



## THE CACAO FLOWER VISITOR INSECTS DIVERSITY AND THEIR POTENTIALITIES AS POLLINATORS

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### ABSTRACT

The cacao flower is beautiful, but small in size, unique in another way, and it has no smell. There a reason that bees do not attracted for pollinating the cacao flowers. Study on the diversities of flower visitor insects and their potentialities as pollinators was conducted on smallholder cacao plantations at Gumawang-Puthat village, Pathuksubdistrict of Gunungkidul in October 2012 to January 2013. First, field observations on 10 open flowers per plant and 10 plants per period. Second, we placed yellow paper sticky-traps on flowering sections of cacao trunks, collecting insects that became entangled. The results showed that eight species of insects visited cacao flowers. The largest populations occur in the rainy season. Aphid *Toxopteraaurantii*, mealy bug *Planococcuslilacinus*, black ants (*Dolichoderusbituberculatus*), *Crematogaster* ants and *ngangrang* (*Anoplolepislongipes*), were common cacao flower visitor, but not all role as pollinators. Aphid was potential as pollinator for self compatible clones. Mealy bug infested as pest on cushion and stalk of flower. Black ants, *Crematogaster* ants, and *ngangrang* symbionts of aphids and mealy bug and also no act as pollinators. *Drosophila* flies as flower visitors, but only outside sepal and not into the petal sac and style. Only midges *Cecidomyiid* and *Ceratopogonid* were potential as pollinators, due to the body size, character of morphology and activity in the flower were proportionate as pollinator.

Key words: Insect diversity, visitor and pollinator, cacao

### INTRODUCTION

Pollination is a free ecological service. In order to sustain pollinator services associated with agricultural ecosystems, far more understanding is needed of the multiple goods and services provided by pollinator diversity. Cacao (*Theobromacacao* L.) is a cauliflorous tree and produces a surplus flowers (Glendenning, 1972), of which generally no more than 5% develop into mature fruits (Entwistle, 1972; Young, 1994). The cacao flower is strictly entomophilous (Fimprong, 2011), but small in size, unique in another way, and it has no smell. There a reason that bees do not attracted for pollinating the cacao flowers.

The objectives of this study were to determine the diversities of flower visitor insects and their potentialities as pollinators on smallholder cacao plantations. It is necessary to identify adaptive management practices that minimize negative impacts by humans on pollinators, promote the conservation and diversity of native pollinators, and conserve and restore natural areas necessary to optimize pollinator services in cacao plantation.

### MATERIALS AND METHODS

Research was conducted on smallholder cacao plantations at Gumawang-Puthat village, Pathuksubdistrict of Gunungkidul in October 2012 to January 2013. First, field observations on 10 open flowers per plant and 10 plants per period. Second, we placed yellow paper sticky-traps on flowering sections of cacao trunks, collecting insects that became entangled.

## RESULTS AND DISCUSSION

The results showed that eight species of insects visited cacao flowers. The insect populations were lowly at October - November. The largest populations occur in the early rainy season on January. Aphids *Toxoptera aurantii*, mealybugs *Planococcus lilacinus*, black ants (*Dolichoderus bituberculatus*), Crematogaster ants and ngangrang (*Anoplolepis longipes*), were common cacao flower visitor, but not all role as pollinators.

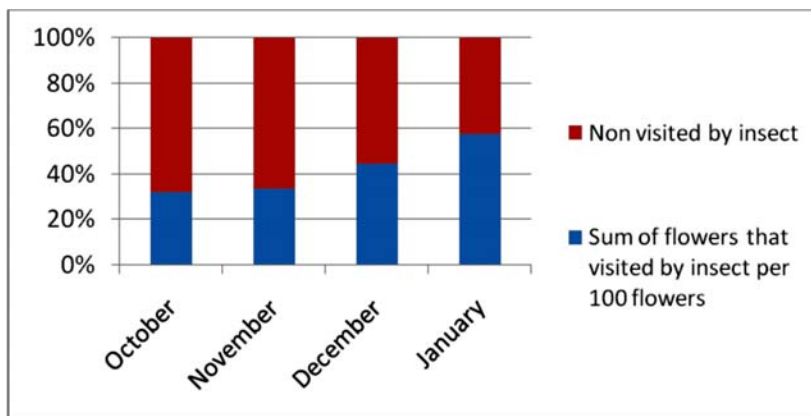


Figure 1. Sum of flower visited by insect per 100 opened flowers.

Aphid colonies usually found feeding on underside of young leaves, on succulent stem of chupons and on the stalk of flowers. The wingless form usually predominates. It was potential as pollinator for self compatible clones only due to the sedentary behavior of aphids. According to Susilo (2006), that most cacao varieties are self incompatible, and are thus dependent on cross-pollination.

Mealybugs may be found infested as pest on unripe pods, on the angles of newer branches, flower cushion and flower stalks. They are usually considered to be relatively immobile and not role as pollinator. Black ants (*D. bituberculatus*), *Crematogaster* ants, and ngangrangas symbionts of aphids and mealybugs and also no act as pollinators. Drosophilid flies as flower visitors, but only outside sepal and not into the petal sac and style.

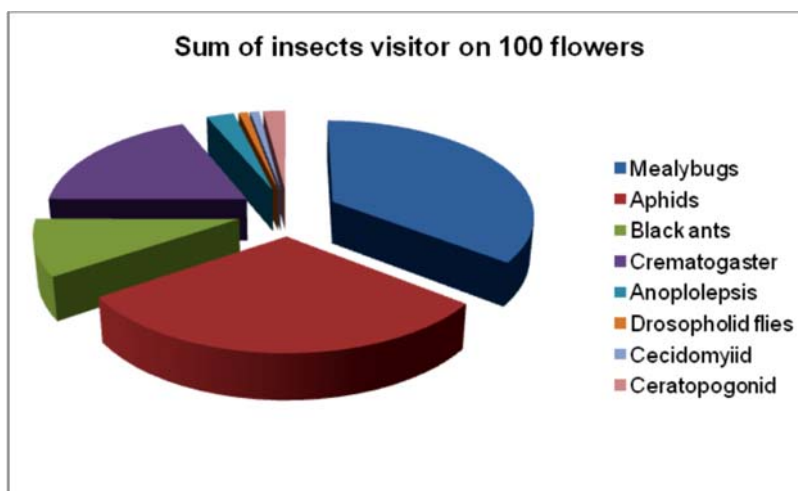


Figure 2. Sum of insects visitor on 100 opened flowers

The flying insect midges Cecidomyiidae and Ceratopogonidae were potential as pollinators, due to the body size, character of morphology and activity in the flower were proportionate as pollinator, but flower-visiting and pollinating species of ceratopogonid and cecidomyiid are not identified to the species level.

## CONCLUSION

The results showed that eight species of insects visited cacao flowers are aphid *Toxoptera aurantii*, mealy bug *Planococcus lilacinus*, black ants (*Dolichoderus bituberculatus*), Crematogaster ants and ngangrang (*Anoplolepis longipes*), drosophilid flies, but only midges cecidomyiid and ceratopogonid were potential as economic pollinators.

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