THE HABITAT AND DISTRIBUTION OF THE KATIPO SPIDER AT SOUTH BRIGHTON BEACH, CHRISTCHURCH, NEW ZEALAND

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SUMMARY

In May 1969 the distribution of the Katipo spider **Latrodectus** katipo (Araneae : Theridiidae) at South Brighton Beach, Christchurch, was investigated. The spiders were most abundant in a narrow zone about 10-30 metres from the most seaward clumps of marram grass. Habitat characteristics were examined and a preference for sparse to medium densities of marram on sloping ground facing north-west, was found. An analysis of the contents of 32 webs indicated that a weevil, **Cecyropa modesta,** is probably the most important prey.

INTRODUCTION

Reference to the distribution of the Katipo spider have been published by Ralph (1885), Buller (1870) and Parrott (1948).

It has been known since at least 1870 that the spider is to be found at Rangiora, several miles inland on the Canterbury Plains, although Powell recorded it as being rare. Parrott (1948) noted the presence of these animals at Leithfield and Brighton Beach. However there appeared to be considerable doubt as to the specific habitat in relation to beach vegetation and it was the purpose of this study to define the habitat of the spiders in the South Brighton area.

The South Brighton area consists of an elongated sand dune bank bordered, on the ocean side by a sandy beach, and on the inland side by the Heathcote-Avon estuary and the southern extension of the suburb of New Brighton. The study was carried out in May 1969.

METHODS

To obtain some idea of the abundance and distribution of Katipo spiders over the dune area, eight transects 650 metres apart were searched as metre quadrats. The transects were started at the most seaward vegetation and continued inland until 10 metres of transect had been searched without spiders being seen. Most of the transects stopped at or near the lupin belt on the inland side of the foredunes. The vegetation in the area from the ends of the transects to the road was too thick for systematic sampling and was searched separately. When spiders were found, vegetation type density, dune slope and orientation, and the presence or absence of plant debris was noted.

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VEGETATION TYPE AND ABUNDANCE

One of the most effective sand-binding grasses found on the dunes of the spit is Marram **(Ammophila arenaria)**, although the native sedge Pingao **(Desmoschoenus spiralis)** is also common. Later in the dune succession, woody forbs, ice plant and lupins are also found.

Vegetation abundance was difficult to estimate and a subjective approach was chosen as being most suitable. The categories finally decided upon were:—

1. Marram Grass:
   Sparse, small, distinct tillers or separate stalks, up to 50 stalks per tussock.
2. Marram Grass:
   Medium density, tillers large but still distinct, 50-100 stalks per tussock.
3. Marram Grass:
   Dense growth, usually with litter in the form of dead leaves still attached to the tussocks.
4. Pingao.
5. Other vegetation.
6. Open sand.

In all 187 Katipo spiders were found. Of these 89% were in marram grass, 10% in Pingao and 1% in other vegetation. Forty-nine per cent of the spiders in marram grass were in stands of medium density and 26% were in sparse marram (Table 1).

Although 10% of the spiders were found in Pingao, these were found in only 6% of the 170 quardrats searched.

TABLE 1

Percentage of total number of spiders found in relation to vegetation and density.

Category	Percentage of spiders found	Number of Quadrats
Sparse marram ...	26	29
Medium marram ...	49	32
Dense marram ...	14	32
Pingao	10	10
Other vegetation ...	1	28
Open Sand	0	39

The majority of individuals occurring in marram stands were clumped in their distribution, that is they were associated with groups of webs which were touching or nearly touching at any point. In Pingao the webs were usually more than 10 centimetres apart.

SPIDER DISTRIBUTION IN RELATION TO DUNE SLOPE AND ORIENTATION

Katipo spiders appear to prefer ground sloping between 30° and 45° to the horizontal (Table 2). Over half the spiders found were in steeply sloping situations.

TABLE 2

Percentages of total number of spiders found in relation to dune slopes.

Category	Percentages of total number of spiders found	Number of Quadrats
Flat	10	50
Slightly sloping (10° - 30°) ...	35	62
Steeply sloping (30° - 45°) ...	55	58

The distribution of spiders was not uniform with respect to slope orientation and 65% were found on northern and western slopes (Table 3).

TABLE 3

Percentages of total number of spiders found in relation to slope orientation.

Slope Orientation	Percentages of total number of spiders found	Number of Quadrats
North	30	31
South	1	31
East	15	28
West	35	30
None	19	50

DISTRIBUTION OF SPIDERS IN RELATION TO PLANT DEBRIS

Situations were divided into three categories with respect to plant debris accumulation, none, slight and dense. The dense category included situations where there was an accumulation of dead leaves around the bases of well established marram tussocks.

Almost all the spiders were associated with vegetation containing little or no plant debris (Table 4).

TABLE 4

Percentages of total number of spiders found in relation to litter.

Category	Percentage of spiders found	Number of Quadrats
None	55	55
Slight	44	63
Dense	1	52

FOOD ANALYSIS

On 23 March, 1969, 32 webs from a 10 metre square were collected and the contents identified (Table 5). The weevil **Cecyropa modesta** accounted for over half of the prey numbers present. It was not possible to determine whether the Katipo exoskeletons were from animals killed as prey or from normal moults.

TABLE 5

Prey species found in webs.

Species	Percentage of total prey Nos.
Cecyropa modesta (Coleoptera)	56
Mimopeus thoracicus (Coleoptera)	17
Xylotoles griseus (Coleoptera)	9
Talorchestia quoyana (Amphipoda)	6
Anisolabis littorea (Dermaptera)	3
Latrodectus katipo (Araneae) (male exoskeletons)	2
Lepidopterous larvae (Leptidoptera)	4
Other spider exoskeletons (unidentifiable) ...	3

ABUNDANCE OF SPIDERS

The density of spiders in the area covered by the transects was 1.1 spiders/m^2. However, because the area covered by the transects was wider than the zone in which spiders were found the density in the inhabited area may be as high as 3-4 spiders/m^2, of marram.

The sex ratio for the 187 spiders was 2 : 3 (m : f) and the ration of Males : Females : Juveniles was 1 : 1. 46 : 1. 59.

THE WEB FORM

The web-form varies from a relatively diffuse construction to one or more funnel-shaped structures, 4-6 cm long and 1-3 cm in diameter. The webs are built at ground level and are supported by threads from nearby stalks of marram.

DISCUSSION

The Katipo spider is a native species which has taken advantage of an introduced grass to extend its range. It is not known whether this spread is primarily due to a greater abundance of food or an increase in suitable web sites.

It was surprising to find the distribution of the spiders restricted to such a narrow band of vegetation in view of the observations of previous authors. For instance Parrott (1949) implied a wider distribution when he said "Personal collecting has shown that it (the Katipo spider) is seldom found far from the coast. Although it may be found in certain inland localities I have never found it more than 3 miles from the coast. Its usual habitat is in the coastal regions actually along the sea beach above high water mark. It is generally distributed throughout both islands although I am not aware that it has been found south of Dunedin in the South Island."

It is commonly believed that Katipo spiders are to be found in driftwood. As any wood deposited on South Brighton Beach is soon removed by the inhabitants of New Brighton it is unlikely that Katipo spiders would have time to become established in this habitat.

ACKNOWLEDGMENT

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