# FOOD OF SKYLARKS AND PIPITS, FINCHES, AND FERAL PIGEONS NEAR CHRISTCHURCH

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The following notes are part of a major study entitled " Ecological aspects of the bird hazard problem at Christchurch International Airport " carried out at the University of Canterbury. Crop contents of a number of species of birds were examined during this study and some are reported upon here.

## I. FOOD OF SKYLARKS AND PIPITS

### INTRODUCTION

Little information is available on the food of Skylarks *(Alauda arvensis)* and Pipits *(Anthus novaeseelandiae)* in New Zealand. Oliver (1955) reported that Skylarks fed mostly on seeds, including grain, with fruit and insects; while Pipits fed on insects, spiders, earthworms and occasionally small seeds. Falla *et al.* (1970) regarded Pipits as almost entirely insectivorous though some seeds were also taken.

While investigating the food of birds at Christchurch International Airport (Moeed 1970), the gizzards of nine Skylarks and five Pipits were examined. The permanent pasture was kept mown and harboured many insects, spiders, harvestmen and earthworms as well as seeding plants.

### RESULTS AND DISCUSSION

Food of Skylarks (Table 1) comprised insects from the orders Coleoptera, Hemiptera, Diptera, Lepidoptera and Orthoptera. Coleoptera, especially Carabidae and Curculionidae, occurred most frequently. Spiders eaten belonged to the family Lycosidae. No harvestmen were recorded. Small seeds were eaten more frequently than invertebrates, except in January.

Pipits fed on similar food to the Skylarks (Table 2) except that the order Orthoptera was absent and one gizzard contained harvestmen.

Seeds formed 75% or more of the items contained in the gizzards of both species but, as most of the seeds were much smaller in size than the invertebrates, their volume in the diet was less. The fewer types of food recorded in the Pipit's diet may be a result of the smaller sample.

TABLE 1 — Food items in nine Skylarks (Alauda arvensis)

| Food | | Number of food items | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1968 | | | | | | | 1969 | | Total |
| Date | | Aug. | Oct. | Nov. | Nov. | Nov. | Nov. | Dec. | Jan. | Jan. | |
| Skylark Number | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| Insects | | | | | | | | | | | |
| Adults | | | | | | | | | | | |
| Rhodopsalta sp. | (Hem.) | - | - | - | - | - | - | 2 | - | - | 2 |
| Nysius sp. | (Hem.) | - | - | 1 | 2 | - | - | - | - | - | 3 |
| Phaulacridium marginale | (Orth.) | - | - | - | - | - | - | 1 | - | - | 1 |
| Crambus sp. | (Lep.) | - | - | - | - | - | - | 3 | 2 | - | 5 |
| Costelytra zealandica | (Col.) | - | - | - | 3 | - | 1 | - | 1 | 2 | 7 |
| Carabidae | (Col.) | - | 1 | 18 | 2 | 2 | - | - | 49 | - | 72 |
| Elateridae | (Col.) | - | - | - | - | 1 | - | - | - | - | 1 |
| Curculionidae | (Col.) | - | 7 | 4 | 11 | - | - | 4 | 7 | 8 | 41 |
| Diptera | | - | - | - | - | - | - | 1 | - | 2 | 3 |
| Larvae | | | | | | | | | | | |
| Coleophora sp. | (Lep.) | 4 | - | - | - | - | - | - | 1 | 4 | 9 |
| Crambus sp. | (Lep.) | - | - | 1 | 1 | - | - | - | - | - | 2 |
| Arachnids | | | | | | | | | | | |
| Lycosidae | | - | - | - | - | - | - | 2 | - | - | 3 |
| Seeds | | | | | | | | | | | |
| Stellaria media | | - | 19 | 116 | 66 | 150 | - | 110 | - | - | 461 |
| Chenopodium album | | - | - | 7 | - | 3 | - | - | - | - | 10 |
| Anthoxanthum odoratum | | - | - | - | 13 | - | 21 | - | - | - | 34 |
| Erodium sp. | | 4 | 11 | 4 | 2 | 5 | 16 | 1 | - | 1 | 44 |
| Poa sp. | | - | - | 110 | - | 25 | - | - | - | - | 135 |
| Stipa sp. | | - | 3 | - | - | - | - | 25 | - | - | 28 |
| Polygonum sp. | | 5 | - | - | - | - | - | 7 | - | - | 12 |
| Trifolium sp. | | - | - | - | 1 | 2 | - | - | - | - | 3 |
| Oxalis sp. | | - | - | - | - | - | 36 | - | - | - | 36 |

Earthworm remains were not found in either Skylarks or Pipits, perhaps because most of the records were from summer months when earthworms were not present in the top soil (Moeed 1970; Moeed in prep.).

Collinge (1924-27) in the U.K. has reported that Skylarks feed more on seeds than insects (volumetric), in contrast to these data which show that the food consisted of more insects than seeds.

TABLE 2— Food items in five Pipits (*Anthus novaeseelandiae*)

| Food | | Number of food items | | | | | |
|---|---|---|---|---|---|---|---|
| | Date | 1968 | | | | | |
| | | Jul. | Aug. | Oct. | Nov. | Nov. | Total |
| | Pipit Number | 1 | 2 | 3 | 4 | 5 | |
| **Insects** | | | | | | | |
| Adults | | | | | | | |
| *Nysius* sp. | (Hem.) | – | 1 | 2 | 5 | 2 | 10 |
| *Coccinella undecimpunctata* | (Col.) | – | 1 | – | – | – | 1 |
| *Costelytra zealandica* | (Col.) | – | – | – | 2 | – | 2 |
| Carabidae | (Col.) | 9 | 1 | – | – | – | 10 |
| Curculionidae | (Col.) | – | 10 | 12 | 9 | 13 | 44 |
| Diptera | | 9 | 21 | – | – | – | 30 |
| Larvae | | | | | | | |
| *Coleophora* sp. | (Lep.) | – | – | – | – | 3 | 3 |
| *Crambus* sp. | (Lep.) | 2 | – | – | – | – | 2 |
| Arachnids | | | | | | | |
| Lycosidae | | – | 3 | – | – | – | 3 |
| *Phalangium opilio* | (Opil.) | – | – | 2 | – | – | 2 |
| Seeds | | | | | | | |
| *Stellaria media* | | – | – | 130 | – | – | 130 |
| *Erodium* sp. | | – | – | 26 | – | 31 | 57 |
| *Poa* sp. | | – | – | 27 | – | 23 | 50 |
| *Polygonum* sp. | | – | – | – | 2 | – | 2 |
| *Trifolium* sp. | | – | – | – | – | 80 | 80 |
| *Oxalis* sp. | | – | – | – | – | 7 | 7 |

Reporting the distribution of Pipits and Skylarks in Otago, Hamel (1972) regarded food supply as one of the factors responsible for their distribution and wrote, " it would be unwise to presume that Skylarks consume even roughly the same range of insects as Pipits." Although based on small samples, the present data show considerable overlap in the diet of Skylarks and Pipits, and competition for food may be important.

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## II. FOOD OF HOUSE SPARROWS, GREENFINCHES, GOLDFINCHES AND YELLOWHAMMERS

### INTRODUCTION

I examined the crop contents of 15 House Sparrows *(Passer domesticus)*, 6 Greenfinches *(Carduelis chloris)*, 6 Goldfinches *(Carduelis carduelis)* and 2 Yellowhammers *(Emberiza citrinella)* shot between March 1968 and February 1969. All birds were adults.

Except for the Yellowhammers and one Greenfinch (shot in July and September 1968), the birds were collected during the summer when they fed on airfield pasture containing many seeding plants (Moeed 1970). They also fed on adjacent agricultural fields during and after harvesting.

Foods of these birds have been reported and reviewed by many workers, including Collinge (1924-27) for House Sparrows, Greenfinches, Goldfinches and Yellowhammers; Kalmbach (1940), Southern (1945) and Hammer (1948) for House Sparrows; Newton (1967) for Greenfinches and Goldfinches; and Campbell (1972) for Goldfinches.

### RESULTS AND DISCUSSION

Table 1 presents the frequency and percentage of occurrence of all food items in the four species studied. Numbers of food items and sampling dates are given in Appendix 1. Grit, in the form of stones and sand, was present in all samples.

In House Sparrows, insects (Coleoptera) formed only 0.5% of the total food. Seeds of *Stellaria media, Triticum* sp., *Lolium* sp, and *Avena* sp. occurred frequently (66.1%); other seeds were eaten either less often or in smaller numbers.

The proportion of insects in the diet was lower than reported in Britain (Collinge 1924-27, Southern 1945), in U.S.A. (Kalmbach, 1940) and in Denmark (Hammer 1948), perhaps because this small New Zealand sample came only from summer months when adult House Sparrows may have been feeding insects to their nestlings.

Greenfinches ate somewhat similar food to the House Sparrows except that Coleoptera were replaced by Lepidoptera. Seeds of *Lolium* sp., *Triticum* sp., *Chenopodium album, Stellaria media* and *Avena* sp. formed 83.4% of the food. Like House Sparrows, insects were eaten less than reported by Newton (1967) in Britain.

The food of Goldfinches differed slightly as insects were absent and some smaller seeds were eaten more frequently. Seeds of *Stellaria media, Lolium* sp., *Oxalis* sp. and *Poa* sp. formed 53.6% of the food. According to Newton (1967) *Taraxacum* sp. seeds were important over short periods, and these formed 28.9% of the food at Christchurch Airport.

In Yellowhammers, Coleoptera and Lepidoptera together amounted to 3.9% while seeds of *Lolium* sp. formed 85.8% of the total food. Although predation on insects overall was low, Yellowhammers fed more on insects than did the previous three species. Collinge (1924-27) has also reported a higher animal content (29.0%) in the diet of Yellowhammers than in House Sparrows, Greenfinches and Goldfinches.

TABLE 1 - Food items in House Sparrows, Greenfinches, Goldfinches and Yellowhammers collected near Christchurch

| Food | Percentage of total number of items and frequency | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | House Sparrow n = 15 | | Greenfinch n = 6 | | Goldfinch n = 6 | | Yellowhammer n = 2 | |
| | % | Frequency | % | Frequency | % | Frequency | % | Frequency |
| Insects | | | | | | | | |
| Coleoptera (Adults) | 0.5 | 3 | - | - | - | - | 1.0 | 1 |
| Lepidoptera (Larvae) | - | - | 0.5 | 1 | - | - | 2.9 | 2 |
| Seeds | | | | | | | | |
| Anthoxanthum odoratum | 1.8 | 4 | 1.3 | 1 | 3.7 | 5 | - | - |
| Avena sp. | 9.5 | 9 | 6.1 | 3 | - | - | - | - |
| Chenopodium album | 3.7 | 3 | 13.9 | 3 | 3.5 | 4 | - | - |
| Cytisus sp. | 0.6 | 3 | 1.3 | 2 | - | - | - | - |
| Erodium sp. | 0.5 | 2 | - | - | 1.0 | 1 | 1.0 | 1 |
| Lolium sp. | 15.5 | 5 | 35.6 | 4 | 16.2 | 4 | 85.8 | 2 |
| Oxalis sp. | - | - | - | - | 8.0 | 4 | 0.5 | 1 |
| Poa sp. | - | - | - | - | 12.5 | 6 | - | - |
| Polygonum sp. | 1.1 | 2 | 0.8 | 1 | - | - | - | - |
| Stellaria media | 24.3 | 4 | 11.5 | 1 | 16.9 | 5 | - | - |
| Stipa sp. | 7.1 | 5 | - | - | 2.5 | 2 | 4.9 | 1 |
| Taraxacum sp. | - | - | - | - | 28.9 | 6 | - | - |
| Trifolium sp. | 7.3 | 6 | 5.3 | 1 | - | - | - | - |
| Triticum sp. | 16.8 | 13 | 16.3 | 4 | - | - | - | - |
| Ulex sp. | 0.5 | 2 | 1.3 | 2 | - | - | - | - |
| Vicia sp. | 4.8 | 3 | 0.8 | 1 | - | - | - | - |
| Vulpia sp. | 5.8 | 5 | 5.1 | 1 | 6.7 | 4 | 3.9 | 1 |

APPENDIX 1 — Number of food items in House Sparrows, Greenfinches, Goldfinches and Yellowhammers

| Food | 1968 | | | | | | | Numbers | | | | | | | 1969 | | | | | | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | Mar. | | | Jul. | Sep. | | | Dec. | | | | | | | Jan. | | | | | | | Feb. | | | | | | | |
| Bird no. | A1 | A2 | A3 | A4 | D1 | D2 | B1 | A5 | A6 | A7 | B2 | B3 | B4 | C1 | A8 | A9 | A10 | A11 | C2 | C3 | C4 | A12 | A13 | A14 | A15 | B5 | B6 | C5 | C6 | |
| Insects | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Coleoptera (Adults) | 2 | – | – | – | – | 2 | – | – | – | – | – | – | – | – | – | 2 | – | 1 | – | – | – | – | – | – | – | – | – | – | – | 7 |
| Lepidoptera (Larvae) | – | – | – | – | 1 | 5 | – | – | – | – | – | 2 | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | 8 |
| Seeds | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Anthoxanthum odoratum | 7 | – | – | – | – | – | – | 6 | 2 | – | – | – | – | 2 | – | – | 4 | – | 3 | – | 1 | – | – | – | – | – | 5 | 8 | 1 | 39 |
| Avena sp. | 16 | 7 | – | – | – | – | – | 19 | 6 | 17 | 8 | 8 | – | – | – | – | – | 4 | – | – | – | 8 | 17 | – | 4 | – | 6 | – | – | 121 |
| Chenopodium album | – | – | – | 16 | – | – | 10 | – | – | 6 | – | – | 26 | – | – | 16 | – | – | 4 | 2 | – | – | – | – | – | 16 | – | 6 | 2 | 104 |
| Cytisus sp. | – | 2 | – | – | – | – | – | – | – | – | – | – | 3 | – | 2 | – | – | – | – | – | – | – | – | – | 3 | 2 | – | – | – | 12 |
| Erodium sp. | 4 | – | – | – | 2 | – | – | – | 1 | – | – | – | – | – | – | – | – | – | – | 4 | – | – | – | – | – | – | – | – | – | 11 |
| Lolium sp. | – | – | – | – | 75 | 100 | 9 | 12 | 16 | – | – | 18 | – | – | 17 | – | – | 28 | – | 18 | 27 | 88 | – | – | – | 10 | 96 | 7 | 13 | 534 |
| Oxalis sp. | – | – | – | – | – | 1 | – | – | – | – | – | – | – | 8 | – | – | – | – | 6 | – | 12 | – | – | – | – | – | – | – | 6 | 33 |
| Poa sp. | – | – | – | – | – | – | – | – | – | – | – | – | – | 16 | – | – | – | – | 11 | 6 | 4 | – | – | – | – | – | – | 7 | 6 | 50 |
| Polygonum sp. | 8 | – | – | – | – | – | – | – | – | – | – | – | 3 | – | – | – | – | – | – | – | – | – | – | – | 3 | – | – | – | – | 14 |
| Stellaria media | – | 13 | 78 | – | – | – | – | – | – | – | – | – | 43 | 12 | – | 107 | 54 | – | 17 | – | 19 | – | – | – | – | – | – | 11 | 9 | 363 |
| Stipa sp. | – | – | – | 21 | 10 | – | – | 7 | 12 | – | – | – | – | 4 | – | – | 7 | – | 6 | – | – | 27 | – | – | – | – | – | – | – | 94 |
| Taraxacum sp. | – | – | – | – | – | – | – | – | – | – | – | – | – | 27 | – | – | – | – | 21 | 18 | 16 | – | – | – | – | – | – | 16 | 18 | 116 |
| Trifolium sp. | – | 8 | 12 | 11 | – | – | 20 | – | – | 12 | – | – | – | – | – | – | – | – | – | – | – | – | – | 17 | 16 | – | – | – | – | 96 |
| Triticum sp. | 13 | 12 | 7 | 10 | – | – | – | 16 | 26 | 21 | 26 | – | 4 | – | – | 21 | 20 | 10 | – | – | – | 6 | 6 | 6 | – | 13 | 18 | – | – | 235 |
| Ulex sp. | – | – | – | – | – | – | – | – | – | – | 3 | 2 | – | – | 1 | – | – | – | – | – | – | – | – | 4 | – | – | – | – | – | 10 |
| Vicia sp. | – | – | 16 | – | – | – | – | – | – | – | – | – | – | – | 6 | – | – | – | – | – | – | – | – | 28 | – | – | 3 | – | – | 53 |
| Vulpia sp. | – | – | 4 | 18 | 8 | – | 19 | – | – | – | – | – | – | – | 12 | – | 10 | – | 3 | 10 | 9 | 16 | – | – | – | – | – | – | 5 | 114 |

A = House Sparrow; B = Greenfinch; C = Goldfinch; D = Yellowhammer

Although the samples are small, the results indicate that Goldfinches, which formed feeding flocks with House Sparrows and Greenfinches, fed more on *Taraxacum* sp., *Poa* sp. and *Oxalis* sp. seeds (49.5%). These seeds were not eaten by House Sparrows or Greenfinches, and formed only 0.5% of the food eaten by Yellowhammers. In accord with Gause's hypothesis (in Newton 1967), closely related species living together in the same area would be expected to differ from one another in choice of habitat, food, or feeding place, at least at certain times of the year. Goldfinches appear to have a different feeding niche from the House Sparrows, Greenfinches and Yellowhammers in the same habitat, but the latter three species may be competing for food.

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## III. FOOD OF FERAL PIGEONS *(Columba livia)*

Recently, Dilks (1975) has reported in detail the food of Feral Pigeons *(Columba livia)* from Hawke's Bay. The present report gives additional information from Christchurch based on crop contents of 18 Feral Pigeons feeding on the agricultural fields surrounding the Christchurch International Airport (Moeed 1970).

The amount of each food item was assessed on an arbitrary five-point scale from 0-4, indicating absent, traces, some, several and many. The results and the sampling months are presented in Table 1.

According to Dilks, pea (*Pisum* sp.), maize (*Zea* sp.) and barley (*Hordeum* sp.) formed bulk of the food in Hawke's Bay, though other food items were also recorded. In Christchurch the food consisted entirely of pea (*Pisum* sp.), wheat (*Triticum* sp.), oat (*Avena* sp.), clover (*Trifolium* sp.) and vetches (*Vicia* sp.). Seeds of *Vicia* sp. and *Trifolium* sp. were the most consistent food items, being present in 16 out of 18 crops. The two crops in which they were lacking were collected in April. Seeds of *Pisum* sp. were abundant in December, decreased in April and were absent in the August samples. *Avena* sp. and *Triticum* sp. were recorded only in the April sample.

The presence of *Pisum* sp. in December and January and *Avena* sp. and *Triticum* sp. in April and their absence in the August sample was due to their seasonal availability in the study area. The vetches (*Vicia* sp.) were common weeds among the agricultural crops.

Grit in the form of small stones was present in all crops.

TABLE 1 – Food of Feral Pigeons shot on agricultural fields near Christchurch

| | | Food items and index of abundance * | | | | |
|---|---|---|---|---|---|---|
| Months | Pigeon No. | *Pisum* sp. | *Triticum* sp. | *Avena* sp. | *Trifolium* sp. | *Vicia* sp. |
| April | 1 | 2 | 3 | 4 | 1 | 1 |
| " | 2 | 2 | 3 | 3 | 1 | 1 |
| " | 3 | 2 | 2 | 4 | 0 | 0 |
| " | 4 | 1 | 3 | 4 | 1 | 1 |
| " | 5 | 2 | 3 | 3 | 0 | 0 |
| " | 6 | 1 | 2 | 4 | 1 | 1 |
| " | 7 | 2 | 3 | 3 | 1 | 1 |
| " | 8 | 2 | 3 | 4 | 1 | 1 |
| August | 9 | 0 | 0 | 0 | 4 | 3 |
| " | 10 | 0 | 0 | 0 | 4 | 4 |
| " | 11 | 0 | 0 | 0 | 3 | 4 |
| " | 12 | 0 | 0 | 0 | 4 | 4 |
| December | 13 | 4 | 0 | 0 | 2 | 2 |
| " | 14 | 4 | 0 | 0 | 2 | 2 |
| " | 15 | 3 | 0 | 0 | 2 | 3 |
| " | 16 | 4 | 0 | 0 | 1 | 3 |
| " | 17 | 3 | 0 | 0 | 2 | 2 |
| " | 18 | 4 | 0 | 0 | 1 | 3 |

* 0 = Absent, 1 = Traces, 2 = Some, 3 = Several, 4 = Many

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