

THE STUDY OF BEE-COLLECTED POLLEN LOADS IN NANTOU, TAIWAN⁽³⁾

SU-HWA LIN⁽¹⁾, SHU-YOUNG CHANG⁽²⁾ and SU-HWA CHEN⁽¹⁾⁽⁴⁾

Abstract: This study analyzes the content of the pollen loads collected by honeybees in the town of Ming-Chien in Nantou County, located in the middle of Taiwan, during the one year period of 1991 and investigates the pollen gathering activity of *Apis mellifera*. This study identified 106 pollen taxa belonging to 56 angiosperm families, one *Lycopodium* spore and one fungus spore. Among the pollen identified, 12 species belong to Compositae, 9 to Leguminosae, 7 to Euphorbiaceae, 5 to Solanaceae and 4 to Gramineae. Pollen of *Camellia sinensis* occupies the highest frequency (28.69%), followed by the *Ageratum conyzoides* and *A. houstonianum* (18.95%), *Mimosa pudica* (6.85%), *Oryza sativa* (5.98%), *Citrus grandis* (5.80%) and *Humulus scandens* (4.72%). Honeybee collects pollen from both entomophilous and anemophilous plants. Cultivated plants and wild plants are both equally important pollen sources. Factors that affect pollen gathering activity of bees include the morphology and color of the flower, time of anthesis, distribution of plants, temperature and humidity. Most of the pollen source plants have the following features: yellow or white flowers with opened petals and exposed anther, noon-time anthesis and location close to the hive.

INTRODUCTION

The pollen grain is a male gametophyte of seed plant. Different plant species have different chemical compositions in pollen grains. A mature pollen grain is comprised of 3-15% water, 10-40% protein and 1-50% carbohydrates (Barbier, 1970). Also present are lipids, vitamins and minerals. Nectar is an important source of carbohydrate needed in the honeybee's growth and development, while pollen is its main protein source (Paul *et al.*, 1987). When the honeybee collects pollen, it molds it into a pollen load, places it in the "pollen basket" of its hind legs and carries it back to the hive to be stored for future use (Hodges, 1952).

Bonnier (1906, in Sharma, 1970) was the first to observe a fidelity tendency when the honeybee collected pollen grains. Others after him have subsequently come to the same conclusion (Betts, 1935; Vansell & Griggs, 1952; Eckert & Shaw, 1960). They found that over 90% of the pollen loads brought back to the hive were uniflora while only 2%-7% were multiflora.

The honeybee is known to collect pollen of entomophilous as well as anemophilous plants (Parker, 1926; Chaturvedi, 1973; Wills *et al.*, 1990). Analyzing the pollen species in a pollen load reveals information about the pollen source plants used by the honeybee, the preference for each of these sources, and the biological and environmental

(1) 林淑華, 陳淑華。Department of Botany, National Taiwan University, Taiwan, ROC.

(2) 張世揚。Apiculture Section Director, Taiwan Apicultural and Sericultural Experiment Station.

(3) This research is based partly on a M. S. thesis of the first author to the Research Institute of Botany, NTU.

(4) To whom correspondence should be addressed.