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The bumblebees of Gansu, Northwest China (Hymenoptera, Apidae)

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Abstract

Bumblebees are important pollinators for agricultural and natural ecosystems. Gansu province, China, is located in part of the greatest hotspot of bumblebee diversity worldwide, a region of very varied geomorphology and vegetation. We report on a recent field survey of the bumblebees of Gansu made between 2007–2010. A sample of 5941 bumblebee specimens from Gansu are assigned to 49 species. Two older specimens held in London add two more species to this list. Together, these 51 species belong to 10 subgenera of the genus *Bombus*, and 10 species (nearly one fifth of the fauna) are recorded for the first time from Gansu: *B. asiaticus*, *B. bicoloratus*, *B. chinensis*, *B. coreanus*, *B. deuteronymus*, *B. expolitus*, *B. festivus*, *B. grahami*, *B. hypocrita*, and *B. opulentus*. None of the species is endemic to Gansu. We provide distribution maps and describe variation in local species richness and abundance and list the food plants used in Gansu. The highest bumblebee richness for the province is in the southeastern mountains and Qinghai-Tibetan plateau in the southwest. We describe how the fauna of Gansu is transitional between the fauna of North China and the fauna of the more southern Sichuan-Himalayan region.

Key words: *Bombus*, fauna, biogeography, distribution, abundance, pollinator

Introduction

Bumblebees are important pollinators in agricultural and natural ecosystems (Velthuis & van Doorn, 2006; Huang *et al.*, 2007; Goulson *et al.*, 2008; Xie *et al.*, 2008; Grixti *et al.*, 2009). The mountains around the edges of the Qinghai-Tibetan plateau form the greatest hotspot of bumblebee diversity in the world (Williams, 1998). The problem is that the bumblebee fauna in the region has been insufficiently studied, so there is a serious taxonomic impediment to recognising which species occur where. A major part of this problem is that the different species often mimic one another closely in colour pattern (Williams, 2007), while some are very variable in colour pattern within species (Williams *et al.*, 2009).

Gansu province is located at the northeastern edge of the Qinghai-Tibetan plateau, in a transition zone between the Neimenggu (Inner Mongolian) plateau, the Qinghai-Tibetan plateau, and the Loess plateau (Fig. 1). There is a broad diversity of habitats in Gansu, including the southern mountains with a subtropical climate, the southeastern mountains with a temperate humid climate, the Qinghai-Tibetan plateau in the southwest with a high elevation humid cold climate, the eastern loess plateau with a temperate sub-humid to semi-arid climate, the northern and