

Density and foraging behaviour of Pipits (*Anthus novaeseelandiae chathamensis*) and Skylarks (*Alauda arvensis*) on Chatham Island

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ABSTRACT

The densities of Chatham Island Pipits (*Anthus novaeseelandiae chathamensis*) and Skylarks (*Alauda arvensis*) on the south coast of Chatham Island were estimated at 7 individuals km⁻² and 10 ind. km⁻², respectively. Foraging behaviours used by Pipit differed significantly between rough fernland, pasture and beaches. Foraging behaviours also differed significantly between Pipits and Skylark on pasture, and Pipits moved on average 10 times further per minute than Skylark. The make-up of Pipit foraging behaviours on fields and beaches on Chatham Island also differed significantly from those at Wellington, North Island, during autumn.

KEYWORDS: Pipit, *Anthus novaeseelandiae*, density, Skylark, *Alauda arvensis*, Chatham Island.

INTRODUCTION

The New Zealand Pipit (*Anthus novaeseelandiae*) occurs as a single species in Europe (as Richard's Pipit), Africa, Eurasia, New Guinea, Australia and New Zealand. It has four subspecies in the New Zealand region, on the main islands of New Zealand (*A. n. novaeseelandiae*), on the Chatham Islands (*A. n. chathamensis*), on the Antipodes Islands (*A. n. steindachneri*) and on the Auckland and Campbell Islands (*A. n. aucklandicus*). Foggo *et al.* (1997) concluded that the allozyme separation distances indicated that the Pipits from the outer islands, and those on Mainland New Zealand were separate species. However, they delayed suggesting taxonomic changes until their material was compared with Pipits from Africa and Eurasia.

In New Zealand, Pipits favour open habitats, and are absent from pure pasture and broad-leaved forest and scrub (Beauchamp 1995, Heather & Robertson 1996). Pipits were common throughout New Zealand from the 1880s to the 1920s, when forest and tussock grasslands were converted to pasture (Guthrie-Smith 1927, Turbott 1967, Garrick 1985). Over the past 40 years they have declined in range and numbers (Hodgkins 1949, Stidolph 1974, Beauchamp 1995), but they still occur on beaches (Young 1976), open tussock grassland (Dawson & Cresswell 1949, Challies 1966), clearings within exotic forests, braided riverbeds and their margins and alpine habitats (Oliver 1955). Pipits and Skylarks (*Alauda arvensis*) overlap in range (Garrick 1981, 1985, Heather & Robertson 1996). Pipits are considered "common", and Skylarks "extremely common" throughout Chatham Island (Freeman 1994), but there are only limited data on abundance (Young 1976, Freeman 1994, Heather & Robertson 1996).

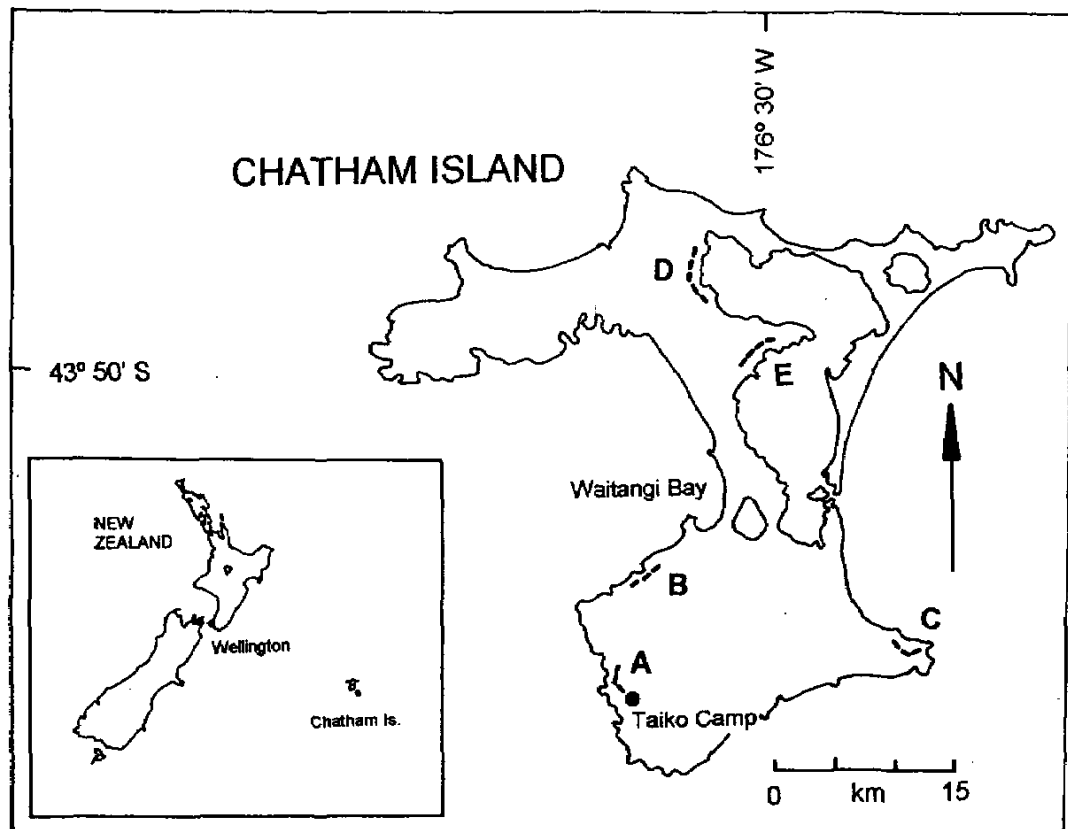


FIGURE 1 - The location of Pipit count routes on Chatham Island. Dotted lines are the count routes: A. Tuku a tamatea valley to Taiko camp; B. Waitangi-Tuku Road near Matakatau Stream; C. Manukau Point; D. Cattle Point - Cemetery Point; E. Airport to Waikato Point.

METHODS

Pipits were studied in the bracken (*Pteridium esculentum*) fernland, rough pasture and beaches on Chatham Island in 1997. I used two main study areas, the 2 km² upper coastal fringe of farmland (0 - 180 m) between the Taiko Camp and the northern side of the Tuku a tamatea Valley, and the 6 km of the sandy Waitangi Bay beach south of Red Bluff (Fig. 1).

The upper southern fields comprised peat ridges and swampy marshes. Isolated remnant grass trees (*Dracophyllum arboreum*) were scattered throughout the fields. During the study, soils were saturated due to an unusually wet and overcast summer.

Waitangi Bay Beach was sandy with steep eroded foredunes (20 m high) and a littoral zone of 20 - 70 m wide. Between 66 - 100% of the littoral zone was covered during each high tide, and bands of seaweed and other debris was distributed over the beach as the tide subsided.

Pipits and Skylarks were counted on 29 April, 1, 6 and 10 May 1997, along a 2 km route between Taiko Camp and the gate on the north ridge of Tuku a tamatea Valley. During 11-13 May 1997, Pipits were counted four times on Waitangi Beach,

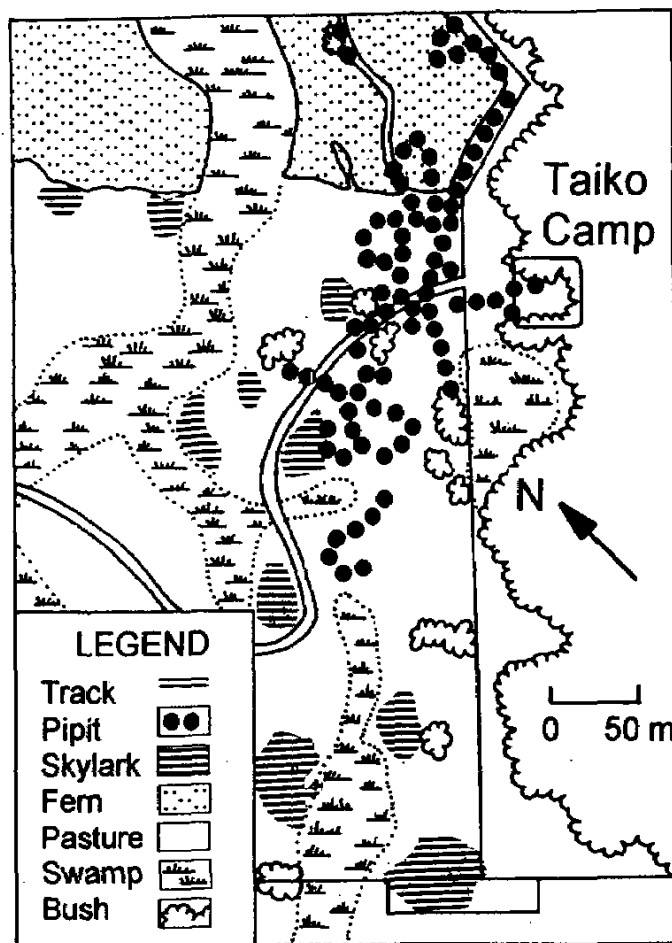


FIGURE 2 – Foraging locations of Pipit and Skylark at the field on the south coast, Chatham Island.

in overcast conditions with moderate south to southwesterly winds. These counts, foraging studies and extensive walking throughout a 3 km² area between 28 April and 11 May 1997 were used to assess population density.

Both species were also counted at four additional sites during 11 -13 May 1997, to gauge the applicability of data from the main study sites to the rest of Chatham Island (Fig. 1). These sites were on the Waitangi-Tuku road near the Matakatau Stream, near Manukau Point at Owenga, on North Road between Cattle Point and Cemetery Point, and from the Airport to Waikato Point on Chatham Island

Between the 28 April and 10 May 1997 I assessed and compared foraging behaviour of Pipits, in approximately 0.03 km² rough bracken fernland and 0.15 km² of rough pasture near Taiko Camp in south-western Chatham Island (Fig.2). I compared the foraging behaviour of Pipits and Skylarks in the same area of rough pasture. Weather conditions varied from strong south-westerlies, fog and light rain, to fine overcast conditions with light winds. I also compared the foraging behaviours of Pipit on Waitangi Bay Beach with those in pasture on Chatham Island, and with those on the beaches and hilly pasture in Wellington, New Zealand, during autumn

TABLE 1 - Activity budget (% time) of Pipits and Skylarks on the Chatham Island

Activity	Pipit		Skylark
	Fern and rough pasture	Open pasture	Open pasture
Stand searching	11.9	13.7	15.4
Walk	50.5	43.8	17.4
Dash	3.0	5.7	1.2
Hop	8.6	3.9	0.001
Dash-fly	3.0	1.7	
Feed	17.1	23.4	57.1
Preen	2.4	2.0	1.2
Bill clean & perch	0.009	0.001	
Fly	2.4	5.6	6.4
Aggression	0.002	0.001	1.2
Minimum number of individuals followed	4	8	8
No. 5 sec units	572	984	846

(Beauchamp 1995). Waitangi Beach was also walked at dusk to assess Pipit roosting behaviour there.

Pipit and Skylark foraging data were collected between 10:00 - 17:00 New Zealand Standard Time. The foraging behaviour of Pipits was recorded from a distance of 10 - 20 m, and Skylarks at 50 m through a telescope. Individuals of both species were observed for up to 10 minutes, and activities recorded every 5 seconds. Foraging behaviour categories were: hopping, walking, feeding (bill movements on the ground or against objects), stand searching (looking for food), dashing after food items and dash-flying after invertebrates (Tables 1 & 2, Beauchamp 1995). The method used to collect foraging information lacked independence; as individual birds may have been observed repeatedly, but this method was the same as that used in Wellington, and elsewhere (Beauchamp 1995).

RESULTS

Density and distribution

Pipit numbers averaged 3.8 birds/km walked (*s.e.* = 1.09, *n* = 5) in southern pasture; 2.4 birds/km walked (*s.e.* = 1.37, *n* = 4) on roads; and 3.6 birds/km walked (*s.e.* = 1.13, *n* = 4) on beaches. Pipit and Skylark densities were estimated at 7 birds km⁻² and 10 birds km⁻², respectively, from counts and foraging observations on the pasture fringe of the south coast. Both species appeared to be equally common elsewhere on Chatham Island.

Most Pipits and Skylarks used pasture intermittently in April to May, and showed limited range overlap (Fig. 2). Pipits were alone, in pairs or in loose groups. Grouping occurred on exposed headlands of the Tuku a tamatea Valley when winds exceeded 30 km h⁻¹. Skylarks dispersed and fed in groups of 2 - 12 birds on the upper fields

TABLE 2 - Pipit foraging activities (%) on beaches and pasture on Chatham Island and in Wellington.

	Beach		Pasture	
	Chatham Island	Wellington	Chatham Island	Wellington
Stand searching	16.3	7.2	13.7	20.1
Walk	38.0	51.7	43.8	44.6
Dash	7.6	3.4	5.7	1.3
Hop	0.006	1.7	3.9	
Dash-fly	0.009		1.7	
Feed	32.8	34.3	23.4	27.1
Preen	0.006	0.006	2.0	
Bill clean & perch			0.001	
Fly	2.4	3.4	5.6	4.4
Agression	0.007	0.006	0.001	
Minimum number of individuals followed	12	5	8	5
No. of 5 sec units	673	172	984	159

during all weather conditions. One pair of Pipits defended approximately 2.5 ha against other Pipits, but they foraged with Skylarks. This area included pugged seeps, close-grazed grassland, rocky outcrops, and open gravel road. Another Pipit sang for 20 seconds at 12:05 on 4 May 1997, from a 2.5 m perch 300 m south of the Taiko Camp. Skylarks sang above the fields during sunny breaks, and some displays ended in aerial fights and chases.

Foraging behaviour

There were very significant differences in foraging behaviour between Pipits and Skylarks in open pasture ($\chi^2 = 300.04$, $d.f. = 3$, $p < 0.0001$). Skylarks tended to fly to a site in pairs or groups, or descend into areas where other Skylarks were foraging. Groups fed without much movement (mean distance walked = 1.06 m min^{-1} , $s.e. = 1.08$ m, $n = 5$) and spent more time feeding than Pipits. Pipits walked on average 10.3 m min^{-1} ($s.e. = 5.57$ m, $n = 10$). Pipits used all habitats including bogs, all grazed areas, vehicle tracks and roads (Fig. 1). Skylarks tended to feed in areas of the most closely grazed grass and near seeding *Bromus* spp. on the drier slopes.

The composition of Pipit foraging behaviour differed significantly between the open pasture and fernland (Fig. 1) ($\chi^2 = 30.518$, $d.f. = 4$, $p < 0.001$). There was more hopping onto mounds and vegetation, dash-flying after insects and walking on the rough firebreaks and fern. In pasture, birds handled food, stood looking for food, and dashed after prey more frequently.

The composition of Pipit foraging behaviours also differed significantly between open pasture and open sandy beaches on Chatham Island ($\chi^2 = 38.23$, $d.f. = 3$, $p < 0.001$). On the beaches there was less walking, more prey handling and dashing, and far less hopping and dash-flying than on open pasture. Pipits fed from clumps

of seaweed, or from open sand in the wash zone, and moved on average 23.1 m min^{-1} ($s.e. = 23.5$ m, $n = 14$). Pipits were on average 350 m apart on the beach and defended their area aggressively during daylight, but deserted the beach at dusk.

The composition of Pipit foraging behaviours on hilly pasture in autumn in Wellington differed significantly from those on Chatham Island pasture ($\chi^2 = 13.43$, $d.f. = 2$, $p < 0.01$, Table 2). In Wellington more time was spent standing and searching for food at good vantage points, while on Chatham Island foraging involved greater movement over level ground.

The composition of Pipit foraging behaviours on beaches in autumn in Wellington also differed significantly from those on Chatham Island beaches ($\chi^2 = 7.03$, $d.f. = 2$, $p < 0.05$, Table 2). The differences reflected the composition of the habitats, with rocky beaches in Wellington and isolated clumps of seaweed, and open sandy beaches on Chatham Island and more evenly distributed seaweed clumps. Pipits dashed more frequently after flies on Chatham Island beaches. In both areas the stranded flotsam, foredunes and cliff faces of beaches were defended more frequently than other habitats (Beauchamp 1995).

DISCUSSION

Between 1969 and 1979 Pipits were recorded in 57% of all North Island, and 59% of all South Island 10,000-yard squares (Bull *et. al* 1985). Since 1979 the number and distribution of Pipits has declined in some North Island regions including Northland, Bay of Plenty, Gisborne and Wellington (Beauchamp, unpubl. data).

The density of Pipits on Chatham Island (7 birds km^{-2}), exceeded that in the best habitats near Wellington (2.5 birds km^{-2}), and appears higher than in comparable habitats throughout the North Island of New Zealand (Beauchamp 1995, unpubl. data; Parrish & Lock 1997). The autumn density of Skylarks on Chatham Island (10 birds km^{-2}) was more similar to those on the more densely populated areas of New Zealand, and approached the 10-15 birds km^{-2} on Mana Island during 1987-1990 when pasture management favoured Skylarks (Beauchamp, unpubl. data).

This study found that in the activities that make-up foraging behaviour in Wellington and Chatham Island are similar, but this cursory analysis suggests that the composition and use of these behaviours was influenced by habitat attributes and the food types being pursued. Dashing was more prevalent on smooth surfaces like pasture and sandy beaches, while hopping was more common on rough surfaces with fern and rocks. Dash flying was common in all habitats when flying insects were present.

It is unknown whether Pipits spend the same proportion of the day foraging in Wellington and Chatham Island. The Chatham Island peat soils have high invertebrate densities (Beauchamp, pers. obs.). The lower number of Pipits on the New Zealand mainland may reflect differences in food abundance, or Pipits may be rarer for other reasons, like disease (Westerskov 1953, Quinn 1971), mammalian predation (Foggo 1984) or a lack of suitable habitat (Beauchamp 1995).

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