BUMBLE BEE SPECIES PRESENT IN THE SOUTH ISLAND OF NEW ZEALAND

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Summary

On the basis of collections made in 155 different localities throughout the South Island of New Zealand it is established that four species: Bombus terrestris (L.), B. ruderatus (Fab.), B. subterraneus (L.) subsp. latreillellus (Kirby), and B. hortorum (L.) occur there.

B. terrestris and B. ruderatus are present throughout the island, while B. subterraneus subsp. latreillellus and B. hortorum appear to be confined to the eastern side of the main divide south of Balclutha in north Canterbury.

After a number of unsuccessful attempts from 1870 onwards, bumble bees were finally established in New Zealand in 1885. From two consignments from England in January and February of that year, the Canterbury Acclimatisation Society liberated 93 queen bumble bees near Christchurch. They rapidly spread throughout the island and by 1890 had reached Invercargill. No record was kept of the species liberated; hence in 1895 when the society sought advice on further importations they deemed it necessary to send specimens to Miss E. A. Ormerod (formerly Entomologist to the Royal Agricultural Society of England) for identification. She reported that Bombus terrestris and B. subterraneus were present. Sladen (1912) states that up till that time British authors applied the name subterraneus to the species now known as ruderatus. A perusal of Miss Ormerod's letter (by courtesy of the Secretary of the North Canterbury Acclimatisation Society) shows that she was in fact referring to ruderatus. She says "among your specimens I have found a queen and three workers, ... entirely black except the apex of the abdomen which is fuscous." Only ruderatus in the whole genus Bombus exhibits this degree of blackness. Of the striped specimens she states definitely that they are sufficiently different from B. hortorum to say that they were not that species and her description of them does not tally with that of B. subterraneus subsp. latreillellus. B. terrestris and B. ruderatus then were definitely established in New Zealand by 1895. The next attempt at importation of bumble bees was made by the Canterbury Agricultural and Pastoral Association in 1906, when from three consignments received from England in February, November, and December, 143 queens were liberated. Hopkins (1914) quotes two letters written to him by Mr. O. B. Pemberton, the secretary of the association. One written in January 1913 referring to the species imported by the association in 1906 in which he states, "The queens we got out were B. lapidarius and B. hortorum", and in the second letter written in August 1913 he states, "Re species imported (by the Canterbury Agricultural and Pastoral Association) (1) B. lapidarius; (2) B. hortorum; (3) B. hortorum (variety harrisellus); (4) B. hortorum (variety subterraneus); (5) B. derhamellus. The majority of the bees which arrived alive were species 1, 2, and 3."

*Both harrisellus and subterraneus as here used are synonyms of ruderatus.
Hopkins (1914) attempted to discover which species had successfully established here and believed that the following species occurred:—

*B. terrestris* (L.), *B. ruderatus* (Fab.), *B. hortorum* (L.), and *B. lucorum* (L.) (probably). Next, McBurney (1941), on the basis of a year's study carried out at Lincoln, considered that all four species mentioned by Hopkins (1914) were present in Canterbury. He found *B. subterraneus* (L.) subsp. *latreillei* (Kirby) there also. Dumbleton (1949) carried out a survey from Nelson to south Canterbury in February–March 1947 and found only *B. terrestris*, *B. ruderatus*, and *B. subterraneus* subsp. *latreillei*, as did Montgomery (1951) in a survey of the whole of the South Island in 1949–50 (both authors had their specimens determined by Professor O. W. Richards, London). Dumbleton (1949) states, "*B. hortorum* was not present, and as the collection covered a wide area, is presumably not present in the country. Since all the specimens of the presumed *terrestris* were not submitted for determination there remains a doubt as to whether *lucorum* is present or not."

The present survey was started in 1953 and has been continued annually. Collections have been made in 155 different localities throughout the South Island.

*B. terrestris* and *B. ruderatus* were found to be present throughout the island.

*B. subterraneus* subsp. *latreillei* was taken at Cromwell only, but McBurney (1941) found it at Lincoln, Montgomery (on file Entomology Division, Department of Scientific and Industrial Research) records it from Clydevale, and Dumbleton (1949) records it from Fairlie, Hakataramea, and between Surrey Hills and Mayfield.

*B. hortorum* (identification confirmed by Professor O. W. Richards, London) was found to be present not only in Canterbury but in Otago and Southland also. This species was recorded from 37 different localities. Further work will be necessary to delimit exactly its range, but so far it has not been found west of the eastern limit of the main divide (then Mount) or further north than Balcarrin in Canterbury. Although the bulk of the present collections, especially of *B. ruderatus* the most nearly related species, comes from Nelson, Marlborough, and Westland, no specimens of *B. hortorum* have been taken in these districts; it seems likely therefore that it is in fact confined to Canterbury, Otago, and Southland.

*B. lucorum* was not found, although special visits were made to localities where McBurney (1941) stated that this species occurred. Since only one specimen labelled *B. lucorum* by McBurney remains at Lincoln College and this is definitely *B. terrestris*, it seems likely that his claim for the presence of *B. lucorum* was based on misidentification. Neither did Hopkins (1914) claim to have found this species for he states, "... it being so very like its near relative *B. terrestris*, I think it more than likely that we have it." This species therefore has never been taken in New Zealand and identified beyond doubt.

*B. lapidarius* apparently failed to establish here. Sladen (1912) says Dr. Hilgendorf informed him that "up to November 1911 no specimens have been seen flying." Mr. O. B. Pemberton writing to
Hopkins in 1913 states, "I have not heard of any of the B. lapidarius being seen so I presume they did not live." None have been recorded from New Zealand.

B. derhamellus was also mentioned by Mr. Pemberton but he implies that few if any were liberated. None have been recorded from New Zealand.

Both these species are conspicuous insects, black with the last three abdominal segments of the abdomen red, quite distinct from the familiar yellow-striped bumble bees whose terminal abdominal segments are white or fawn. The possibility that such conspicuous insects could have remained unnoticed for the past 50 years is so remote that it can be safely assumed they are not present.

It is now established from the information gained on the present survey that, of the seven species, either claimed or thought to have been liberated in New Zealand, four species—B. terestris, B. ruderatus, B. hortorum, and B. subterraneus subsp. latreillellus—occur at present in the South Island. B. lucorum, B. lapidarius, and B. derhamellus were not found. B. lapidarius and B. derhamellus have never been found, but McBurney (1941) claimed to have found B. lucorum although there is doubt about his identification of the species. There still remains, therefore, a remote possibility that B. lucorum may be found, but not B. lapidarius or B. derhamellus.

Contrary to the findings of the two previous surveys (Dumbleton in 1947 and Montgomery in 1949-50) B. hortorum was shown to be present and relatively numerous throughout its range. This species is a long-tongued bumble bee, particularly desirable as a pollinator of red clover. Each time it has been suggested that new species should be introduced in order to increase pollination and thus seed set in red clover, B. hortorum has been high on the priority list. It is shown now that this species no longer needs to be considered in this respect for it is here already.

References


Appendix

The following key and diagram (after Dumbleton (1949) but altered and added to) give the salient differences between the queens of the four species of bumble bees now known to be present in the South Island of New Zealand. The workers do not show the characters so clearly. In cases of doubt the queens may be identified by the structure of the inner projection of the sting sheath and the males by the structure of their genitalia. These structures are figured by Richards, O. W. 1927: The Specific Characters of the British Humble bees (Hymenoptera). *Trans Ent. Soc. Lond.* 75: 233-68.

**Key to Bombus Species in New Zealand**

1. A single (anterior) yellow band on the thorax, a prominent broad yellow band on the second abdominal segment, posterior third of 4th and the whole of 5th abdominal segment tawny, short tongued  
   Two yellow bands (anterior and posterior) present on the thorax, long tongued  
   **B. terrestris**

2. Anterior and posterior yellow bands on thorax of equal width, yellow colouration on abdomen confined to 1st abdominal segment and most strongly developed laterally, always interrupted in the middle by more or less black, the posterior margin of 3rd abdominal segment white laterally, 4th and 5th abdominal segments white  
   • (All transitional stages occur between completely black form and normally banded forms.)
   Posterior thoracic yellow band narrower than anterior one, yellow band on abdomen occupying the whole of 1st abdominal segment and extending onto anterior margin of 2nd abdominal segment, bands bright lemon yellow, posterior margin of 3rd abdominal segment white laterally, 4th and 5th abdominal segments white, coat uneven and longer than in *ruderatus*, head more elongate than other species, nearly twice as long as it is broad  
   **B. hortorum**

Posterior thoracic yellow band narrow, half the width of anterior, anterior yellow band invaded in the middle of the hind margin by a darker area, yellow colour on abdomen, confined to lateral margins of 1st and posterior margins of 2nd and 3rd abdominal segments, 4th and 5th abdominal segments white, coat short—very short on basal segments of abdomen, head shorter than *ruderatus*  

**B. subterraneus subsp. latreillei**