

# EFFECTIVITY AND PRODUCT DIVERSIFICATION OF THE BIOLOGICAL POLLINATOR OF *Apis mellifera* L. IN TORAJA COFFEE PLANTATION MONOCULTURE

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## ABSTRACT

Plant flowers and another part of plant in the form of nectar, ekstranutfialnectar, resin and or pollen were abundant and still wasted in the Toraja coffee plantation monoculture *Coffea arabica* Usda. *Apis mellifera* L. honey bees is known as one of biology pollinator is easily manipulated and can convert plant flowers into products of high economic value, but its effectivity as a biology pollinator, unknown in monoculture plantations Toraja coffee *C. arabica* Usda. The purpose of this study was to evaluate the efficacy and product production of biology pollinator of the *A. mellifera* L. honey bees in Toraja coffee monoculture plantations. Analysis of data to distinguish between treatments (pollination with bees) with no bees used testing the equality of two average t-distribution. The results showed that the the management of *A. mellifera* L. honey bees as biology pollinator in Toraja Coffee plantations *C. arabica* Usda , is very effective in improving the quantity amounted to 18.75 % and quality amounted 6.4 % of the coffee fruit production per season. The amount of production diversification of *A. mellifera* L. honey bees in Toraja coffee plantations are 5 types of products with an average amount of production, ie 0.85 kg of honey, bee pollen 0.51 kg, 0.37 kg beeswax, propolis 0.21 kg and 0.15 kg of bee venom per colony per flowers season.

Key words: effectivity, product diversification and biology pollinator.

## INTRODUCTION

Usda monoculture plantation companies have thousands of acres of land, located in Tana Toraja with a distinctive aroma, grows well and is one of Indonesia's mainstay export products of high economic value. *A. mellifera* L. honey bees was known as one of pollinator biology. However, its effectiveness as a biology pollinator is unknown in monoculture plantations Toraja coffee (*C. arabica* Usda).

## RESEARCH METHODS

**The effectivity of *A. mellifera* L. honey bee as a biology pollinator to improving the quality and quantity of the coffee fruit production.**

- (1) Placement of 20 colonies of *A. mellifera* L. honey bees on the sidelines of the coffee plant is in bloom.
- (2) The control plants (without *A. mellifera* L. honey bees) covered with gauze, so it can not be passed by *A. mellifera* L. honey bees and other pollinating insects, but can still be traversed by wind and water with 10 replications.
- (3) Other coffee plants left open, so that bees can pollinate freely.
- (4) Analysis of data to distinguish between treatments (pollination with bees) with no bees used testing the equality of two average t-

distribution. (Sudjana 1984) by the following equation:

$$t = \frac{B}{SB/\sqrt{n}}$$

where:

$\bar{B}$  = difference value of each pair of dat (X1-X2)

SB = standard deviation

- (5) To determine the pollination influence to increase of honey bees production, used the following formula:

$$PL = \frac{L}{T} \times 100\%$$

Where:

PL = the percentage increase in production quantity by the influence of *A. mellifera* L. honeybees

L = the average treatment by *A. mellifera* L. honeybees

T = average treatment without pollination by *A. mellifera* L. honeybees

- (6) Parameters observed:

- The weight of seeds (g)
- The quality of the fruit is harvested (the percentage of defective seeds in 100 seeds).

**Productivity and diversification of production of *A. mellifera* L. honey bees in monocultures Toraja coffee (*Coffea arabica* Usda)**

- (1) To calculate the productivity of *A. mellifera* L honey bees, and diversification of products in Toraja coffee monoculture plantations, the harvesting some bee products for 12 months, namely: honey, beeswax, bee pollen, royal jelly, propolis and bee venom.
- (2) Considering all the honey bees production with digital scales.
- (3) Calculating accretion of coffee fruit production per tree.
- (4) To achieve the optimization of production, then made colonies intensive maintenance.

## RESULTS AND DISCUSSION

### Effectiveness of *A. mellifera* L. honeybees as biology pollinator

#### Quantity

Treatment pollination of *A. mellifera* L. honey bees significantly different compared to control (without pollination) for parameters are wet seed weight. Fig. 1, shows that honey bees *A. mellifera* L. can be used as a pollinator biology to increase the quantity of coffee fruit production in the Toraja Coffee plantations with an average value-added production of 0.5332 g per seed or an increase of 18.75%.

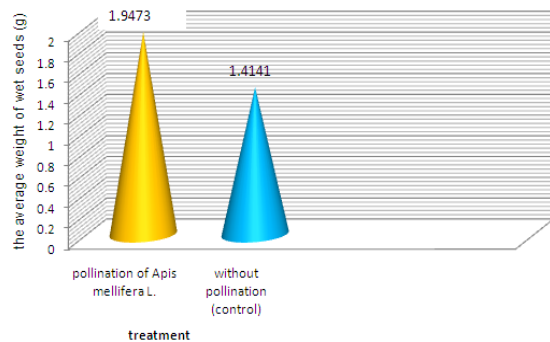


Figure 1. Histogram of average weight seeds (g) of Toraja coffee (*C. arabica* Usda)

#### Quality

Fig.2 indicate that treatment of *A. mellifera* L. honey bees highly significant compared to the control (no pollination) to improve the quality of fruit production in Toraja coffee *Coffea arabica* Usda with the added value of 6.34% quality in terms of the number of seeds in 100 seed defects.

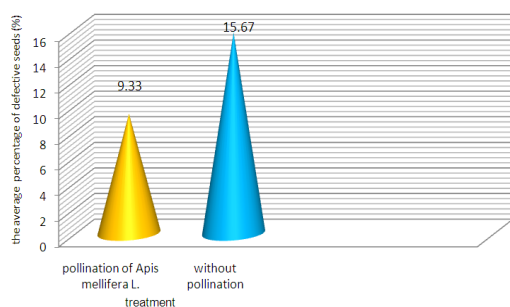


Figure 2. Histogram of average percentage (%) of defective seeds

### Diversification and Productivity of *A. mellifera* L. honeybees in monoculture Toraja Coffee plantation

Diversification of production and productivity of *A. mellifera* L. honey bees in Toraja coffee plantations in the spring can be seen in Fig. 3, which shows that the amount of product diversification of *A. mellifera* L. honey bees in Toraja coffee plantations are 5 types of products with an average amount of production, ie 0.85 kg of honey, bee pollen 0.51 kg, 0.37 kg beeswax, propolis 0.21 kg and 0.15 kg of bee venom per colony per flowers season. Royal jelly while not able to be produced, It is caused by a lack of pollen produced by the coffee fruit that acts as a raw material for making royal jelly.

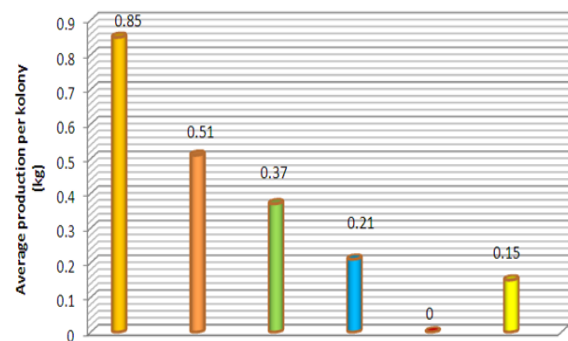


Figure 3. Diversification and productivity of *A. mellifera* L. honey bees in monoculture Toraja coffee in the flower season.

## CONCLUSION

The management of *A. mellifera* L. honey bees as biology pollinator in Toraja Coffee plantations *C. arabica* Usda, is very effective in improving the quantity amounted to 18.75 % and quality amounted 6.4% of the coffee fruit production per season.

The amount of product diversification of *A. mellifera* L. honey bees in Toraja coffee plantations are 5 types of products with an average amount of production, ie 0.85 kg of honey, bee pollen 0.51 kg, 0.37 kg beeswax, propolis 0.21 kg and 0.15 kg of bee venom per colony per flowers season.

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