

## BACKGROUND

Comb foundation is essential in any beekeeping activity since it is the primary requirement for the bees to make additional space for the queen to lay eggs and for the worker bees to store food such as pollen and nectar.

Majority of the beekeepers in the country are using wax comb foundation for the expansion of their honeybee colonies. A single standard hive contains 10 individual frames that need also 10 single sheets of wax comb foundation. Average colony holding of beekeepers in the country is between 3-15 standard colonies.

At present there are about 1,500 beekeepers in the country concentrated in the culture of honeybees (*A. mellifera L.*). These types of honeybees require foundation sheets for colony expansion. It is essential for the honeybees that they should be provided with this type of material to provide enough space since strong colony population is needed during honeyflow, brood rearing and queen rearing seasons.

Problem arises for the beekeepers because they constantly need the supply of wax foundation sheets to replenish turn-out pieces. A build-up foundation sheet called "combs" does not last in more than 3 consecutive years thus requires constant supply of this material. However, local supply is not enough to augment the needs of the beekeepers. The only recourse is to import materials from other countries like Thailand and Canada. Imported wax foundation sheets cost a market price of ₱80.00/piece where most beekeepers could not afford and additional expenses for them because they will have to replace the material given the time frame.

## SYNOPSIS OF THE STUDY

Purpose of the study:

The purpose of the study is to test plastic comb foundation as new material in augmentation to the wax comb foundation usually used by beekeepers in colony expansion

It is hoped that in localizing the use of this material, could address shortage in the supply of wax comb foundation and lessens input of beekeepers in the country more specifically to determine the following:

- Area build-up
- Weight gained
- Net revenue

## METHODOLOGY

**Data Gathered:**

**a. Area build-up**

This was done by measuring the area build-up using the Grid Method (calculated at 25 cells per square inch). The formula is as follows:

$$\text{No. of cells build-up} \times 25 \text{ cells/in.}^2 = \text{total area build-up (in}^2\text{)}$$

**b. Weight gained**

This was done by determining first its initial weight minus the weight obtained after 72 hours, 144 hours, 216 hours, 288 hours, and 360 hours respectively. The formula is as follows:

$$\text{Initial weight} - \text{weight obtained at 3 (...6, 9, 12, 15) hours} = \text{weight gained (g)}$$

Analysis of data obtained was analyzed using the simple Randomized Complete Block Design (RCBD) with t-test for the Analysis of Variance (ANOVA).

## PROBLEMS MET

In the course of the study, the following problems challenged the researcher to push through with this activity in view of searching ways and means of lifting the status of beekeeping industry in the country.

- Unavailability in the supply of plastic comb foundation in the local market.
- Procurement of supplies to be used specifically with plastic comb foundation is delayed due to the absence of suppliers to quote on the requested items.
- Scheduled travel is intensive since the research activity is set-up at Baguio City given the frequency of data gathering.
- Some of the proponent was not a bonded official and thus, not allowed to make advances beyond the travel expenses.

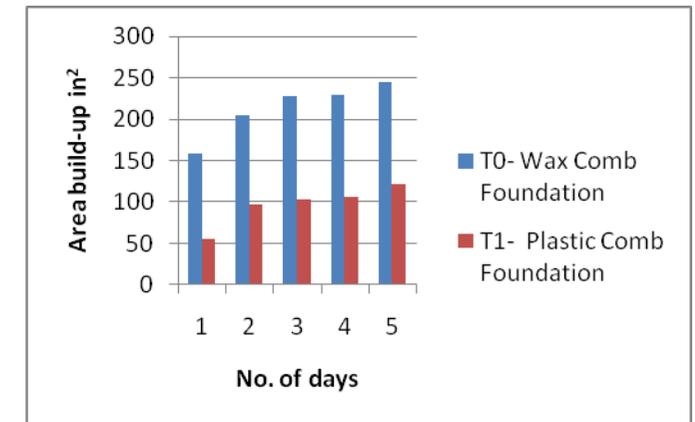
## RESULTS

**Table 1. Summary of research result for the area build-up**

Treatment	Area build-up (in. <sup>2</sup> )					Total area (in <sup>2</sup> )	Mean (in <sup>2</sup> )
	3 days	6 days	9 days	12 days	15 days		
T0- Wax comb foundation	158.66	46.34	23.33	1.12	15.78	245.23	49.05
T1- Plastic Comb foundation	55.45	40.72	7.11	3.38	14.22	120.88	24.18

\*\* Not significant at 0.05 level of significance

**Graphical presentation on area build-up**



**Table 2. Summary of research result for the weight gained.**

Treatment	Weight(g)					Total Wt.(g)	Mean
	3days	6 days	9 days	12days	15days		
T0-Waxcomb foundation	96.55	341.78	310.11	305.11	183.00	1,236.55	247.31
T1- Plastic Comb foundation	15.00	89.00	149.45	238.67	77.56	569.68	113.94

\*Significant at 0.05 level of significance

### Graphical presentation on weight gained

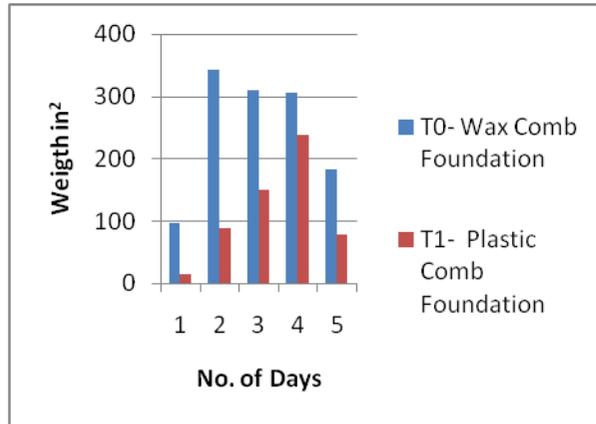


Table 3. Comparative mean net revenue of comb foundations

Input	Wax comb foundation			Plastic Comb Foundation		
	Unit	Unit Cost (₱)	Total unit cost (₱)	Unit	Unit Cost (₱)	Total unit cost (₱)
I. Operating Expenses						
A. Materials/Supplies						
1. Foundation sheet	3 pcs.	70.00	210.00	3 pcs.	100.00	300.00
2. Frames	3 pcs.	65.00	195.00	3 pcs.	65.00	195.00
B. Labor			960.00			960.00
1 MD/6 visits						
1 visit/4 hrs.						
1 hr./₱40.00						
<b>Total cost of materials and supplies (₱)</b>			<b>1,365.00</b>			<b>1,455.00</b>
II. Production						
A. Raw wax	1.24 kg	350.00	434.00	0.57 kg	350	199.50
B. Honey	12.45 kg	350.00	4,357.50	5.47kg	350	1,914.50
<b>Total cost of products</b>			<b>4,791.50</b>			<b>2,313.50</b>
<b>Net Revenue (₱)</b>			<b>3,426.50</b>			<b>858.50</b>

## CONCLUSIONS

Wax comb foundation was found to be more accepted by honeybees which were showed as a manifest in the area build-up and weight recorded. Moreover, the findings confirmed that wax comb foundation as a tool in increasing productivity is efficient in terms of net revenue.

## RECOMMENDATIONS

1. Use wax comb foundation to maximize wax build-up and weight gained as well as benefit from higher revenue
2. A follow-up study should be conducted to test the performance of both plastic and wax comb foundation in lowland condition.
3. Further, a study should be conducted to test the possibility of enhancing the ability of the honeybees in building-up combs especially during brood rearing and honey flow season using plastic comb foundation considering that it is more stronger, easy to install and reusable.

## ADVANTAGES

### Plastic Comb Foundation

1. Stronger than wax
2. Easy to install
3. Can be used for production of raw beeswax
4. Reusable

### Wax Comb Foundation

1. Easily accepted by the bees
2. Built-up faster
3. Locally available
4. Renewable

### For more information, contact:

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# Wax or Plastic Comb Foundations for Honeybee Culture

