

Role of Sugar Syrup Feeding As an Artificial Diet on *Apis Mellifera* L. Colonies during Dearth Period.

Sushma Kumari*

P.G. Department of Zoology, Samastipur College, Samastipur, Bihar
Corresponding Author-*

Abstract

During dearth period, major drawback in feeding and resulted colonies destroyed in commercial beekeeping. The temperature was recorded high 48°C during this period, thus, it was very difficult to honey bees to collect food. The honey stores in farms in a colony was maximum (3.44 and 2.96 kg/colony) provided with artificial diet T_4 Whereas, the minimum (2.28 and 2.02 kg/colony) with artificial diet T_1 in both years, 2009 and 2010, respectively. The finding revealed that when colonies were fed with T_6 artificial diet, the colony performed better management of *Apis mellifera* L. Colonies during dearth period.

Keywords: *Apis mellifera* L., Sugar Syrup, dearth period.

Date of Submission: 17-10-2020

Date of Acceptance: 02-11-2020

I. Introduction

Beekeeping is the practice of keeping and managing honey bees, which contribute immensely to welfare and economy of mankind. Beekeeping is a collage industry having its relation with agriculture and horticulture. Success of this small cottage industry depends upon panned bee management technology. Honey bees acts as bioindicators of environment which are based on floral wealth like nectar and pollen. Honey bees not only provide honey, beeswax, royal jelly, propolis and bee venom which are useful products from medicinal and commercial point of view. (Atwal and sharma, 2014) honey bees *Apis mellifera* L are full dependent on flowers of different plants for pollen and nectar for their food and they are well known producers of raw honey, bee wax royal jelly, propolis and venom. Honey bees increase the quality and quantity of almost crops through cross pollination. Bee keeper faces a very difficult period during summer especially in months, June to October due to lack of flora. Growth of colonies stops which now get dwindled. There fare, present investigation was conducted to study the effect of artificial diet, sugar syrup at different intervals on colony survival and honey store during dearth period.

II. Materials and Methods

Description of the study area two areas of samastipur district were selected by researchers for collecting basic information of bee keeping and resource availability. It was found that the farmers of those areas maintain bees in despite of paucity of flora during the months June to October. The performance of artificial diet, sugar syrup for the proper development of *Apis mellifera* colonies during dearth period was studied with seven treatments and three replication in randomised block. Design during two consecutive years, 2009 and 2010.

T_1 - Sugar Syrup – 250 ml/week

T_2 - Sugar Syrup – 250 /twice week

T_3 - Sugar Syrup – 500 ml/ week

T_4 - $T_1 + \frac{1}{2}$ capsule – 250 ml/ week

Tetramycin (500 mg) + $\frac{1}{2}$ Capsule vitamin B complex

T_5 - $T_1 +$ Extract of Mahua 250 ml / week

T_6 – $T_1 +$ Pollen substitute (A) recommended $T_1 + 100$ g/ week

T_7 – $T_1 +$ Pollen Substitute (B) indigenous.

Pollen substitute (A) were indigenous and locally available. It is comprised of soyabean meal (100g), yeast powder (10g), natural pollen (5g), skimmed milk powder (5g), Sugar (22.59g), honey (22.5g) and glycerine (1g). the required quality of each component were accordingly weighted as their quantity and made dough. The sugar syrup was prepared by boiling sugar and water (1:1). This syrup was given after cooling in feeder. Mahua fruit was soaked overnight then crushed and extract was mixed with sugar syrup. The gram flour (sattu) was given as pollen substitute.

Feeding method- the sugar syrup was applied in feeder pollen substitute after making doush given on top bar. The diets were given to selected colonies of sunset at different doses mentioned above in the colonies at fortnightly interval, starting from month of June to October. These bees were also allowed to feed on natural flora in addition to artificial diet. Observations were recorded on different parameters in each treatment for measuring the development of honey colonies i.e. brood area at fortnightly intervals from June to October in 2009 and 2010. The brood area were measured in cm² while honey stores in kg. the data were statistically analysed in Factorial Randomised Block Design (FRBD) to find out the effect of factors and their interactions.

III. Results

The result obtained on the effect of different artificial diets for the development of *Apismellifera* colonies with respect to the brood area, pollen area (cm²) and honey stores (kg) during dearth period (2009 and 2010) in a colony area presented in Tables 1.

The observations on the effect of different artificial diets on brood area (cm²) were recorded and presented in table- 1. The data indicated that the brood area in the different treatment of artificial diets different significantly (p<0.05) in both the year (2009 and 2010).

In 2009, it is evident from Table 1 that the brood area was maximum (1155 cm² / colony) in the colony bees fed with artificial diet T₆ followed by T₇ (1083 cm² / colony). The minimum brood area (900 cm² / colony) in a colony was observed when bees were fed with only sugar syrup in T₁. The rest of the treatments Viz. T₂, T₃, T₄ and T₅ differ significantly among themselves and had brood area 932, 972, 1046 and 1005 cm² / colony, respectively.

In 2010, almost a similar trend was found with respect to brood area in the colony. It was found as the treatment T₆ which had maximum brood area (1301 cm² / colony) followed by T₇ (1238 cm²/ colony) and the minimum brood area (1014 cm²/ colony) recorded in the treatment T₁ (Table – 1). The rest of the treatments Viz., T₂, T₃, T₄ and T₅ different significantly with each other and had brood area of 1074, 1097, 1131 cm²/ colony, respectively.

The brood area in a colony with respect to different diets and months were found significant (p<0.05). the minimum brood area was recorded in the month of August (906.43, 1044.29 cm²) while the maximum brood area was recorded in October followed by June in both the rears, respectively. The colony fed with T₆ artificial diets. The interaction of year X month, year X diet, month X diet and year X month X diet were found significant (p<0.05).

Effect of artificial feeding on brood area (cm²) of *Apismellifera* In dearth period (June- October) during two consecutive years, 2009 and 2010.

Treatment and Doses	Mean brood area (cm ²) during 2009						Mean brood area (cm ²) during 2010					
	June	July	August	Sept.	Oct.	Mean	June	July	August	Sept.	Oct.	Mean
T ₁ Sugar Syrup- 250 ml/week	1050	875	750	850	975	900	1210	1010	900	900	1050	1014
T ₂ Sugar syrup ~ 250 ml/twice week	1075	900	800	900	985	932	1230	1020	950	1025	1150	1074
T ₃ Sugar syrup - 500 ml/ twice week	1100	910	850	950	1050	972	1225	1050	960	1050	1200	1097
T ₄ T ₁ + ½ capsule of Teramycin (500 mg)+1/2 capsule of vitamin (250mg)	1120	985	950	1050	1125	1046	1250	1140	1050	1125	1275	1168
T ₅ T ₁ + Extract of Mahua 250 ml/week	1100	950	900	1000	1075	1005	1230	1100	1000	1100	1225	1131
T ₆ T ₁ + poen substitute (A) recommended T ₁ + 100 g/ week	1175	1050	1070	1100	1380	1155	1295	1210	1260	1260	1480	1301
T ₇ T ₁ + Pollen substitute (B) indigenously used- T ₁ + 100g/week	1130	1000	1025	1080	1180	1083	1260	1170	1190	1220	1350	1238
Mean	1107.14	952.86	906.43	990.00	1110.00	-	1242.86	1100.00	1044.29	1097.14	1247.14	-

- Mean of three replications. Where T₁+ A= 100g sonabean meal + 10g yeast +5g natural Pollen +5g skimmed milk + 22.5g sugar + 22.5g honey + 1g glycerine
B= T₁+ Chanasattu
Sugar syrup (1:1)

Factor	S.Em. (±)	CD (P=0.05)
Year	2.31	6.72
Month	3.41	9.92
Size	4.21	12.25
Year X month	5.11	14.87
Year X size	6.22	18.10
Month X size	7.43	21.62
Year X month X size	8.91	25.92

IV. Discussion

The observation recorded on different parameters i.e. brood area, pollen area and honey stores in different treatments have been presented in Table 1 honey bee colonies fed diet T₆ showed the maximum brood area (1155.00 and 1301.00 cm²) followed by T₇ (1083 and 1238 cm²) and the minimum brood area (900.00 and 1014 cm²) were recorded in the colony T₁ in both the years of experimentation, respectively. There were significant variation (p<0.05) in brood area in all the factors and their interactions studied.

V. Conclusion

It is suggested that artificial diets must be given to colony of Apismellifera during dearth period (June to October) for better performance. There observations are in conformity with findings of the earlier workers (Hameedetal. 1989 Mishra, 1995 and Chand and Singh, 1995, Ono, M. et.al, 1995). They also suggested to fed Apismellifera colonies with artificial diets during dearth period. The composition of artificial diet T₆ proved to be better in maintaining the colony in comparison to other artificial diets.

Acknowledgements

Authors are thankful to P.G. Department of Zoology, Samastipur College, Samastipur, Bihar for providing necessary equipments to complete the entire research works.

CONFLICT OF INTEREST

Authors declare no conflict of interest regarding publication or any other activity related to this article.

References

- [1]. Atwal, A.S. And Sharma, O.P. (2014) Beekeeping in Punjab. Punjab Agril.UnivLudhiana Bull. No. 14 : 43P.
- [2]. Chand, H. and Singh R (1995) : Performance of different artificial diets for the proper development of apismellifera L. honey bee during dearth period in North Bihar (India). J. ent. Res., 19(4) : 357 -361.
- [3]. Hameed, S.F and Singh, B. (1989): effect of varroaJacobsonioud. Infestation on foraging and brood rearing in apisceranaindicaFabr. Indian Bee J. 51 (4) : 135-135.
- [4]. Nehru, C.R. (1995) : Studies on the management of Indian honeybee apisceranaindica F. the European honeybee, Apismellifera L. in rubber plantations. Rubber Bulletin, 27: 5-6.
- [5]. Ono, M., Igarash, T., Ohno, E. and Sasaki, M. (1995): Unusual thermal defence by a honebee against mass attack by hornets. Nature, 377:334-336.

Sushma Kumari. "Role of Sugar Syrup Feeding As an Artificial Diet on Apis Mellifera L. Colonies during Dearth Period. *IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*, 14(10), (2020): pp 01-03.