp.)* and willows *(Salix sp.)* that are important for soil conservation, as well as exotic conifer plantations, orchards and gardens (Pracy and Kean 1949, Wodzicki 1950). The aim of this study was to determine the diet of the opossum in the Otari reserve during autumn 1965.

STUDY AREA

The Otari reserve, comprising 60 hectares of indigenous forest, is situated approximately 5 km west of Wellington Harbour. The study area occupied half of the reserve.

Dominant trees were kohekohe, mahoe *(Melicytus ramiflorus)*, hinau, tawa and five-finger, interspersed with some rewarewa (*Knightia excelsa*), karaka (*Corynocarpus laevigatus*) and scattered remnants of rimu *(Dacrydium cupressinum)* which was formerly a dominant species. Lianes such as lawyer, pohuehue, supplejack *(Ripogonum scandens)*, kaiwhiria *(Parsonsia heterophylla)* and kohia *(Tetrapathaea tetranda)* grew throughout the bush. Abundant smaller trees and shrubs included *Coprosma* spp. and kawakawa *(Macropiper excelsum)*. On some of the higher ridges were gorse *(Ulex europaeus)*, bracken *(Pteridium aquilinum* var. *esculentum)*, broom *(Sarothamnus scoparium)*, barberry *(Berberis darwinii)* and blackberry *(Rubus fruticosus)* or open grass areas. A full plant species list for the Otari reserve was published by the Wellington City Council (1967).

METHODS

From late February to May 1965, opossums were caught in 10 wire cage traps and 12 wooden box traps baited with apple or banana. Traps were spaced over a distance of 2 km and set away from obvious opossum tracks to reduce the chance of opossums discovering them before feeding. Set overnight, the traps were checked at dawn and all animals caught were killed. The stomach contents were then removed and preserved in 4% formalin.

Reference slides

Microscope slides of leaf fragments and leaf cuticles of plant species collected in Otari were prepared to assist identification of material from opossum stomachs. Leaf fragments were dehydrated and mounted in DePeX. Cuticles of leaves of each species were removed by heating the leaves in concentrated nitric acid after Martin (1955) and Croker (1959); the cuticles were then stained with carbol fuchsin.

The cuticle pattern of a particular species was found to vary with the maturity and situation of the trees, so more than one reference slide was necessary for several species. Photomicrographs were prepared of all slides.

Analysis of stomach contents

Both leaf cuticles and leaf fragments from each stomach were examined as some species were difficult to identify when using only one of the methods. A sample from each stomach was transferred to a crystallising dish with a small quantity of water. Three subsamples were taken and each was heated in concentrated nitric acid at 95°C for a different period as the mesophyll and cuticles of some species took longer to break down than did those of other species. The first subsample was heated until the first cuticles were visible; the second until approximately 50% of the mixture was clouded by free cuticles; and the third until no tissue was visible. The action of the acid was checked by pouring the subsample into a petri dish of water. Each subsample was filtered, rinsed with water, stained and dehydrated and a layer of fragments mounted on a slide in glycerine. Most species present were identified under a compound microscope with the help of the reference collection.

A second sample from each stomach was transferred to a crystallising dish with some water, agitated so that a scatter of fragments lay on a microscope slide and examined under a binocular microscope. The first 50 fragments (0.25 mm or larger) were usually identified by differences of texture, colour, venation, oil glands and, if present, the abundance of trichomes. Fragments that were not readily recognisable could usually be identified by their cuticle patterns, using high power.

RESULTS AND DISCUSSION

Of 95 opossums aged two years* or more, captured from late February to May 1965, 60% were males and 40% were females. Thirty-four of 49 stomachs examined contained food. Leaves were the main component though fruit, flowers and in one stomach fragments of an insect were found. Of the total foods identified kohekohe constituted 32.0%, pohuehue 14.5%, hinau 8.5%, climbing rata 7.5%, five-finger 7.5%, tawa 6.5% and lawyer 5.0%. The relative importance of the different foods was substantially the same whether assessed by percentage occurrence in the combined sample as above or by the number of opossums that ate them (Fig. 1).

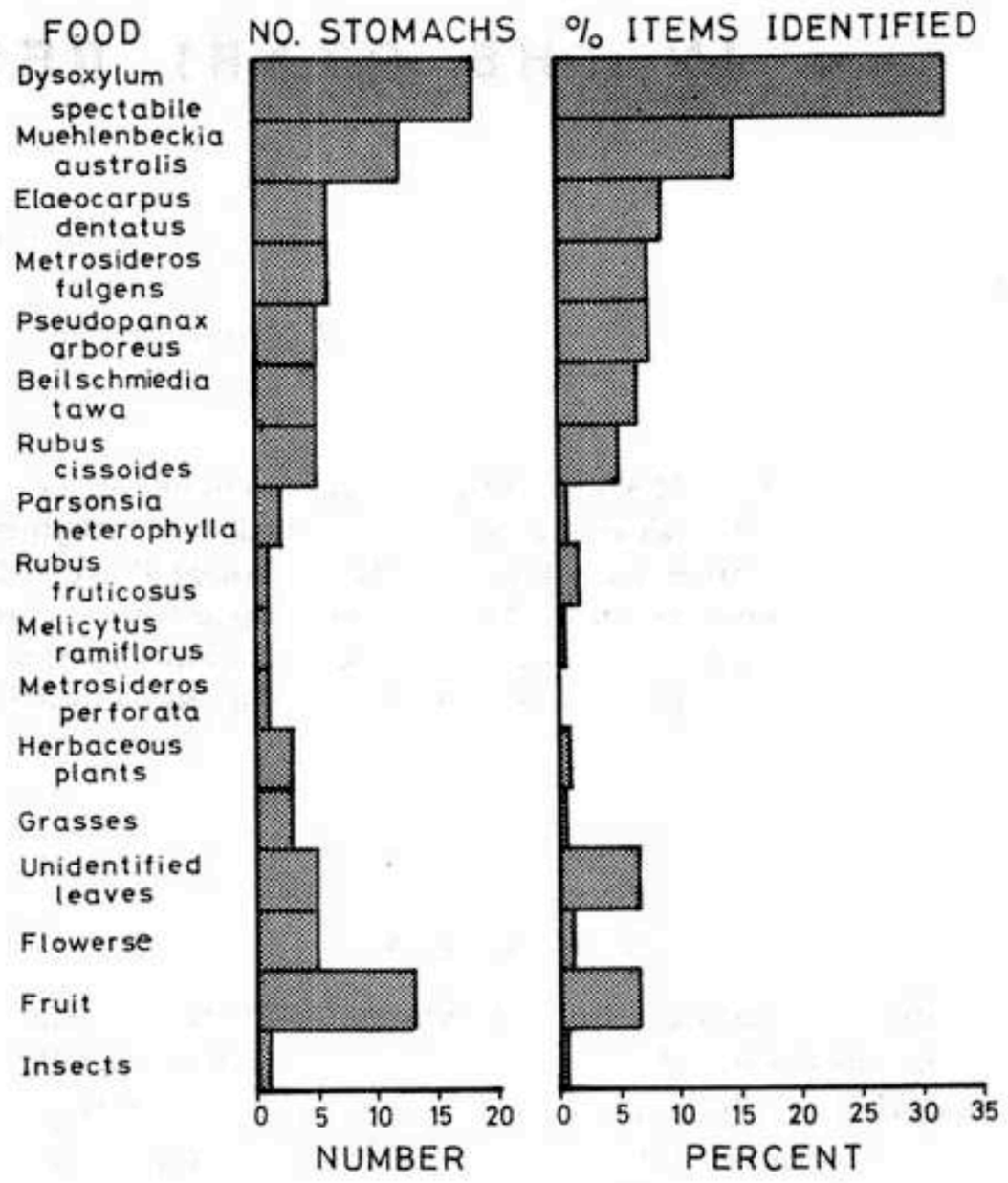

FIGURE 1. *Food eaten by opossums in autumn. On the left are the number of stomachs that contained each food item. On the right is the percentage of each food item found in the stomachs.*

On average three plant species were identified in the stomachs containing food (range 1-8) but most frequently two species were present.

Six species of fruit were eaten but these were not identified.

Plants eaten by opossums at Otari in autumn 1965 were similar to those eaten elsewhere (Pracy and Kean 1949). Although damage to the foliage by opossums was not measured, damaged canopy leaves were recorded for all the main food species and especially for kohekohe and pohuehue where browsing had been extensive. The few titoki *(Alectryon excelsus)* and kotukutuku *(Fuchia excorticata)* growing in Otari were also severely browsed by opossums but did not appear in the stomachs, perhaps because the sample size was small.

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