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龙须藤传粉生态学的初步研究

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摘要 龙须藤(*Bauhinia championii*)的传粉者包括数种蜂类及蝴蝶类昆虫。龙须藤的柱头对花粉的接收高峰大体上与传粉昆虫的活动高峰相吻合。

关键词 龙须藤；传粉；昆虫

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A PRELIMINARY STUDY ON THE POLLINATION ECOLOGY OF *BAUHINIA CHAMPIONII* (BENTH.) BENTH. (LEGUMINOSAE) IN HONK KONG

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Abstract Pollination ecology of a liana species, *Bauhinia championii* (Benth.) Benth., was investigated in Hong Kong in August 1997. It turned out that the flowers of this species were pollinated/visited by several species of wasps, bees and butterflies. The peaks of stigma receptivity roughly concurred with the peaks of insect activities.

Key words *Bauhinia championii*; Pollination; Insects

1 Introduction

Bauhinia L. is a pantropical genus of about 300 species of trees, shrubs, and lianas with very diverse floral morphology. Interests in the taxonomy of the genus has been revived in recent years[1－4]. But the study of pollination ecology of the genus is limited to the neotropical species so far. Heithaus et al[5] studied the pollination of *B. pauletia* and concluded that it is pollinated by bats. Ramirez et al[6] studied the pollination of another species of section *Pauletia* and also found it to be a chiropterophilous plant. Hokche & Ramirez[7] studied the pollination ecology of seven species of New World *Bauhinia* and concluded that the species of section *Tylotaea* are visited by bees, wasps, butterflies and hummingbirds; on the contrary, flowers of species of section *Pauletia* are nocturnal and bat-pollinated, while *B. aculeata* is intermediate between the two sections in pollination behaviour.

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Bauhinia championii (Benth.) Benth. is a species widely distributed in the warmer part of China from Hubei in the north and covers all the provinces south of the Changjiang River (Yangtsi River), and reaches northern Vietnam in the south[8]. It is usually found in disturbed habitats or on forest margins. In Hong Kong, it is found in the New Territories, on Hong Kong Island, Lantou Island and some smaller islands. It is a liana with elongated racemose inflorescence of ca. 40－100 white flowers. In full bloom the flower has a diameter of 1－1.2 cm. As most species in the section *Phanera*, it has three fertile stamens.

2 Materials and methods

The study site is located on Hong Kong Island, near the campus of the University of Hong Kong at the latitude of 22°16′N and longitude of 114°8′E. The *Bauhinia* population is on the margin of a secondary broad-leaved forest at the side of a highway. Although it is only about 30 m away from a residential building, the presence of it as a natural population is almost certain, because there is no record of cultivation of this species for any purpose in Hong Kong and elsewhere in southern China. And the species is quite often to be encountered in similar habitat elsewhere.

Floral phenology and lifespan for flowers and inflorescences were recorded from five individuals, five inflorescences were recorded for each individual, and five flowers for each inflorescence respectively.

Studies on pollination ecology were carried on from 6th to 12th August, 1997.

Pollinators/flower visitors were caught and identified previous to the observation. On the day of study, observation were taken from 5:30 am to 8:00 pm at intervals of 30 min to 1 h. Insect numbers were recorded in an area of ca. 2 m^2 with about 50 inflorescences (including those with fully developed buds and those full bloom was over).

The receptivity of stigma was tested using 3% hydrogen peroxide[9]. Localization of osmophores was determined by immersing the whole flower in neutral red dye for time interval of 30 s to 2 min[9].

3 Results

Bauhinia championii blooms from July to October, but the peak of flowering is in late August. It takes about a week for a inflorescence with fully developed buds to blossom, although it may take 3－4 weeks for a inflorescence to develop its flower buds. The lifespan (from opening of the petals to losing the stamens and petals) of a single flower is about 4 days.

The floral disc can produce some liquid material which forms small drops and may function as rewards for the pollinators. The floral disc and the sepal margins are stained red in neutral red solution, which means they are the localities of odour glands which attract pollinators.

The receptivity of stigma lasts only one to two days, it reaches the peak at 9:00 am soon after the petals are open, and it lost much of its receptivity on the next morning, and lost all the receptivity on the third day of anthesis. It seems the receptivity is variable in a day with the first peak appearing at around 9:00 am and the second peak at about 3:00 pm as indicated by quantity of air bubbles produced in hydrogen peroxide, which roughly concur with the peaks of insect activity.

Seven species of Insectae were identified and recorded from the flowers of *Bauhinia championii*. They are: *Sphex* sp. (Sphecidae); *Tiphia* sp. (Tiphiidae); *Vespa velutina nigrithorax* (Vespidae); *Polistes rothneyi grahami* (Polistidae); *Apis* sp. (Apidae); *Euploea idamus* L. (Papilionae); and *E. core* Cramer (Papilionae). The number of insects in sight on each time interval are illustrated in Figure 1.

The insect activities form three peaks in the day. The first peak appears at around 7:30 am, while the second and the last peaks appear at around 11:00 am and 3:00 pm, respectively. The first peak is characterized by the presence of butterflies, while the second

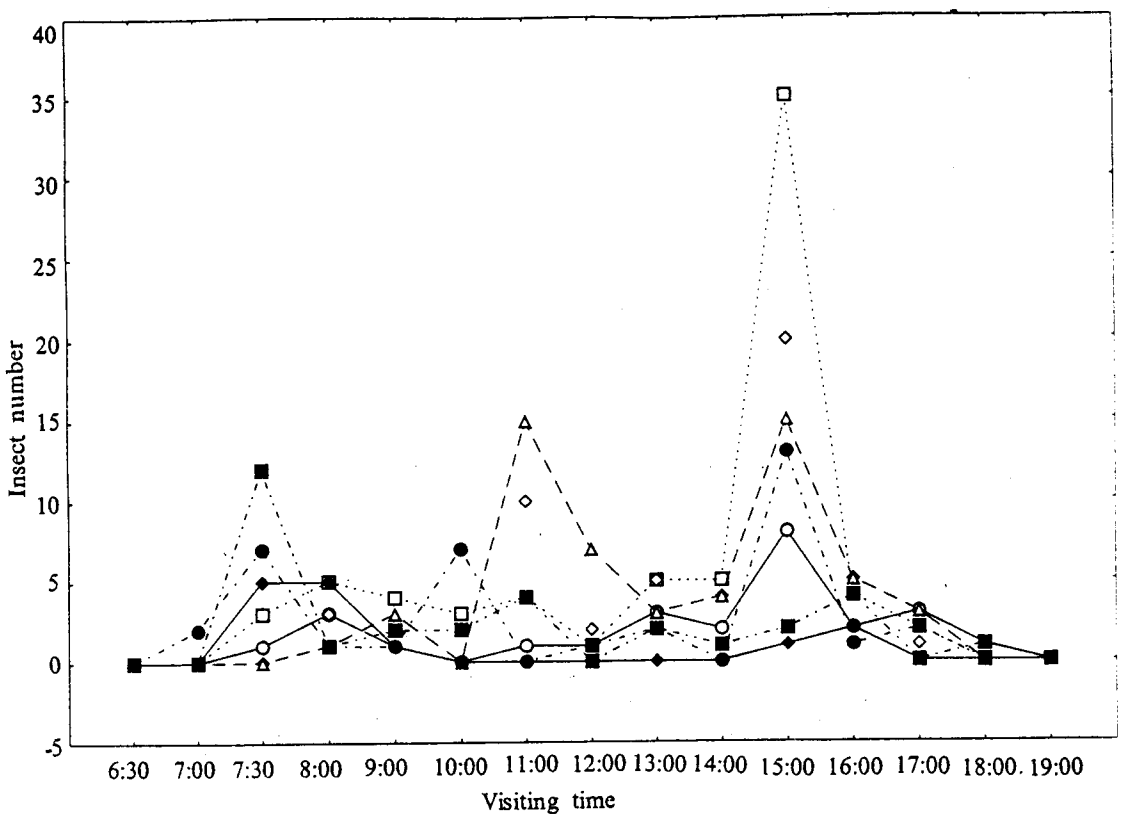

Fig. 1 Activities of pollinators/flower visitors of *B. championii* during the day
—⊖—*Sphex* sp. - -⊡-*Tiphia* sp. - -◇- -*Vespa velutina nigrithorax* —△—*Polistes rothneyi grahami;*
- -●- - *Apis* sp. - ■ - *Euploea idamus;* —◆— *Euploea core*

peak is predominantly represented by wasps. The third peak is characterized by the presence of all the insects.

4 Discussion

Bauhinia championii is pollinated /visited by bees, wasps and butterflies, among which the species of Apidae and Vespidae played an important role in pollination/flower visiting, which is similar to liana species from the New World.

Frankie et al[10] indicated that small bee pollinated flowers are generally small, white to cream-coloured, and radially symmetrical, while large bee pollinated flowers are relatively larger, generally colourful, and usually lasted for one day. It is thus reasonable to conclude that *Apis* sp. played an important role in the pollination of *B. championii* since the flower of this species is typical of the small bee pollinated flowers.

Although several species were recorded visiting the flower of *B. championii*, further studies are needed to differentiate flower pollinators and flower visitors among them. As the present study was carried out just in a single locality, it is necessary to study in other localities if a more robust conclusion is to be drawn.

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