

## A PRELIMINARY STUDY ON DIVERSITY AND ABUNDANCE OF INSECT POLLINATORS OF *PAULOWNIA* SPECIES

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### Abstract

A study was conducted in the Pakistan Forest Institute, Peshawar to record the insect pollinators and their abundance on the inflorescence of *Paulownia* during spring season. The insect species, belonging to 6 families of order Hymenoptera and order Diptera, were recorded on the blossoms of *Paulownia* in four time periods, 8-9 a.m, 11-12 a.m, 2-3 p.m and 5-6 p.m. *Xylocopa fenestrata* Fabr., family Xylcopidae, order Hymenoptera spent maximum duration on the blossoms. Among honeybees, *Apis dorsata*, family Apidae, order Hymenoptera was found more abundantly on the blossoms in all the time periods. A maximum population of all honeybees species was recorded at the first observation period.

### Introduction

A substantial proportion of the world's crops rely on insect pollination. More than a third of all human food is dependent upon insect pollination (Ingram, Nabhan & Buchmann, 1996). Animals provide pollination service for over 75% of all the world's staple crop and for 90% of all the world's flowering plants (Buchmann and Nabhan, 1996). In USA the economic benefit of pollinators has been studied which varies from \$1.6 billion to \$ 40 billion per year (Robinson et al. 1989). Gill (1991) estimated the value of pollinators to be A\$ 156 million for Australia, while Winston and Scott (1984) put the value for Canada at C\$ 1.2 billion. The value of insect pollination upon which man can exert much influence is not limited to the cultivated crops. Baker and Hurd (1968) also recognized this important ecological relationship and stated that insect pollination was still extremely important in grasslands, temperate forests and deserts. The role of pollination in forest trees has not been widely studied.

*Paulownia* is a fast growing tree which is extensively cultivated and inter-cropped in various agro forestry systems in China. This multipurpose tree is of significant importance for its timber which is used as furniture, plywood, musical instruments, paper pulp etc. Its foliage is lopped for fodder, flower yield honey and its fruit as well as leaves are utilized in medicine (Anon., 1986). It also occurs naturally in China, Vietnam and Laos. Four species viz. *Paulownia catalpifolia*, *P. tomentosa*, *P. fortunei* and *P. elongata* were introduced in the Pakistan Forest Institute, Peshawar in March 2005. These were acclimatized successfully and today there are 1600 trees of these species.

In Peshawar *Paulownia* blooms during March/ April with cream coloured funnel shaped flowers. These flowers secrete large quantity of nectar at the base of their cup shaped calyx, which attracts numerous species of insects. A study was carried out in the Pakistan Forest Institute, Peshawar to record diversity and abundance of insect pollinators and their peak foraging period. This is first record of insect pollinators of

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*Paulownia* in Pakistan; therefore this study will be very useful for ecologists, environmentalists, foresters and beekeepers.

### Material and Methods

The study was conducted on pollinators of *Paulownia* at the Pakistan Forest Institute, Peshawar during spring season. A sweep net of 30 cm radius was used to collect the pollinating insects at four different times i.e. 8-9 a.m, 11-12a.m, 2-3 p.m and 5-6 p.m. Randomly selected fifty sweeps were taken in one week and 200 sweeps in one month to check the pollinators. The collected insect specimens were pinned, labeled and preserved in the collection boxes. The smaller insects were mounted on card points, labeled and preserved. Data were recorded on pollinators belonging to different insect orders.

### Results and Discussion

The following insects were recorded pollinating the flowers of *Paulownia*.

Table 1. Insect pollinators of *Paulownia*

S. No	Insect speices	Family	Order
1	<i>Apis dorsata</i> Fabr.	Apidae	Hymenoptera
2	<i>Apis mellifera</i> Linn.	Apidae	Hymenoptera
3	<i>Apis cerana</i> Fabr.	Apidae	Hymenoptera
4	<i>Apis florum</i> Fabr.	Apidae	Hymenoptera
5	<i>Bombus haemorrhoidalis</i> Smith	Bombidae	Hymenoptera
6	<i>Xylocopa fenestrata</i> Fabr.	Xylocopidae	Hymenoptera
7	<i>Syrphus latifasciatus</i> Maeq.	Syrphidae	Diptera
8	<i>Syrphus balteatus</i> De Geer	Syrphidae	Diptera
9	<i>Calliphora</i> sp	Calliphoridae	Diptera
10	<i>Sarcophaga</i> sp	Sarcophagidae	Diptera

The table reveals that 10 insect species, belonging to 6 families of order Hymenoptera and Diptera, visited the inflorescence of *Paulownia*.

It was observed during the study that *Xylocopa fenestrata* Fabr. behaved aggressively and prevented the members of family Bombidae from collecting nectar from the blossoms. More over it spent maximum duration on *Paulownia* blossoms as compared to the members of all other families.

Four honey bee species were found abundantly collecting nectar from the flowers throughout the day. Their abundance in 4 visiting period is given in the following figure.

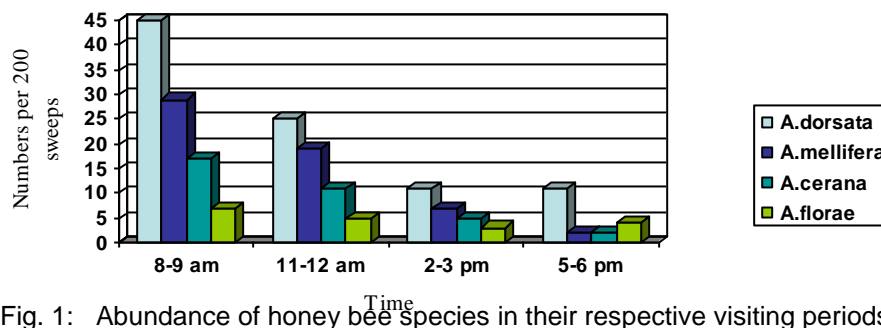


Fig. 1: Abundance of honey bee species in their respective visiting periods

The figure clearly indicates that among the visiting honeybee species number of *Apis dorsata* is higher than the other species in the four visiting periods, probably due to the presence of numerous colonies of this species in the area. The population of *Apis mellifera* and *Apis cerana* is less as compared to *Apis dorsata*, whereas the population of *Apis floreae* is negligible at all time periods. The figure also shows that the time from 08-09 hours is the peak periods for the foraging honeybees.

## References

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