Kirkuk University Journal for Agricultural Sciences
ISSN:2958-6585
https://kujas.uokirkuk.edu.iq

RESEARCH ARTICLE
https://doi.org. 10.58928/ku24.15223

Degree of applying bee keepers for modern methods in storing and marketing bee products in Nineveh government in Iraq.

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Received: 19/04/2024 **Revised: 21/05/2024** **Accepted: 24/5/2024** **Published: 01/06/2024**

ABSTRACT

The aim of the current research is to know the degree of applying bee keepers for modern methods in storing and marketing bee products in Nineveh government in general, understand the correlation between the level of following modern methods in storing and marketing bee products and independent variables of research. To collect data, the researcher adopted a survey of two parts: the first number of personal variables of beekeepers. Second a scale to measure the degree of applying of beekeepers with modern methods in storing and marketing bee products with (30) items. Society of Research was all (113) licensed bee breeders. After preparing a questionnaire, the validity and reliability of data collection tool were confirmed. A percentage representing (40%) of society was chosen. Thus, the sample was (45) researchers. Results showed that the level of applying of beekeepers with modern methods in storing and marketing bee products, in general, is moderate and tends to increase. There was a morally significant relation between the level of applying of beekeepers with modern methods in storing and marketing bee products and the following independent variables (percentage of contribution of beekeeping in annual revenue of its owner, number of bee hives). The first three items were (I always sterilize tools of purifying honey, I always keep jars tightly close, and keep main dates to harvest honey) respectively. Researcher recommends adopting the technique of extracting bees' poison by electric shock outside the hive, extracting gemogenes from bees, inject bees' poison to treat diseases.

***Keywords*:** Keepers, degree, Bee, marketing, Products.

INTRODUCTION

Breeding honey bees is considered one of the important activities that contribute majorly to social and economic development via its products and work opportunities. Bee breeding was one of Iraq's major agricultural activities, and it was a land of shining sun and a source of aromatic plants. All this made Iraq home to bees and a source of honey. Bee breeding in Iraq dates back thousands of years. Since the Sumerian era, we have found writings about bees in clay tablets and the marble obelisk of Hammurabi [1], [2]. For centuries, bee breeding has paid back positively for humans, plants and the environment. Bees are the most dedicated insects in their work. Bees and other pollen carrying pollen-carrying animals provide a lot of grains, nuts, fruits, wider variety and better quality and production, contributing to food security [3], [4].

Honeybees are one of the most important economic insects. Raising this insect is a source of income for many Iraqi citizens and a second job for many others for more income [5]. The economic importance of bees lies in producing and selling bees, queens, wax, bee poison in medication, royal jelly, and pollinating flowers [6]. Raising bees in Iraq is important economically and socially due to suitable ecological conditions. Modern breeding of bees has made this job an important agricultural job to pollinate crops, vegetables, and fruits to increase production, as well as countless benefits. Raising bees is not restricted only to producing honey and wax or trading with its species and queens but also the benefits of royal food rich in its contents and its effect on health [7]. Raising bees is a project of good income due to its continuous need for working hands. It has the privilege of other floral and animal foods being stored for long periods and not rotting soon in case of good storing conditions. There are three ways to benefit from bees: honey, wax, the poison of bees' royal food, and pollen. Bees trade is trading bees sold as a whole tribe, packed or only traded with queen bees. When we talk about polling crops, bee hives are let to farmers to pollinate their crops. This kind of use is the most important thing because of the use of bees in pollination [8],[9]. Breeding bees requires expertise, knowledge of technical processes, and knowledge of rules and bases. Bee breeders must understand bee behaviours to make correct decisions and help bees maintain their strength to produce the most products. correct management of bee hives has a great effect on the stability of the health and power of bee hives and their productive power [10]. Agricultural extension has a big and effective role in developing information for beekeepers in all aspects of breeding bees such as storing and marketing bee products through training courses and workshops. Iraq is characterized by ecological and floral diversion from north to south. Nineveh weighs big in breeding bees and the care of its products. In 2022, apiaries were more than 984 with 25,155 bee hives according to statistics made by a division of preserving crops/agriculture

administration in Nineveh, Nineveh governorate. Due to setbacks in storing and marketing bee products, the idea of this research came to know the degree to which beekeepers apply modern methods in storing and marketing bee products. The researcher tried to answer the following questions:

1- How many beekeepers are committed to using modern methods in storing and marketing bee products in Nineveh governorate / Iraq? What is the correlation between the level of applying of farmers to apply modern methods in marketing and storing bee products and the following independent variables: (academic achievement, years spent as a beekeeper, percentage of contribution of beekeeping in annual revenue its owner, ecology of apiary, number of bee cells, status of property of apiary, purpose of owning an apiary)

Objectives of Research?

1. What is the degree of applying beekeepers for modern methods in storing and marketing bee products in the Nineveh government in general?
2. What is correlation between degree of applying with each of the independent variables.
3. According to researchers' answers, what are the arrangements for modern methods in storing and marketing bee products?

Material and Methods

1. Area of Research:

The researcher chose Nineveh governorate, the second in area and one of the governorates that breed bees. The descriptive method was adopted due to its suitability.

2. Sample and research community or population:

The society included all registered apiarists, reaching (113) from Gweer (24), Bartella (18), Sinjar (30), Talaafar (19), and Al-Namrood (23). A random sample was chosen to represent (40%) of the research society. Thus, the final sample consisted of (45) researchers.

3. Preparing the research tools:

A questionnaire was designed to collect data, it consisted of three parts:

-Part one: Data related to personal independent variables (academic achievement, number of years as a bee keeper, percentage of the contribution of beekeeping to the annual revenue of its owner, status of property, purpose of breeding bees).

-Second part: dependent variable (Applying bee keepers for modern methods in storing and marketing bee products in Nineveh governorate / Iraq) with (29) items related to producing, storing, and marketing bee products.

Measuring research variables:

A- Independent variables:

- Academic achievement**:** measured according to these levels: reads and writes (1), primary (2), intermediate (3) secondary (4), institution (5) bachelor (6) postgraduate (7).
- years of work as a beekeeper**:** measured in years:
- Percentage of the contribution of beekeeping in the annual revenue of its owner: measured according to these levels: total income (5), most of the income (4), half of the income (3), not much of the income (2), no contribution at all (1)
- Ecology of apiary: measured in these levels: country (1), city (2), country and city (3).
- The number of bees measures the Total number of bee hives that a beekeeper owns.
- Status of property of apiary: measured through the following alternatives: owns and breeds bees by himself, owns a bee hive but hires workers.
- Purpose of breeding bees: measured through the following alternatives: hobby, meet family needs of honey, side job, main job.

B- Measuring dependent variable:

Measured through preparing quadrable scale with four alternatives (the Likert scale) (I totally follow, I follow, I rarely follow, I don't follow) graded (1,2,3,4) respectively. By sum answers of respondents about the research items, we will get a total degree representing how bee breeders are applying modern methods in storing and marketing bee products in Nineveh governorate.

Reliability and stability: These were extracted by passing a panel of experts in agricultural extension and bee breeding to ensure the suitability of research items linguistically and academically; some items were adjusted.

Stability was found through the pilot sample of bee breeders via half-division. To find the correlation between odd and even items (stability of half of scale), the total stability scale was found by using the Alpha-Kronbach formula, scoring (0,93).

4. **Data collection:** After having the final design of the questionnaire, data were collected through personal interviews data were collected in February (2024).
5. **Statistical means:** After collecting research data, checking them, writing them, and classifying them in Excel tables, the researcher used the SPSS program and other statistical means, such as arithmetic means, Frequency, ratio, Pearson simple conjunction factor, and Spearman rank conjunction factor.
6. **Results and discussion**

1. What the degree of applying bee keepers for modern methods in storing and marketing bee products in Nineveh government in general: Results showed that the highest digit was (112) and the least (53) with an average of (81,31). Researches were categorized in these three categories as shown in table (1).

Table (1) Classification of respondents according to their application of modern methods in storing and marketing bee products Nineveh governorate in general.

Categories	Frequency	percentage
Low (53-72)	11	24,45%
Medium (73-92)	22	48,88%
High (93-112)	12	26,67%
Total	45	100

Table (1) shows that the highest theoretical digit was in medium (73-92) with a ratio of (48,88%) and least was high category (53-72) with an average of (24,45%). Table (1) shows that the level of applying modern methods to store and market bee products was medium and tends to rise. **What is correlation between degree of applying with each of the independent variables:**

Table (2) Shows correlation between applying beekeepers for modern methods in storing and marketing of bee products and independent variables of research.

Categories	Frequency	Percentage	Person correlation cofficence	Spearman correlation cofficence
Academic achievement				
-postgraduate	4	9		
-Bachelor	11	24		
-institute	9	20		0,005
-Secondary	8	18		
-intermediate	3	7		
-primary	4	9		
-reads and writes	6	13		
Total	45	100		
Numbers of years as a bee keeper				
-Few (1-16)	40	89		
-Middle (17-33)	3	7	-0,027	
-Big (34-49)	2	4		
Total	45	100		
Percentage of the contribution of beekeeping in annual revenue of its owner				
-All revenue	5	11		*0,315
-Most of revenue	8	18		
-Half	8	18		
-A portion of income	21	47		
- Doesn't provide income	3	6		
Total	45	100		
Environment of apiary				
-Country	23	51		0,156
-City	15	33		
-Country and city	7	16		
Total	45	100		
Status of Property				
-Owns and works as a beekeeper	39	87		
-Owns a bee hive and hires workers	4	9		-0,110
-Worker	2	4		
Total	45	100		
Number of bee hives				
-Few (10-23)	30	67		
-Moderate (24-37)	10	22		
-High (38-51)	5	11	*3,06	

Total	45	100	
Purpose of breeding bees			
-Hobby	21	47	
-Meet family needs for honey	5	11	-0,170
-A side job	14	31	
-Main job	5	11	
Total	45	100	

1. Academic achievement: Table (2) shows that the highest percentage was in the (college) category with a ratio of (24%). There was no morally.A significant correlation between academic achievement and following modern methods in storing and marketing bee products Spearman rank conjunction factor was (-0,005) insignificant meaning that beekeeper doesn't get his information and knowledge about beekeeping from curriculums but from practice, courses, and workshops.

2. Numbers of years spent as a beekeeper:

Table (2) shows that the highest number was (49) and the lowest (1) with an average of (9,62) when categorizing researchers according to years spent as a beekeeper, the highest was low (1-16) representing 89%. There was no morally significant correlation between years spent as a beekeeper and following modern methods in storing and marketing bees' products Simple Pearson conjunction factor was (-0,027) immoral. Means that years spent as a beekeeper isn't essential to increase his knowledge and information about modern methods in storing and marketing bee products Rather personal.

3. Percentage of the contribution of beekeeping in annual revenue of its owner

Table (2) shows that the highest annual revenue is concentrated in a low category with a percentage of (47%). There was a morally significant correlation between annual revenue and the degree of following modern methods to store and market bee products. The Spearman conjunction factor was (0,315) moral at the level of (0,05), meaning that the rate of revenue is closely related to the degree of the application of modern methods to store and market bee products.

4. Environment of apiary:

Table (2) shows that the highest digit was country with a ratio of (56%). There was no morally significant correlation between the environment of the apiary and the level of applying modern methods to store and market bee products. Spearman rank conjunction factor was (0,156) meaning that the environment of the apiary isn't related to the level of using modern methods to store and market bee products.

5. Number of bee hives:

Table (2) shows that the highest digit was (51) and the least was (10). The highest number was in the low category (10-23) representing (67%) an average of (20,9). A morally significant relation was found between the number of hives and the level of applying modern methods to store and market bee products. Simple Pearson conjunction factor was (0,306) significant at the level of (0,05) meaning that the more bee hives the more adoption of modern methods to store and market bee products.

6. status of property:

Table (2) shows that the highest digit was in (owns and works in beekeeping) representing (87%). There was no morally significant relation between the status of property and following modern methods of storing and marketing of bee products. Spearman rank conjunction factor was (-0,110) meaning that following modern methods to store and market bee products isn't related to the status of the property of bee hive.

7. Purpose of breeding bees:

Table (2) shows that the highest number was in (I do this as a hobby) representing (47%). There was no morally significant correlation between the purpose of having a bee hive and following modern methods to store and market bee products. Simple Spearman conjunction factor was (-0,170) immoral. meaning that the degree of following modern methods to store and market bee products isn't related to the purpose of having a bee hive. **What is the arrangement modern methods in storing and marketing bee products of according to answers of researches?**

Table (3) Shows the arrangement of research items according to the answers of respondents:

Items	Arithmetical means	No.
I always sterilize tools to extract honey	3,53	1
I always keep jars tightly close	3,48	2
Keep main dates to gain honey	3,42	3
Use a manual way to extract honey	3,41	4
I freeze pure royal food	3,26	5
Make sure that the temperature in stores is no more than 30	3,22	6
I use plastic containers to store honey	3,21	7
I don't keep honey in refrigerators	3,20	8
I use glass containers to store honey	3,04	9
I breed and reproduce queen bees	3,02	10

I mix 10 g of royal food with 1 kilo of honey	2,97	11
I always produce wax	2,96	12
I keep maturing rooms dark with air drafts	2,88	13
I import wax of apiaries	2,86	14
I can tell a fake honey	2,84	15
Use direct injection of bees' poison as treatment	2,82	16
I put labels always on honey jars	2,77	17
Use the special maturing device to exterminate over-humidity	2,71	18
Make sure that transporters are equipped to save honey	2,68	19
Use the electric device to extract honey	2,66	20
Import queen bees	2,06	21
Always mention the production date, name, and address of the apiary	2,55	22
I extract pollen seeds from sources of pollen seeds	2,51	23
I use social media to market the products of bees	2,48	24
I extract royal food through modern methods	2,46	25
I use an electric shock inside the hive to extract the poison from the bee	2	26
I treat using poison of bees in syringes	1,97	27
I extract germogens from bees	1,86	28
Use electric shock outside the hive to get the poison of bees	1,71	29

Table (3) shows that the top three items were (I always sterilize tools to extract honey, I always keep jars tightly close, and Keep main dates to gain honey) meaning that researchers follow modern methods to store and market bee products. At least 3 items were (Use electric shock outside the hive to get the poison of bees, I extract germogens of bees, I extract germogens from bees, I treat using poison of bees in syringes) meaning that that bee keepers don't have information about these items.

Conclusions

Beekeepers in Nineveh governorate, in general, need to increase their knowledge of modern methods for storing and marketing bee products because their information level is moderate and tends to increase.

1. Number of hives and the percentage of contribution of revenue of beekeeping in the total revenue of the owner play an important role in following modern methods to store and market bee products.
2. Academic achievement, years spent as a beekeeper, environment of the apiary, owner of the apiary, and purpose play no role in the level of adopting modern methods to store and market bee products.
3. beekeepers have knowledge and information about sterilizing tools for purifying and extracting honey, honey jars must be tightly closed, sticking with the main dates to harvest honey.
4. Beekeepers do not know these variables (extract bee poison via electric shock, extract germogens of honey, treat with the poison of bees by injection.

Recommendations

Necessity of protecting local production and controlling exported honey to enhance the revenue of beekeepers.

1. Build advanced research centers to develop species of bees and improve quantities in healthy scientific ways.
2. Increase knowledge and information of beekeepers in these points (extract bee poison via electric shock, extract germogens of honey, treat with the poison of bees by injection

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درجة تطبيق مربي النحل للأساليب الحديثة في خزن وتسويق منتجات النحل في محافظة نينوى / العراق.

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الخلاصة

استهدف البحث التعرف على درجة تطبيق مربي النحل للأساليب الحديثة في خزن وتسويق منتجات النحل في محافظة نينوى بشكل عام، والتعرف على العلاقة الارتباطية بين درجة تطبيق مربي النحل للأساليب الحديثة في خزن وتسويق منتجات النحل والمتغيرات المستقلة التي سيتضمنها البحث، والتعرف على المشاكل والمعوقات التي تواجه مربي النحل في موضوع خزن وتسويق منتجات النحل، ولغرض الحصول على بيانات البحث اعتمدت استمارة استبيان مؤلفة من جزيئين: الجزء الاول تضمن عدد من المتغيرات الشخصية المتعلقة بمربي النحل ،والجزء الثاني اشتمل على مقياس لقياس مستوى تطبيق مربي النحل للأساليب الحديثة في خزن وتسويق منتجات النحل، حيث تضمن (30) فقرة. شمل البحث جميع النحالين المجازين في قسم وقاية المزروعات والبالغ عددهم (113) مربي نحل، من مناطق (الكوير 24، برطله 18، سنجار 30، تلعفر 19، النمرود، 23، نحال، بعد اعداد الاستبيان تم ايجاد صدق وثبات المقياس، واختيرت طريقة العينة العشوائية البسيطة بنسبة (40%) في اختيار عينة البحث وبذلك بلغ حجم العينة المختارة (45) مبحوثاً. اوضحت النتائج ان مستوى تطبيق مربي النحل للأساليب الحديثة في خزن وتسويق منتجات النحل بشكل عام هو متوسط يميل للارتفاع، كما تبين وجود علاقة ارتباط معنوية بين مستوى تطبيق مربي النحل للأساليب الحديثة والمتغيرات المستقلة الاتية: (نسبة مساهمة الدخل الناتج من تربية النحل في اجمالي دخل المربي السنوي، عدد سنوات تربية النحل)، كما تبين ان الفقرات التي احتلت المراكز الثلاثة الاولى هي (احرص على تعقيم ادوات فرز وتصفية العسل، احرص ان تكون اواني العسل محكمة الاغلاق، اتبع المواعيد الرئيسية لجني العسل) على التوالي، ويوصي الباحث بضرورة العمل على (استخدم تقنية استخراج سم النحل بواسطة الصدمة الكهربائية خارج الخلية، استخرج الجيموجينات من النحل، استخدم العلاج بسم النحل بالتقنية الحديثة بزرق الابر).

الكلمات المفتاحية : النحالين، درجة، النحل، تسويق، انتاج.