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Asian Journal of Animal and Veterinary Advances

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Asian Journal of Animal and Veterinary Advances 3 (1): 51-53, 2008
ISSN 1683-9919
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Effects of Comb Wax Age on the Brood and Honey Product Performance in Honey Bee

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Abstract: There is a direct relationship between the production of honey bee and population of colony. Using long lasting comb may be offset by deleterious effects of old comb acting as a biological constraint on larval development. In this research compared the quantity of brood produced, average body weight of adult bee and population of adult bees in hive on brood combs of either old and new bee wax. Old combs were of an unknown age, were dark and heavy as typical of combs one or more years old. We placed the old combs in to strong colonies to clean them of debris. In this study accomplishment between times tow year on days 14 and 21. In the development of brood or population season measured for each colony the area (cm^2) of all brood including eggs, Larvae and brood. T-test used for data analysis. There were significant differences between new and comb waxes in terms of brood population in years 2005 and 2006 ($p<0.01$). Also the significant difference has been found for honey production and weight of honey bees between old and new combs wax at years 2005 and 2006. It is concluded that, new combs are effective on brood development and honey production. Thus, could be suggesting that beekeepers should eliminate old combs from their operations.

Key words: Honeybee, comb wax, population performance, honey production

INTRODUCTION

Honey bees (*Apis mellifera*) use structure like trees, hollows and man-mad hives for shelter, but it is beeswax that provides the basic building material for the interior nest substrate. When comb is first constructed it is pliable and near-white in colors. Comb used for food storage takes on a yellowish hue over time due to the accumulation of pollen (Free and Williams, 1974).

Historically, beekeepers and bee researchers have been concerned with the condition and structure of the wax combs that honey bees use for brood production and for honey storage. There has been considerable controversy about the size of the comb cells and how cell size affects bee size and colony production. Cell size can be controlled by the size of the cell base patterns pressed into wax comb foundation. As larger cells result in larger bees, there has been a tendency to force bees to build comb of larger sizes by providing oversize foundation due to a poorly supported notion that larger bees produce more honey (Coggshall and Morse, 1984). Yet more recently there has been some concern that a natural size bee may actually be better for honey production and disease resistance. After combs have been used for brood production for several brood cycles, the comb becomes darker and the cells tend to become smaller The cell walls thicken with an accumulation of debris from larval cocoons and other detritus (Winston, 1987). The volume of the repeatedly used brood cells becomes significantly smaller,

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resulting in smaller bees. Old combs also have increased disease problems due to accumulations of microorganisms, such as fungi, bacteria, protozoa (Nosema Apis Zander) and viruses (Bailey and Ball, 1991).

However many beekeepers believe that it is not economically feasible to regularly remove and replace old comb with new foundation. Moreover, there is an energetic cost for the bees that must draw out the foundation into a functional comb using metabolically-derived beeswax (Berry and Delaplane, 2001).

This study was conducted to determine effects of comb wax age (new and old comb waxes) on brood population, honey production and weight of adult worker bees.

MATERIALS AND METHODS

The experiment was done in one of the regions in Shabestar, Iran, in the field of one of the beekeepers. It took two years to do this experiment (2005-2006). The rate of reproduction, the rate of grown honey bees, their weighs on the honey combs which were old and new were considered in terms of T-test used for data analysis. The combs of the old honey were black and they were heavy. We put the combs of the old honey near the strong hives so that they make it clean. Then these combs were used as the new hives for the experiment. During the reproduction season (May, June) on day 14 and 21 the rate of population was measured (eggs, larvae and sealed brood). In order to determine the standard of population, we needed a scale and a standard comb of Langerstrot was provided and by a silk string which had wax, was divided into 80 rectangular which had 10 cm area (Asadi Dizaji *et al*., 2007). In order to have the brood all the combs which had the brood on them were taken out one by one. We measured them and all the rectangular which were there were measured carefully. We could determine the rate of the brood population for every side (left and right) of the comb. The true weight of the bees became clear by weighting the combs which were full of honey and then it was reduced from the hollow or empty combs. We measured honey product in all hives. During the experiment Terramycin antibiotics was given to the honey bees in order to prevent the reproduction diseases.

RESULTS AND DISCUSSION

The results of new and old combs effects on area (cm^2) of total brood population were presented in (Table 1-3) for 2005 and 2006 years. There were significant ($p<0.01$) differences between new and old combs in years 2005 (700.87 vs. 600.60 cm^2, respectively) and 2006 (310.08 vs. 200.70 cm^2, respectively). Also with combination of both years the differences between experimental groups were significant ($p<0.05$). The brood population in new combs was higher than that of old combs. The effect of comb ages on honey production and weight of honey bees were shown in Table 4. There were significant differences for honey production in 2005 and 2006 between experimental groups ($p<0.05$). Honey production for new combs was higher than that of old combs. The significant differences were found for weight of honey bees in 2005 ($p<0.05$) and 2006 ($p<0.01$). The honey bees' weight in new combs groups were greater than that of old combs.

The amount of average reduction of the diameter of the cells in the old combs can have undesirable effects on the amount of laying eggs of the queen. The combs of the old honey can be as a place for gathering of different unhealthy products which have adverse effects on the honey bees. The different unhealthy things and microbes can cause the bees unhealthy and ill which is transferred from one group of bees to the other groups (Piccirillo and Jong, 2004). Wax can be a factor for absorbing the pheromones in which honey bees are attracted towards the old honey combs. This can be different because of the size of the diameter of the cells. The diameter of the cells decreases when ever the honey

Table 1: The T-test group used for brood rate in 2005 (cm^2)

Source	Mean of brood area	SD	N	T	Sign
New comb wax	700.87	9.96	10	2.74	**
Old comb wax	600.60	12.29	10		

**: Significantly different at 1% level

Table 2: The T-test group used for brood rate in 2006 (cm^2)

Source	Mean of brood area	SD	N	T	Sign
New comb wax	310.08	11.07	10	3.19	**
Old comb wax	200.70	10.90	10		

**: Significantly different at 1% level

Table 3: The T-test group used for brood rate in 2005 and 2006 (cm^2)

Source	Mean of brood area	SD	N	T	Sign
New comb wax	510.20	22.22	20	2.04	*
Old comb wax	400.78	23.35	20		

*: Significantly different at 5% level

Table 4: Rate of honey production and weight of honey bee in old and new waxes (2005, 2006)

	2005			2006		
Items	Old comb	New comb	Sign	Old comb	New comb	Sign
Honey production (kg)	2.700±0.35	3.600±0.72	*	2.500±0.3	2.900±0.45	*
Weight of honey bee (mg)	99.030±4.10	105.200±1.20	*	93.190±3.1	107.400±2.00	**

**:Significantly different at 1% level, *: Significantly different at 5% level

bees reproduce. This can be because of gathering of extract and cocoon material which increasing them inside the cells have effects on their diameter (Berry and Delaplane, 2001; Giancarlo and Jong, 2004). There is a direct relationship between the production of honey and the population colony. In fact how more the production of bee in the accumulation season of nectar, how more the rate of honey and the nectar will be gathered, so the combs of the new honey can cause to increase of honey bee population and so more population cause on increase of honey production (Asadi Dizaji *et al*., 2007).

CONCLUSION

It is concluded that raising Honey bees using old wax combs resulted in decrease in body size of worker bees as well as reduced colony performance (brood population and honey yield).

REFERENCES

Asadi Dizaji, A., H. Moeini and M. Araghi, 2007. The effect of different carbohydrates on laying queen and honey storage in honeybee colonies. J. Biol. Sci., 7: 706-708.

Bailey, L. and B.V. Ball, 1991. Honey Bee Pathology. Harcourt Brace Jovanovich, Sidcup, Kent, UK., pp: 193.

Berry, J.A. and K.S. Delaplane, 2001. Effect of comb age on honey bee colony growth and brood survivorship. J. Apic. Res., 40: 3-8.

Coggshall, W.L. and R.A. Morse, 1984. Bees Wax. Production, Harvesting, Processing and Products, Wicwas Press, Ithaca, New York, pp: 192.

Free, J.B. and I.H. Williams, 1974. Factors determining food storage and brood rearing in honey bee (*Apis mellifera* L.). Comb. J. Entomol. Series, A 49: 47-63.

Piccirillo, G.A. and D.D. Jong, 2004. Old honey bee brood combs are more infested by the mite *Varroa destructor* than are new combs brood. Apidologie, 35: 359-364.

Winston, M.L., 1987. The Biology of the Honeybee. Harvard University Press, Cambridge, Massachusetts, London, England, pp: 281.