RUMPHIUS PATTIMURA BIOLOGICAL JOURNAL
2020, 2 (2): 56-59
E-ISSN : 2684-804X

DIFFERENCES IN METAMORPHOSIS OF HONEY BEES Apis mellifera IN ROMANG ISLAND

Gratia Mayaut[1], Maria Nindatu[1*], Rahel Hendrijete de Kock[1]

[1]Department of Biology, Universitas Pattimura. Jl. Ir. M. Putuhena, Ambon 97233, Indonesia

**Corresponding Author*: marianindatu@yahoo.com

Received: 2 April 2020 Accepted: 12 July 2020 Published: 25 September 2020

ABSTRACT

Honey bees *(Apis mellifera)* on Romang Island are scattered at several different points with abundant populations. The research location was carried out at two points, namely the first location is near residential areas, the height above sea level is approximately 10 meters, tends to be more crowded while the second location is far from settlements, the height above sea level is approximately 350 meters. The variables measured were the different metamorphosis phases of egg, larva, pupa, adult; temperature, food sources such as flowering plants, forest plants or fruit trees around the site. The difference in the time of metamorphosis of honey bees in the first location, seven days for laying eggs, five days for larvae, nine days for pupae, and seven days for adults while in the second location is six days for eggs, five days for larvae, ten days for pupae, and three days for adults. So the metamorphosis of honey bees in a quiet location and away from settlements shows a shorter duration compared to locations near settlements.

Keywords: *metamorphosis, honey, bee*

To cite this article:
Mayaut, G., Nindatu, M., de Kock, R.H. 2020. Differences in metamorphosis of honey bees apis mellifera in Romang island. *Rumphius Pattimura Biological Journal*.2 (2): 56-59. DOI https://doi.org/10.30598/rumphiusv2i2p056-059

INTRODUCTION

There are about 20,000 types of honey bees in the world that belong to the super family Apoidae, one of which is Apidae. Honey bees belong to the genus Apis and one of its species is Apis mellifera. Apis mellifera is a superior type of honey bee from Europe which has been widely cultivated in Indonesia since 1841 by Rijkeuns, a Dutchman, and in 1971 Apis mellifera was imported from Australia. In beekeeping, breeders make stups (honeycomb boxes), nest foundations, hive comb frames, graze bee colonies, make artificial feed during the rainy season, produce queen bees, control pests and diseases and process honey harvest. Honey production in Apis mellifera bee colonies will be obtained during the dry season and breeders will bring their bee colonies to areas of flowering plants so that the bee colonies get food in the form of nectar and flower pollen (Budiwijono, 2012). Indonesia includes a tropical climate, so it is ideal for breeding and cultivating honey bees, because the average air temperature is 26–35°C (Novita et al, 2013). According to (Novita, 2013), at a temperature of 20°C honey bees begin to be active in obtaining nectar and pollen, but the time needed to obtain nectar and pollen is relatively short, while at a temperature of around 30°C the bees

are very active in searching for nectar or pollen but the time needed is relatively short. to collect it is relatively long. At honey bee grazing areas with different heights are strongly influenced by microclimatic conditions which include temperature, humidity, number of rainy days, rainfall intensity, wind speed and sunlight intensity.

The location preferred by bees is an open place, away from crowds and there are lots of flowers as food. The distance from the location of the farm to the food source is about 0.75 km and the distance to a clean spring of 200-300 m is a condition for good cultivation. Apart from the place, the air must also be cool. The length of time needed by bees to metamorphose varies greatly, depending on the situation and environmental conditions, where the bees are located, including the availability of supporting factors for the survival of the bees (Murtidjo, 1991). Honey bees found on the island of Romang Dusun Oirleli, Southwest Maluku, mostly live freely and wild in nature. The bee colonies build nests on high tree branches, so that predators can't reach them. In addition to free-living bee colonies in nature, in Oirleli Hamlet there are also bee colonies that are cultivated. However, people's understanding, especially honey beekeepers, about the length of time for metamorphosis and natural factors that affect the life cycle of bees, is still lacking, so this research is necessary. Based on this description, it is necessary to conduct research on the differences in the metamorphosis time of the Apis mellifera honey bee on Romang Island, given the lack of knowledge about the environment and natural factors that affect the life cycle of bees, owned by honey beekeepers in the area.

METHOD

This research was conducted in Oirleli Hamlet, Hila Village, Pulau-Selatan District, Southwest Maluku Regency. Maluku Province.

Tools and materials

The equipment used is: stationery, smoker, lever, nails, thermometer, lup, raffia rope, beaker glass, spoon, table, meter roll, camera, good chalk. The materials used are: granulated sugar, water, a beekeeping box complete with frames for queen bees, male stratum bees, and worker bees.

Procedure

Observations were made on the growth of honey bee eggs, and the length of time needed for the bee eggs to become imago. The observation stage is to slowly open the cover of the rearing box, carry out the fumigation process, with the aim of disrupting the detection system by the bee antenna, so that the bees become calmer, and do not attack immediately. Then slowly lift the frame containing the honeycomb with the help of levers. The strata queen bees checked the eggs that were just laid that day in a hexagonal box. Marking is done for every 10 hexagonal boxes containing new eggs, by marking the surface of the hexagonal boxes which are known to contain new eggs, using correct ink. Observation of the metamorphosis cycle of Apis mellifera honey bees.

Data analysis

Research data were analyzed descriptively. In this study, a total of 100 egg samples were observed. Observations were made at two different locations. At each location, observations of honey bee metamorphosis were repeated five times, with the number of egg samples in each repetition being 10 eggs. The length of time for each honey bee metamorphosis phase observed, the total number of five repetitions for each phase, at each observation site, was averaged and used as a comparison.

DISCUSSION RESULT

The two observation sites have a maintenance environment that is far from residential areas, with a height of approximately 350 meters above sea level, indicating a much faster metamorphosis time, when compared to maintenance locations around residential areas, with a height of approximately 10 meters above sea level. The average metamorphosis time for each phase at the two observation locations can be seen in Table 1.

Table 1. Average metamorphosis time for honey bees, for the egg phase

Observation Location	Treatment					Mean (day)
	1	2	3	4	5	
I	6	9	8	4	7	7
II	5	6	5	6	6	6

The metamorphosis of honey bees in the egg phase for the first observation location takes 7 days, and for the second observation location takes 6 days.

Table 2. Average metamorphosis time for honey bees, for the larval phase

Observation location	treatment					Mean (day)
	1	2	3	4	5	
I	4	7	6	4	4	5
II	5	5	4	5	5	5

For the larval phase at both observation locations, the length of time for each repetition can be seen in Table 2, the average time for metamorphosis of the larval phase at the first observation location is 5 days, and at the second observation location it also takes 5 days.

Table 3. Average metamorphosis time for honey bees, for the pupal phase

Observation location	treatment					Mean (day)
	1	2	3	4	5	
I	11	7	10	10	9	9
II	11	10	10	10	9	10

It took 9 days for the larvae at the first observation site to become pupae, while the larvae at the second observation site took 10 days longer.

Table 4. Average metamorphosis time for honey bees, for the imago phase

Observation location	treatment					Mean (day)
	1	2	3	4	5	
I	8	7	4	5	9	7
II	2	3	3	3	3	3

In the imago phase, the pupae at the observation site took 7 days longer than the pupae at the second observation site, which only took 3 days to reach the imago stage. Based on Tables 1 - 4, it can be seen that there are differences in the length of time required for the honey bee metamorphosis process, at the two different observation locations, namely in the egg, pupa and imago phases. The egg phase for the first observation location takes 7 days, and the second observation location takes 6 days. While the larval phase, the first observation location takes 5 days, as well as the development of this phase at the second location. In the pupa phase, the larvae at the first observation site took 9 days to hatch and develop into pupae, while the larvae at the second observation site needed 10 days to become pupae. In the imago phase, the pupae at the first observation location took the longest, namely 7 days, for all the bees to hatch and come out of the hexagonal box; however, the pupae in the second location, only need 3 days faster, to become imago and get out of the hexagonal box.

This is related to the situation and environmental conditions at the second observation location, which is much quieter compared to that at the first observation location, which tends to be more crowded, because it is in a residential area. Apart from that, of course, the environmental temperature and the availability of forage plants are very influential and very supportive for the development of honey bee colonies, especially for prospective new bees. In addition, another thing that needs attention is cleanliness in the beekeeping box. Stup that is not clean, there are cockroaches or ants that interfere with honey bee activities.

CONCLUTION

There is differences in the length of time the metamorphosis of Apis mellifera honey bees was observed at two different observation sites. The location suitable for the growth and development of honey bees is the second observation location. The metamorphosis time for each phase is as follows: 6 days for egg phase, 5 days for larval phase, 10 days for pupa phase, and 3 days for hatching into imago. Honey bee metamorphosis in a more shady and calm location, shows a faster metamorphosis time.

REFERENCES

Budiwijono, T. 2012. Identification of Apis mellifera bee colony productivity through mortality and the extent of pupa eradication in the nest in areas with different altitudes. GAMMA Journal 7(2):111123.

Novita, Saepudin R, Sutriyono. 2013. Morphometric Analysis of Apis cerana Worker Honey Bees Cultivated at Two Different Altitudes. Indonesian Journal of Animal Science 8(1):41-56.

Murtidjo, B. A. 1991. Caring for Honey Bees. Kanisius Publishers. Yogyakarta.

Anonymous, 2000. Cultivating Bees. Rural Community Economic Development Project. National Development Planning Agency.

PPAP. 2003. Honey Bees: How to Raise and Use. Self-Help Spreader. Depok.

Syaifudin S.M and Normagiat S. 2020. Cultivation of Trigona sp. Bee Food. with the Apiculture Agroforestry System in Anjungan Melancar Village, Mempawah Regency. Pangabdhi Scientific Journal 6(1): 17-24.

Pratama I.P.N.E, Watiniasih N.L, Ginantra I.K. 2018. Differences in Altitude on the Types of Pollen Collected by Trigona Bees. Udayana Biology Journal 22(1):42-48.

Sarwono, B. 2001. Honey Bees. PT. Agromedia Pustaka. Jakarta.