FEEDING STATIONS AND FOOD OF NORTH ISLAND SADDLEBACK IN AUGUST

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INTRODUCTION

Since Fleming (1941) recorded a pair of North Island Saddlebacks *(Philesturnus carunculatus rufusater)* in the Raukumara Range during February 1935, none has been definitely recorded save on Hen Island. The danger of losing the Hen Island population through cats, disease or fire is ever present, so it is desirable to establish the bird on other islands as soon as practicable. Detailed knowledge of diet may prevent wasted effort in transferring birds to islands where they cannot survive and, considered with other characteristics, can define the ecological niche of this bird.

This paper records observations on feeding stations and foods of the Saddleback made by a combined Wildlife Branch - O.S.N.Z. - D.S.I.R. expedition to Hen Island from 23rd August to 3rd September, 1963. The party consisted of Mr. D. V. Merton (leader), Misses L. J. Bishop and M. Johnston, Messrs. J. S. Adams, A. Blackburn, D. J. Campbell, M. J. Hogg, J. L. Kendrick, N. J. Ledgard, P. D. G. Skegg and the writer, all of whom contributed observations. I wish to emphasise that the basic data of this paper are entirely the result of a team effort. We are indebted to Dr. J. A. Gibb for helpful criticism of the manuscript.

DISTRIBUTION RELATED TO VEGETATION

In mapping the island's vegetation, the writer tentatively delimited the following types:—

(i) Kanuka scrub on slopes at the western end of the island.
(ii) Kanuka and kanuka-puriri forests on the strongly rolling northern slopes.
(iii) Pohutukawa forest on slopes within 200 ft. of sea-level.
(iv) Puriri-pohutukawa forest in valleys near the sea.
(v) Puriri-taraire forest on the southern slopes.
(vi) Taraire-tawa forest on the southern slopes.
(vii) Cliff vegetation.

During our visit Saddlebacks were seen feeding in almost all these communities, from the pohutukawa near sea-level on both northern and southern coasts, to the kanuka forest of the upper ridges at 900 to 1,000 ft.; but they were not noticed in the kanuka scrub at the western end of the island. An attempt was made to find out whether Saddlebacks were feeding more in one type of vegetation than another but this was unsuccessful because of an inadequate number of observations.

FEEDING STATIONS

Prompted by Gibb's (1961) analysis of the feeding stations of birds in Kaingaroa pine forest, the possible feeding stations of the Saddleback on Hen Island were listed. The party's observations, made mainly on the southern slopes, were recorded daily and the results are

summarised in Table 1. Each observation is that of one bird feeding in one place. If a bird moved to another station then this was treated as a separate observation.

TABLE 1: FEEDING STATIONS OF THE SADDLEBACK ON HEN ISLAND: AUGUST, 1963

Feeding Stations	No. of observations	% of total
Aerial feeding more than 3ft. above ground	0	0
Aerial feeding within 3ft. of the ground	3	2
Canopy foliage (excluding tufted crowns)	19	9
Understorey foliage	13	6
Foliage of cabbage tree, nikau, collospermum and flax	21	10
Dead foliage	15	8
Bark of upper branches and twigs	59	29
Dead branches	9	4
Boles	23	11
Ground	43	21
Total	205	100

A large proportion (44%) of the feeding observations was of birds feeding along branches or on boles. Characteristically a bird would work along the branches, either ascending or descending, ripping or chipping off pieces of bark, probing into knots and holes, tapping on the bole like a woodpecker, and sometimes using the upper mandible alone as a skewer. Once a strip of kanuka bark, 18 in. long, was torn off the trunk from the bottom upwards, beginning 6ft. above the ground (A.B.).

The tree species on which a bird was seen feeding was identified whenever possible but no particular preferences emerged. Trees with relatively smooth bark figured just as prominently as those with flakey bark, such as kanuka.

When feeding on the ground the beak was used to turn leaves and twigs and occasionally to toss them aside. A piece of rotten wood weighing nearly 40 gm. was turned over (A.B.). Probing actions were also seen and D.V.M. watched a bird spend a minute or two digging a hole nearly two inches deep and an inch in diameter. Crevices in rocks were sometimes examined and J.L.K. observed birds pecking at spider webs.

Aerial feeding was observed when a bird made a short flight from the ground to catch a flying insect disturbed while the bird was feeding amongst the litter (A.B.).

The percentages of Table 1 are open to the criticism that some observations were made shortly after the bird had been disturbed by the observer. Thus the birds could be spending more time feeding on the ground than is indicated. A number of timed observations were made in which recording of the bird's feeding station was begun only after it appeared to be taking little notice of the observer (Table 2).

TABLE 2 — TIMES SPENT BY SADDLEBACKS IN THREE GROUPS OF FEEDING STATIONS ON HEN ISLAND: AUGUST, 1963

Feeding Stations	No. of birds observed	Total time of observations (min.)	Percentage of Total
On branches and boles	15	145	43
Among foliage	6	80	24
On ground	14	109	33
Totals	35	334	100

The longest timed observation was made by N.J.L., who followed one bird for 63 minutes, some 25 of which were spent on or within 2 ft. of the ground.

The association of Fantails with feeding Saddlebacks is discussed elsewhere in this issue by Blackburn.

FOODS

Twenty-six observations were made in which the food taken was identified (Table 3).

TABLE 3 — FOODS OF SADDLEBACK ON HEN ISLAND: AUGUST, 1963

Food	No. of observations
Caterpillars, beetle larvae, spiders and centipedes	16
Beetles and moths	4
Apical buds of matipo *(Myrsine australis)*	2
Flower buds of fivefinger *(Neopanax arboreum)*	2
Berries of nightshade *(Solanum nodiflorum)*	1
Nectar of *Clematis paniculata*	1 (?)
Total	26

A.B. observed one bird pick off a case moth cocoon and, grasping it with one foot, pick a hole at one end through which the caterpillar was extracted.

With matipo, the birds pecked off and swallowed the apical buds (P.D.G.S.; L.J.B.). J.L.K. saw a male bird fly on to a large rock, grasp the stem of a nightshade with one foot and then pick and eat a cluster of green berries.

On fivefinger, the birds fed selectively among fruits, flower buds and flowers in the upper canopy (D.J.C. and A.B.). The size of the parts taken indicated that they were flower buds. Sibson (1949) observed Saddlebacks eating ripening berries of fivefinger during early January.

The bird feeding from clematis flowers plunged its bill right into the centre of the flower and moved its tongue backwards and forwards, apparently sucking nectar. Immediately afterwards a Bellbird went through the same motions on another flower 18 in. away (D.V.M.).

Kowhai, puriri and *Rhabdothamnus solandri* were also in full flower but there was nothing to suggest that they were being visited by Saddlebacks.

Near the camp-site at Dragon's Mouth Cove, Saddlebacks were often seen searching for food under the flakey bark of kanuka. D.J.C. examined the invertebrates under the bark of two trees each 25 ft. high and 8 - 10 in. diameter at breast height. The most abundant potential food available on the foliage and fine stems of the canopy were egg masses of scale insects. In the upper branches scale insects themselves were abundant, especially in the axils of small branches where it was damp. Juvenile cockroaches and cockroach egg masses were also common here. Below 15 ft., cockroaches were still present, and centipedes and spiders increasingly common towards the ground; centipedes were the dominant invertebrate under bark within 3 ft. of the ground. Isopodes were also present below 15 ft., particularly in damp places. Thysanurans were present at all levels.

Three Saddleback droppings collected in kanuka forest near the camp have been examined by Dr. K. E. Lee. He reported that most of the material contained in them was so macerated and digested that it was quite unrecognisable. Material that was recognised is shown in Table 4.

TABLE 4 — ANALYSES OF SADDLEBACK DROPPINGS
(Dr. K. E. LEE)

From all 3 droppings	From 2 out of 3	From 1 out of 3
Egg cases of cockroaches	Fragments of elytra, legs; also mandibles, head capsule of Tenebrionid beetle *(Chrysopeplus expolitus)**	Fragments of legs and body segments of adult cockroach.
	Small fragments of legs, body segments, wing covers of large green insect (probably a mantid). Seeds *(Ranunculus?* and one other plant).	Small fragment of skin of insect larva (could be from Elaterid larva).

*Determined by E. S. Gourley

DISCUSSION

These observations establish that during late August Saddlebacks feed primarily on insects and other invertebrates living in bark or in litter. The fact that Saddlebacks can be observed spending one third of their feeding time on the ground, even in the presence of man, demonstrates how vulnerable this bird may be to cats or stoats. It also suggests that an undisturbed forest litter could be an essential source of food that probably could not be maintained in the presence of goats or pigs.

The analysis has not revealed that the birds are dependent on any particular food, lack of which could limit numbers on other islands.

On the contrary it appears that in late August a wide variety of invertebrates is taken from a wide range of stations. Feeding behaviour, further details of which are given in this issue by Blackburn, also suggests that the Saddleback is versatile in collecting food. It is clear that many more feeding studies are required at other times of the year, especially during the nesting period. It would be interesting to ascertain whether there is any overlap in foods with other insectivorous birds. Sampling of the invertebrates of tree bark and litter is also necessary to establish what foods are available at different times of the year.

Dr. K. E. Lee (*pers. comm.*) has made a preliminary examination of stomach contents of Kiore (*Rattus exulans*) collected from Hen Island during August. In spite of the extremely macerated condition of these contents some fragments of centipede were definitely identified and probably also cockroach and cicada larvae. These, together with other insect fragments, indicate that invertebrates are an important component of kiore diet. It is possible that there is competition for food between Saddlebacks and Kiore since both forage for food on the forest floor.

Buller (1888), writing when Saddlebacks were still present on the mainland, stated "At the present time it is more plentiful on the Hen than anywhere else": he attributed this to the absence of cats. Since the abundance of Saddlebacks on Hen Island is of such long standing, the island must be particularly favourable to them. The vegetation is rather unusual in having a high proportion of old kanuka stands intermixed with taller forest containing well developed litters. There is no proof from this study that kanuka bark and deep litters are either or both essential to maintain Saddleback numbers, but this could be examined.

There are few other islands where North Island Saddlebacks could be successfully established. Big Chicken Island has been tried unsuccessfully but reasons for the failure are not known. Middle Chicken Island, though smaller, may be a more suitable habitat. Cuvier Island, where Saddlebacks were formerly present (Oliver, 1955), is an obvious choice when cats have been completely exterminated. Aorangi of the Poor Knights Islands may be worth considering although it does not look ideal.

Originally the Saddleback may have occupied a closely parallel ecological niche to that of the Huia although in a different type of forest. Oliver (1963) points out a close similarity of the Huia to the Saddleback in skull structure. Further intensive work on the Saddleback may allow other comparisons and will certainly be necessary in order to preserve this fascinating bird as a member of our fauna.

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