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Habitat use and foraging patterns of a reintroduced population of the South Island saddleback (*Philesturnus carunculatus carunculatus*), the first breeding season after release

JOHANNA P. PIERRE
Department of Zoology, University of Canterbury, Private Bag 4800, Christchurch, New Zealand
Present address: Laboratory of Biodiversity Science, School of Agriculture and Life Sciences, University of Tokyo, Yayoi 1-1-1, Tokyo 113-8657, Japan
johanna_pierre@hotmail.com

Abstract The benefits of monitoring habitat use patterns of translocated populations are widely acknowledged. However, this monitoring seldom occurs. Here, I report the habitat use and foraging patterns of a newly translocated population of South Island saddlebacks (*Philesturnus carunculatus carunculatus*) on Motuara Island, New Zealand, during the 1st breeding season after release. Reintroduced South Island saddlebacks spent most foraging time on the ground and in *Pseudopanax arboreus*. Foraging substrates used by male and female saddlebacks differed significantly. Saddlebacks focused foraging activities at 0-4 m above ground, and appeared to prefer to forage in larger trees, although the species composition of forested areas did not seem to influence the birds' choices of places to settle. With increasing population density, saddlebacks on Motuara Island may increase their areal foraging efficiency by using a wider range of plant species, vertically stratifying foraging locations within pairs, increasing use of smaller trees for foraging, and possibly by using scrub habitats more extensively. South Island saddlebacks appear to be highly adaptable in their choice of foraging sites and this plasticity may enhance the success of translocations.

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Keywords South Island saddleback; *Philesturnus carunculatus carunculatus*; translocation; habitat use; foraging; New Zealand

INTRODUCTION

Translocation, defined as the intentional release of plants or animals to the wild to establish, re-establish or augment a population (IUCN 1987; Griffith *et al.* 1989), is a widely used conservation tool both in New Zealand and internationally e.g., for invertebrates (e.g., Sherley 1994), mammals (e.g., Dufty *et al.* 1994; Short *et al.* 1994) and birds (e.g., Atkinson & Bell 1973; Merton 1973; Bell 1978; Butler & Merton 1992). Between the 1880s and 1994, nearly 400 translocations of 50 taxa (42 birds, 5 reptiles, 3 invertebrates) were conducted in New Zealand alone (Saunders 1994). Some translocations have saved organisms from extinction, such as the South Island saddleback (*Philesturnus carunculatus carunculatus*) (Atkinson & Bell 1973; Merton 1973; Bell 1978), and the black robin (*Petroica traversi*) (Butler & Merton 1992).

Globally, the success of translocations is most frequently attributed to high habitat quality, quantity, or both (Wolf *et al.* 1996). This emphasises the importance of assessing the habitat characteristics of potential release sites before organisms are released, and monitoring habitat use after release. Monitoring habitat use after release can test suitability of the new habitat, and may give some insight into the feasibility of future translocations, thereby facilitating adaptive wildlife management (Sarrazin & Barbault 1996). However, despite wide acknowledgement of the benefits of documenting habitat use of translocated populations (Griffith *et al.* 1989; Sarrazin & Barbault 1996; Wolf *et al.* 1996), monitoring seldom occurs. For mobile animals at low densities, habitat use may be the result of preference, rather than requirement, and increasing population density may force individuals to colonise previously uninhabited areas (Jenkins 1976; Armstrong & McLean 1995). Thus, monitoring the use of space as populations expand can be instructive in determining 'preferred' habitat types, as well as assessing the ability of translocated organisms to colonise 'novel' habitats successfully.

The South Island saddleback is currently listed as an endangered subspecies of the endemic New Zealand saddleback (Turbott 1990). It is a diurnal, monogamous,

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and territorial forest passerine that usually nests in cavities (Guthrie-Smith 1925; Lovegrove 1980, 1992; Pierre 1995; Lovegrove 1996a; W.F. Cash pers. comm.). Like the North Island subspecies of saddleback, it roosts in concealed locations such as tree holes and under overhanging banks (Guthrie-Smith 1925; Jenkins 1976, 1978; Lovegrove 1992, 1996a). The South Island saddleback was formerly widespread on the South Island and southern offshore islands of New Zealand, however it was virtually exterminated by about 1900, mainly as a result of predation by introduced mammals (Oliver 1955; Merton 1973; Roberts 1991). Currently, the total population of South Island saddlebacks is about 650 birds, which inhabit 11 predator-free islands. Because of its 'endangered' status, the South Island saddleback is the focus of a Department of Conservation Recovery Plan that has the long term goal of upgrading its conservation status from 'endangered' to 'rare' (Roberts 1991). Because there was very little information on the biology of the South Island saddleback, those who developed the Recovery Plan drew heavily on studies of the better known North Island saddleback.

The key to the success of the South Island Saddleback Recovery Plan is a series of translocations to islands free of mammalian predators (Roberts 1991). In March 1994, 26 South Island saddlebacks were transferred from Jacky Lee and North Island in the Titi Islands group, near Stewart Island, to Motuara Island in Queen Charlotte Sound. The translocated group consisted of 7 adult males, 11 adult females, 5 subadult males, 1 subadult female and 1 adult and subadult whose sexes were not determined. Minimum survival of the translocated group was 50% at 8-10 months after release. Eight males and 5 females survived (Pierre 1999). The Titi Islands are covered in a coastal forest, with little understorey, because of the abundance of breeding seabirds. Motuara Island is mostly forested, with a dense band of coastal scrub (Pierre 1995). Vegetation on Motuara Island has been regenerating since farming ceased in 1926 (W.F. Cash pers. comm.). Suitability of habitat on Motuara Island for saddlebacks may have been enhanced by the provision of roost and nest boxes and the construction of 4 water catchments before saddlebacks were released. Jacky Lee, North, and Motuara Islands are all free of introduced mammalian predators.

Before my study, patterns of habitat use of the South Island saddleback were very poorly known, because the bird occupied remote islands. With future translocations of South Island saddlebacks being planned (Roberts 1991), it was important that the outcome of the Motuara Island release was closely monitored. Previously, I examined post-release dispersal, social organisation and survival, of the South Island saddlebacks released on Motuara Island (Pierre 1999). I also investigated their foraging behaviour and diet (Pierre 2000). In this paper, I report the habitat use including foraging locations, and territory characteristics of the newly translocated population.

METHODS

Captured saddlebacks were fitted with numbered D-sized metal leg bands, and unique combinations of coloured plastic bands, to allow individual identification. Sexes were estimated on capture using weight and bill measurements (W.F. Cash pers. comm.; Nilsson 1978; Jenkins & Veitch 1991), and plumage characteristics were used to determine age. [South Island saddlebacks usually acquire full adult plumage by 16 months of age, and have a distinct subadult plumage until that time (Guthrie-Smith 1925; Oliver 1955; Nilsson 1978)]. My study took place from November 1994-January 1995, during the first breeding season after South Island saddlebacks were released on Motuara Island. I considered saddlebacks to be adults if they were paired, or actively defending a territory. I studied habitat use patterns of four pairs of South Island saddlebacks, and one male who was actively defending a territory, but was never seen with a female.

I visited each South Island saddleback territory once every 2 days during the study. Before recording their activities, I located saddlebacks by creating a loud disturbance, such as breaking dead logs. Saddlebacks vocalised in response to disturbances and were sometimes attracted to disturbances. I stopped creating a disturbance as soon as I located a saddleback. I then identified the bird from its unique legband colour combination, and continuously recorded the birds' activities, the plant species it was using, and the substrates activities occurred on (ground, or live or dead wood or leaves) for a maximum of 90 min. If the focal bird disappeared for more than 5 s during the 90 min sampling period, I ceased recording, and recommenced when the bird was relocated. If the bird disappeared for less than 5 s, and reappeared in the same foraging location, I assumed it had continued the same activity in that foraging location while it was not visible. I also recorded the heights at which saddlebacks entered plants when foraging. If the focal saddleback was using its beak, I recorded the surface the beak was in contact with. Otherwise, I recorded the substrate it perched on. I recorded all observations on a portable cassette recorder and timed observations from the recorded tape using a stopwatch. I did not include time spent processing prey prior to ingestion and time spent ingesting prey in foraging analyses. I also measured the size of plants (diameter at breast height, dbh) used by 1 male saddleback and his dependent juveniles every 90 s using a repeating timer (Martin & Bateson 1986). Saddlebacks were sometimes located in areas that were inaccessible because of safety concerns, such as very steep slopes, or where birds could not be followed in extremely dense vegetation. Consequently, I was unable to document foraging patterns extensively in these areas.

I sampled vegetation using 10 × 10 m quadrats placed at 20 m intervals along 1 transect through each of 4 saddleback territories (3-5 quadrats in each territory, depending on territory size) and 1 area uninhabited by saddlebacks (5 quadrats). Transects ran perpendicular to the shoreline, because of zonation of vegetation caused by proximity to the shore. I selected transect locations within each area for maximum length, and therefore the maximum number of quadrats per transect. I identified plants, measured those with dbh ≥ 30 mm and counted plants with dbh < 30 mm. For multiple-stemmed plants, I measured the dbh of all stems ≥ 30 mm. I estimated numbers of individual plants when this was not clear, such as rhizomatous ferns. For tests of saddleback use of plants of different dbh, and to test for differences between size distributions of plants in different territories, I grouped plants into 50 mm dbh size classes. To compare the amount of foraging time saddlebacks spent on plants with plant availability, I used the cross-sectional area of each plant species at breast height (termed basal area hereafter) as the availability measure. The availability of dead wood was determined as the proportion of total quadrat area on each transect covered by this foraging substrate.

I analysed data using paired Student's t tests and analysis of variance (ANOVA) conducted in SPSS 8.0 (SPSS Inc. 1997). Although I could not confirm normality of data due to small sample sizes, I conducted parametric paired t tests and ANOVAs on the premise that these are robust to departures from normality (Zar 1996; Underwood 1997). I followed ANOVAs with Games-Howell post-hoc tests (Day & Quinn 1989) when appropriate. I also conducted G tests (Zar 1996). I used Bonferroni α adjustments when using components of the same data set to conduct multiple analyses (Miller 1981). I conducted statistical tests using means for each bird derived from data for each bird during the entire study, to avoid pseudoreplication and help ensure independence. I suspected that each member of a South Island saddleback pair did not behave independently of its mate, therefore, I initially blocked ANOVAs by pairs. However, the amount of variance captured by blocking was never close to significant; in all instances P values were close to or equal to 1.0. Consequently, I reanalysed data treating members of pairs as independent. Similarly, although I used ANOVA to analyse time budget data, different categories of time budgets, such as the proportion of time spent on different foraging substrates, cannot be strictly independent. However, while more appropriate methods are unavailable, the analytical approach I used continues to be widely practised (e.g., Goulson *et al.* 1997; Sandell & Smith 1997).

RESULTS

South Island saddlebacks on Motuara Island foraged in dead wood and on the ground, as well as in a variety of plant species, including heketara (*Olearia rani*), ivy (*Hedera* sp.), five-finger (*Pseudopanax arboreus*), flax (*Phormium cookianum*), kanuka (*Kunzea ericoides*), karaka (*Corynocarpus laevigatus*), karamu (*Coprosma lucida*), kawakawa (*Macropiper excelsum*), kiokio (*Blechnum* sp.), kohekohe (*Dysoxylum spectabile*), mahoe (*Melicytus ramiflorus*), mamaku (*Cyathea medullaris*), mapou (*Myrsine australis*), pigeonwood (*Hedycarya arborea*), *Pinus* sp., pohuehue (*Muehlenbeckia complexa*), rangiora (*Brachyglottis repanda*), shining spleenwort (*Asplenium oblongifolium*), supplejack (*Ripogonum scandens*), and taupata (*Coprosma repens*). Saddlebacks spent significantly different proportions of foraging time on different plant species, dead wood and the ground (ANOVA: $F_{5,29} = 13.08, P < 0.001$), and foraged most on the ground and in five-finger (Fig. 1). As a result of small sample size, high variability, and the lower power of post-hoc tests compared to ANOVA (Underwood 1997), Games-Howell post-hoc tests did not separate foraging substrates into different homogeneous subgroups. However, based on the significant ANOVA result, differences between the most and least used foraging substrates (the ground and kawakawa, Fig. 1) were significant, at least. Male and female saddlebacks spent different proportions of foraging time on different plant species, dead wood, and the ground (ANOVA: $F_{5,29} = 4.59, P = 0.003$); male South Island saddlebacks appeared to use the ground more than females, and female saddlebacks used five-finger more than males when foraging (Fig. 1). Saddlebacks foraged relatively non-selectively on most plant species and dead wood, except for five-finger (Fig. 2, Table 1). Although I could not test for selective use of flax due to small sample size, birds appeared to use this plant more than expected, and foraged on its nectar (Fig. 2). South Island saddlebacks spent significantly more of their foraging time on wood than leaves (ANOVA: $F_{1,10} = 714.40, P < 0.001$). They foraged more on live wood than dead wood (ANOVA: $F_{1,10} = 217.35, P < 0.001$), and on live leaves more than dead leaves (ANOVA: $F_{1,10} = 7.44, P = 0.02$).

South Island saddlebacks were observed foraging significantly more frequently in lower forest levels, particularly 0-4 m above the ground (ANOVA: $F_{4,30} = 41.31, P < 0.001$, Fig. 3). There were no statistically significant differences in heights at which male and female saddlebacks entered plants for foraging (ANOVA: $F_{4,30} = 0.20, P = 0.94$, Fig. 3), although the statistical power of this test was low ($1-\beta = 0.16$ at $\alpha = 0.1$). Observations of a single family group suggested that saddlebacks may not utilise trees randomly with respect to size (dbh); birds preferred to forage in larger diameter trees (G tests: male and juvenile use each tested against tree size availability determined from plant quadrat sampling data, male: $G_5 = 130, P < 0.005$; juvenile: $G_5 = 146, P < 0.005$, Fig. 4). I observed saddlebacks drinking water on many occasions, from both natural water sources and human-constructed water troughs. I also frequently observed them bathing in water troughs.

South Island saddleback territories had different plant species compositions on Motuara Island (Table 2), but all territories included forest. All territories differed significantly from each other, and an area uninhabited

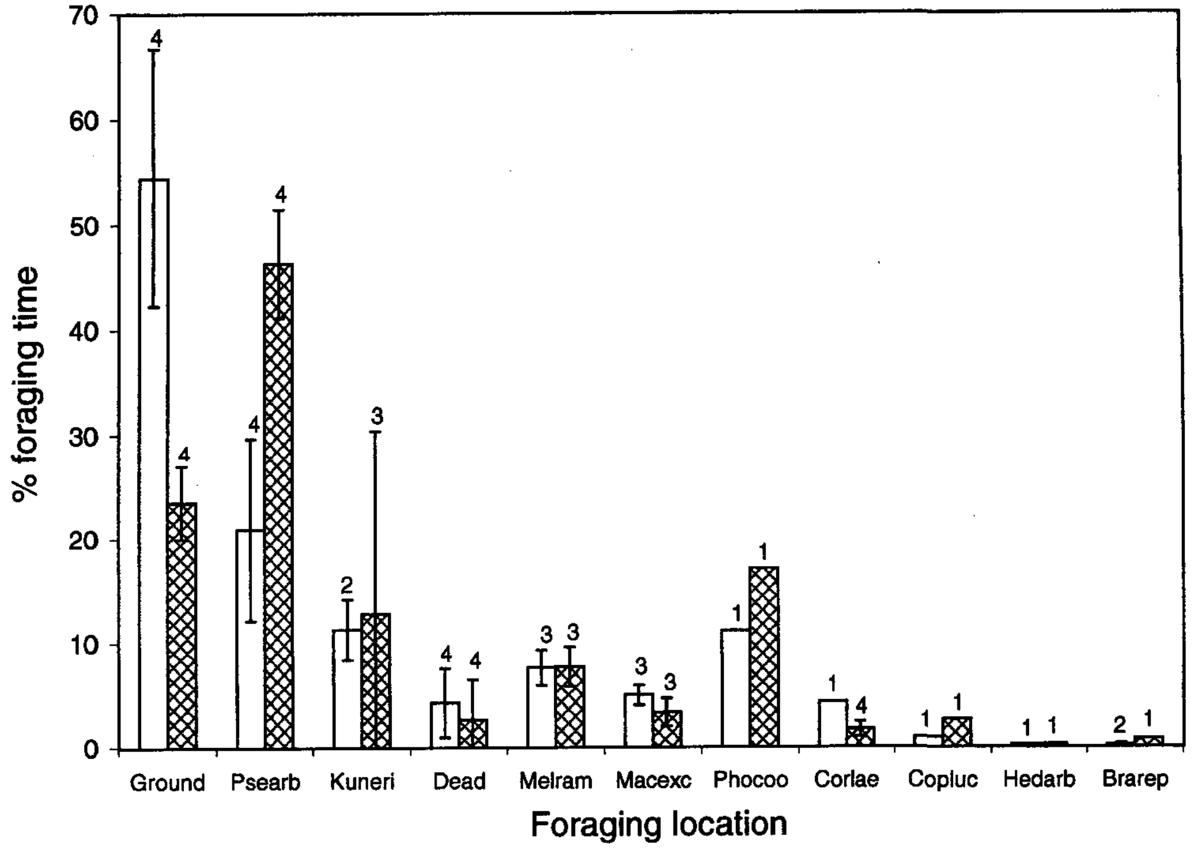

Fig. 1 Percentage of time spent on foraging sites ($\bar{x}$ ± 1 SE$_x$) by male (open bars) and female (hatched bars) South Island saddlebacks (*Philesturnus carunculatus carunculatus*) on Motuara Island. Psearb, *Pseudopanax arboreus*; Kuneri, *Kunzea ericoides*; Dead, dead wood; Melram, *Melicytus ramiflorus*; Macexc, *Macropiper excelsum*; Phocoo, *Phormium cookianum*; Corlae, *Corynocarpus laevigatus*; Copluc, *Coprosma lucida*; Hedarb, *Hedycarya arborea*; Brarep, *Brachyglottis repanda*. Numbers above bars represent the number of birds contributing to means.

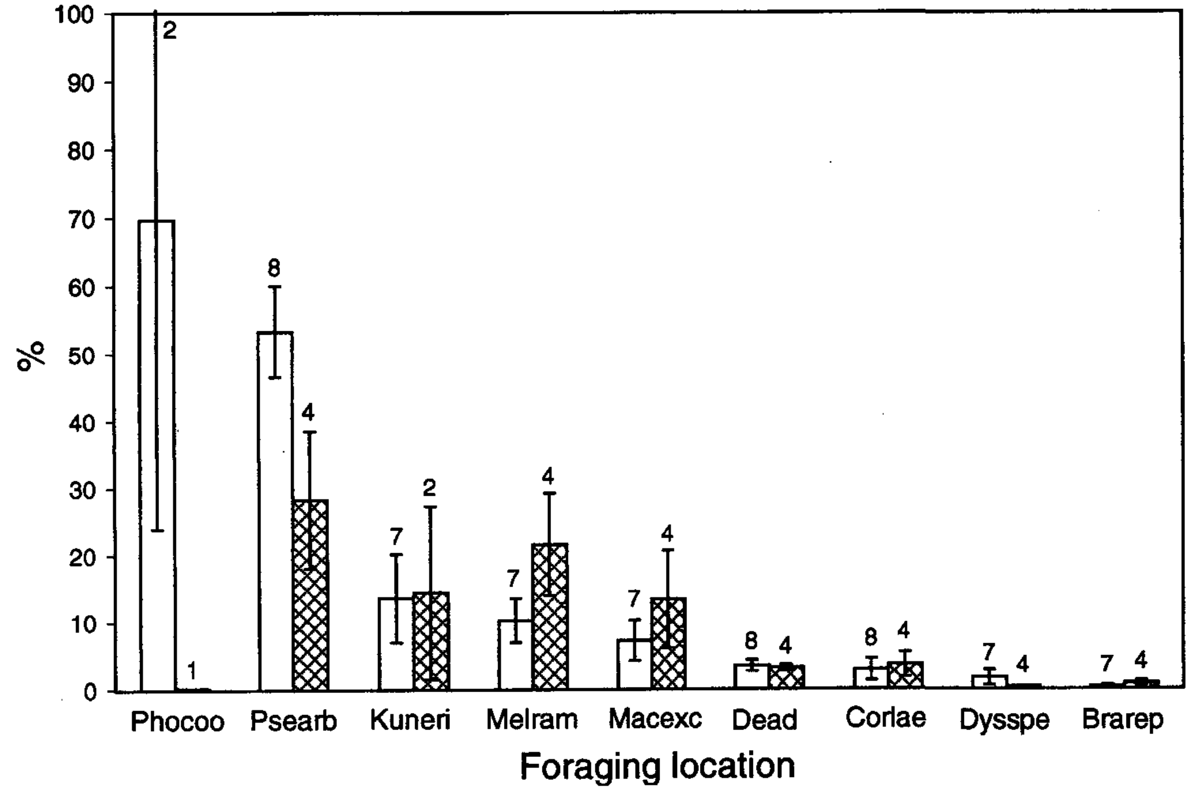

Fig. 2 Percentage of time spent foraging on plants (open bars), including dead wood, by South Island saddlebacks (*Philesturnus carunculatus carunculatus*), compared to expected use (hatched bars) based on availability ($\bar{x}$ ± 1 SE$_x$). Phocoo, *Phormium cookianum*; Psearb, *Pseudopanax arboreus*; Kuneri, *Kunzea ericoides*; Melram, *Melicytus ramiflorus*; Macexc, *Macropiper excelsum*; Dead, dead wood; Corlae, *Corynocarpus laevigatus*; Dysspe, *Dysoxlum spectabile*; Brarep, *Brachyglottis repanda*. Numbers above bars represent the number of birds contributing to means. Birds used *Pseudopanax arboreus* significantly more than expected based on its availability ($P = 0.03$).

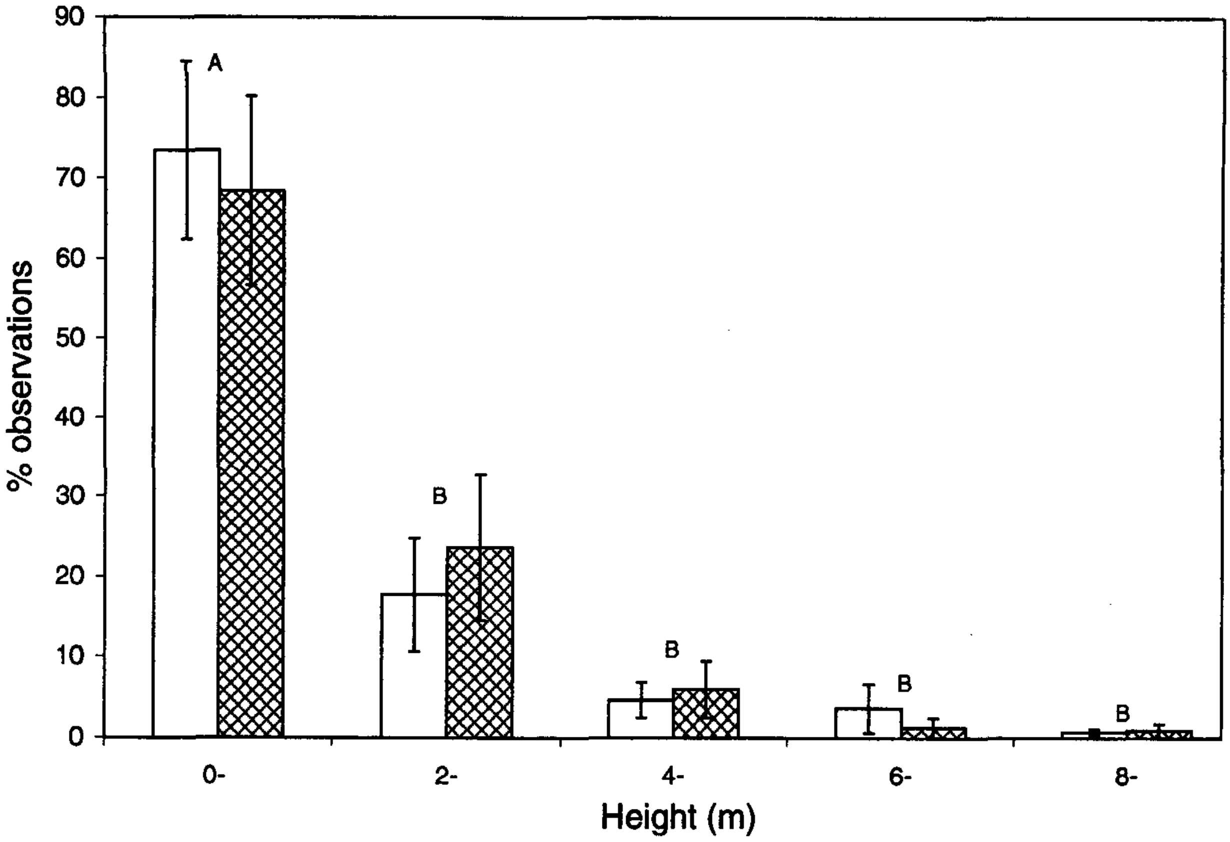

Fig. 3 Frequency of heights that male (open bars) and female (hatched bars) South Island saddlebacks entered plants when foraging ($\bar{x}$ ± $1SE_{\bar{x}}$). Data included for four males and four females, number of observations per bird ($\bar{x}$ ± $1SE_{\bar{x}}$)=53 ± 17. Letters denote homogeneous subgroups determined by Games-Howell multiple comparisons at $\alpha = 0.05$.

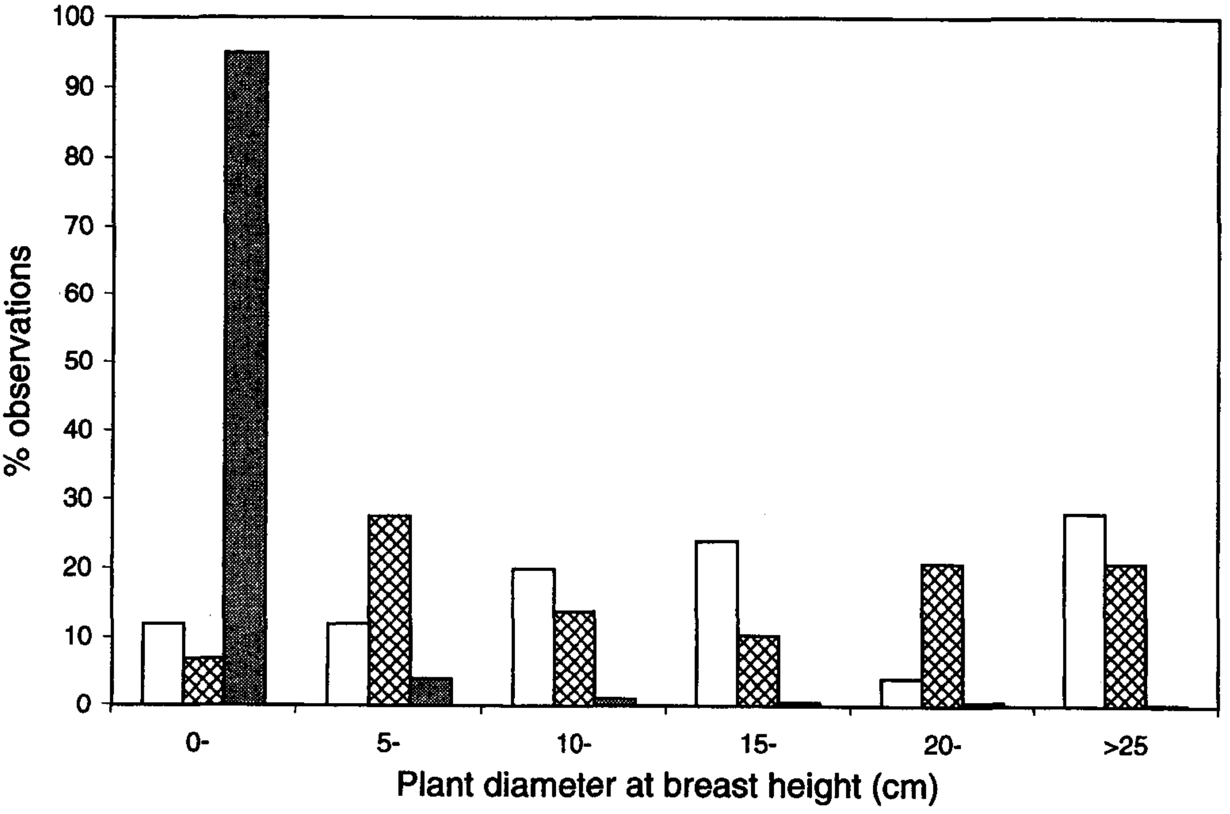

Fig. 4 Frequency one male (open bars, 29 observations) and his dependent juveniles (hatched bars, 25 observations) used different sized plants, and expected use based on plant size availability (stippled bars).

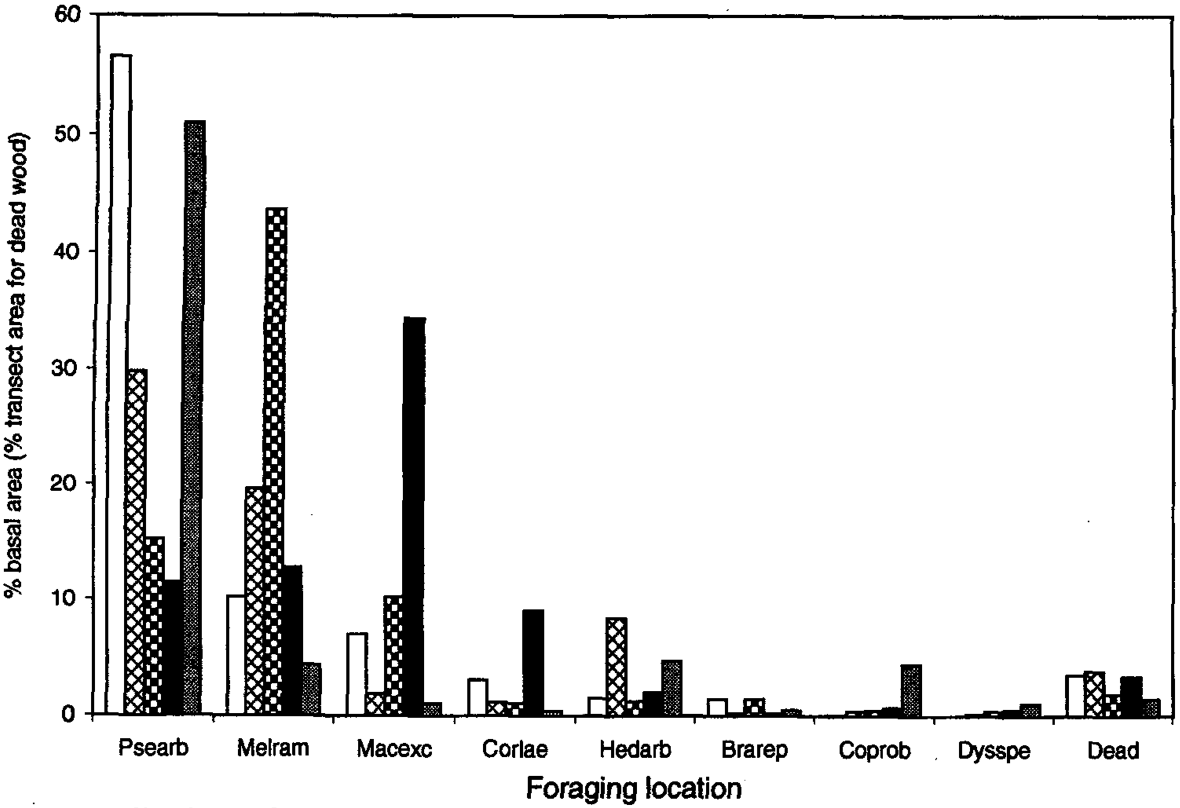

Fig. 5 Percentage of basal area of 8 ubiquitous plant species, and percent of transect area covered by dead wood, on 4 transects (T1-T4, open, hatched, checkered, and black bars, respectively) traversing saddleback territories, and one transect (T5, stippled bars) through an area uninhabited by saddlebacks. Psearb, *Pseudopanax arboreus*; Melram, *Melicytus ramiflorus*; Macexc, *Macropiper excelsum*; Corlae, *Corynocarpus laevigatus*; Hedarb, *Hedycarya arborea*; Brarep, *Brachyglottis repanda*; Coprob, *Coprosma robusta*; Dysspe, *Dysoxylum spectabile*; Dead, dead wood. All transects differ significantly ($P \leq 0.005$) from all others.

Table 1 The results of paired Student's *t* tests investigating differences between use and availability of foraging sites by South Island saddlebacks (*Philesturnus carunculatus carunculatus*) on Motuara Island.

Foraging site	*t*	df	*P*
Brachyglottis repanda	-0.40	2	0.73
Corynocarpus laevigatus	0.24	3	0.83
Dead wood	-0.02	6	0.99
Dysoxylum spectabile	2.87	1	0.21
Macropiper excelsum	-0.28	5	0.79
Melicytus ramiflorus	-1.14	4	0.32
Pseudopanax arboreus	2.74	6	0.03

by saddlebacks, in the basal area of 9 plant species present on all transects (G tests: all transects compared to all other transects including the area uninhabited by saddlebacks, all tests: $G_8 > 2117.36$, $P < 0.005$; Fig. 5. Dead wood was not included in statistical analyses; *Beilschmiedia tawa* was included in analyses, but not in Fig. 5, as the percent basal area of this species was <1% in all transects). Size distributions of plants in the 4 saddleback territories did not differ significantly (G tests: all territories compared to all other territories, $G_5 \leq 14$, $P > 0.005$, ns), however, plant size distributions in all territories differed significantly from the uninhabited area, with plants being larger overall in saddleback territories (G tests: all territories compared to the uninhabited area, all $G_5 \geq 26$, $P < 0.005$). The unoccupied area included extremely dense scrub and was much more exposed to wind than areas occupied by saddlebacks.

DISCUSSION

North Island saddlebacks in high density populations have been reported foraging on a variety of plant species, including *Coprosma* sp., five-finger, kanuka, karaka, kawakawa, kohekohe, and mahoe (Atkinson 1964, 1966; Lovegrove 1980). I observed South Island saddlebacks foraging in these plants on Motuara Island, and the birds spent most foraging time on five-finger and on the ground. On Tiritiri Matangi Island, North Island saddlebacks also forage in the introduced brush wattle (*Paraserianthes lophantha*), which supports the conclusion that saddlebacks are relatively flexible in the species of plants they use for foraging.

It is not known whether North Island saddlebacks at high density forage selectively between plant species (and dead wood), or whether there are intersexual differences in time spent foraging on different plant species (and dead wood). However, on Motuara Island, female saddlebacks appeared to forage in five-finger more than males. South Island saddleback males at low population density, as with their North Island counterparts at high density, appeared to spend more time on the ground than females (Blackburn 1964; Lovegrove 1980; O'Callaghan 1980). Overall,

Table 2 Percentage of basal area of the 10 dominant plant species identified in South Island saddleback (*Philesturnus carunculatus carunculatus*) territories (T1-T4), and 1 area not inhabited by saddlebacks (T5).

Plant species	T1	T2	T3	T4	T5
Aristotelia serrata			3.13		
Asplenium oblongifolium				0.60	3.07
Blechnum chambersii			4.17		
Brachyglottis repanda	1.41		1.41		
Coprosma repens		2.56			
Coprosma robusta					4.37
Corynocarpus laevigatus	3.01	1.15	1.06	9.01	
Cyathea medullaris	5.64		4.00		3.44
Dysoxylum spectabile				0.49	
Fuschia exorticata					19.24
Hedycarya arborea	1.48	8.38	1.23	1.93	4.64
Kunzea ericoides	1.49	27.32			9.42
Leptospermum scoparium					3.03
Macropiper excelsum	6.97	1.82	10.19	34.42	
Melicope ternata		0.77			
Melicytus ramiflorus	10.17	19.64	43.65	12.73	4.28
Myoporum laetum	7.07			5.47	
Myrsine australis			0.65		
Olearia paniculata	2.36	2.50	7.59		
Pittosporum tenuifolium					1.93
Pseudopanax arboreus	56.59	29.81	15.21	11.43	51.05
Rhopalostylis sapida				1.78	
Uncinia sp.					1.32

saddlebacks on Motuara Island foraged on five-finger (and possibly flax) more than expected based on the availability of these species of plants. The heavy use of flax was probably because this plant was flowering, and thus providing nectar, during my study. Therefore, when nectar-bearing flowers are absent, saddlebacks may decrease their use of this species. Other plants, and dead wood, were used approximately in proportion to their availability by foraging saddlebacks.

Unlike South Island saddlebacks on Motuara Island, North Island saddlebacks (in high density populations) have been recorded more frequently feeding in foliage than on wood during the breeding season, suggesting more foraging time may be spent there (Merton 1966; Blackburn 1967; Lovegrove 1980, 1992), although methodological differences between studies make direct comparisons difficult. As with South Island saddlebacks at low population density, North Island saddlebacks at high density appear to spend more time on live wood than dead wood, and on live leaves than dead leaves (Merton 1966; Blackburn 1967; Lovegrove 1980). Because of the lack of information on the amount of time high density saddleback populations spend on different plant species (and dead wood) when foraging, it is difficult to speculate on the effects of low density on South Island saddleback use of foraging substrates. However, as population density increases, South Island saddlebacks may use a wider range of plants to increase the efficiency of foraging in smaller territories.

South Island saddlebacks spent more foraging time in the lower levels of the forest, particularly 0-4 m above ground. North Island saddlebacks at high density also tend to occur in the lower levels of the forest (Lovegrove 1980; O'Callaghan 1980). Unlike the low density population of South Island saddlebacks on Motuara Island however, higher density populations of North Island saddlebacks display vertical stratification within pairs when foraging (Lovegrove 1980; O'Callaghan 1980). Because territorial saddlebacks occupy the same habitat patches for long periods, intersexual differences in habitat use may reduce competition for food between members of pairs, and improve the areal efficiency of resource use (Lovegrove 1980; O'Callaghan 1980). Many birds show intersexual differences in foraging, [e.g. hairy woodpeckers, *Dendrocopos villosus* (Kilham 1966)], which may reduce competition. South Island saddlebacks on Motuara Island appeared to maintain larger territories than necessary (Pierre 1999), based on territory sizes in other saddleback populations (Blackburn 1964; Skegg 1964; O'Callaghan 1980; Roberts 1991). The large territory size on Motuara Island is probably due to low population density (Pierre 1999). Large territory size may reduce competition for food between members of a pair, reducing the need for vertical stratification in foraging niches. Corroborating this speculation, Lovegrove (1980) found that the North Island saddleback pair with the largest territory in his study exhibited the smallest vertical differences in habitat use. Thus, as the South Island saddleback population on Motuara Island increases, and territory size decreases, vertical stratification in foraging niches is expected to increase. As population density increases, saddlebacks are also expected to use a wider size range of trees when foraging, again, to increase the areal efficiency of resource use. However, preferential use of larger trees has not been investigated in North Island saddlebacks.

The diet of saddlebacks provides them with some water and the climate they experience will be a key determinant of the volume of free water they require. There are many reports of North Island saddlebacks drinking (e.g., Blackburn 1964; Atkinson 1966). Motuara Island is very dry, and both natural and human-constructed water sources were used often by all resident birds, including South Island saddlebacks. Saddlebacks were seen at water sources outside their own territories, which also suggests that water sources were limited. Extra-territorial drinking has also been reported from Cuvier Island, where in dry years, North Island saddlebacks travel hundreds of metres outside their own territories to visit waterholes (T. G. Lovegrove, pers. comm.). Constructing water troughs may increase the habitat suitability of very dry islands for saddlebacks, enhancing the likelihood of success of translocations to these islands.

The characteristics of saddleback territories varied significantly on Motuara Island, in terms of the basal area of 9 plant species present in all territories. Saddleback territories contained plants of larger diameter than the area not inhabited by saddlebacks. Also, saddlebacks on Motuara Island were most often observed in forested areas, suggesting that the birds prefer forest to scrub. However, species composition of the forest did not appear to be particularly important, and more extensive sampling of scrub areas would help confirm suspected preferences for forest. (One difficulty on Motuara Island is that the density of some scrub made it impossible to extensively track saddlebacks living there). North Island saddlebacks at low population density also appear to prefer forest. However, as density increases, North Island saddlebacks colonise and successfully breed in scrub areas (Jenkins 1976; Craig 1994; T. G. Lovegrove & B. Walter pers. comm.), although long-term reproductive success of scrub colonists is not well documented. These results suggest that when the South Island saddleback population on Motuara Island increases, birds will colonise scrub areas. Habitat suitability of scrub areas on Kapiti and Tiritiri Matangi Islands may have been enhanced by the addition of roost and nest boxes (T. G. Lovegrove and B. Walter pers. comm.). Scrub areas on Motuara Island may also be more suitable for saddlebacks after the addition of roost and nest boxes. That saddlebacks can apparently successfully colonise scrub habitats emphasises that habitat preference may not necessarily result from habitat suitability (Armstrong & McLean 1995). Thus, when conducting translocations, the behavioural plasticity of reintroduced organisms must not be ignored.

Translocations of 15-59 South Island saddlebacks have been successful in the past (Roberts 1991; Lovegrove 1996b), suggesting the success of the translocation to Motuara Island should not be jeopardised by the relatively small size of the founder group. That birds bred the 1st summer after translocation (Pierre 1995, 1999) suggests they were in good condition, and were not limited by a lack of foraging opportunities or resources. Monitoring at different times through the year, and for several years after the translocation, is required to confirm the suitability of the habitat on Motuara Island for South Island saddlebacks. However, the likelihood of success of South Island saddleback translocations should be enhanced by the birds' behavioural plasticity in exploiting diverse foraging opportunities provided by a range of habitat types.

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