MORPHOMETRIC AND ECONOMICLY USEFUL FEATURES OF HONEYBEES IN EAST KAZAKHSTAN REGION

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Annotation

The article presents the results of a study of productive and economically useful signs of morphometric indicators of bees in the East Kazakhstan region. The assessment of honeybees by morphometric parameters of honeybee breeds is given.

A comparative assessment of economically useful traits in terms of honey productivity and the behavior of bee colonies in apiaries is given. The morphological characteristics of bees to a certain extent may vary depending on the climatic and weather conditions of the year, although they reproduce quite steadily in various natural and climatic conditions. It has been established that in all apiaries bees of the Carniolan honeybee breed are predominate, the bees are peaceful when viewed, and they remain on the combs.The exception is the bees of the farm "Tynybek", whose behavior is typical for European dark bee. The honey productivity in the farm "Shuliko" was 120 kg, compared to other farms, this figure was higher by 37.5-54.16%, a high percentage of compliance of 86-100% with the Carniolan honeybee in the farm "Shuliko" and the farm "Bunkovykh" was established which is associated with a high level of selection work, careful selection of breeding material and control of mating of queen bees on an isolated fly-by.

Keywords: morphometry; honey productivity; honey; apiary; beekeeping; breed of bees.

Introduction

Eastern Kazakhstan has huge honey-bearing resources, which are poorly studied today, the wild part of the honey-bearing flora is practically not used by bees. With such a resource potential, the production of biologically active beekeeping products in Kazakhstan could be raised to a level that satisfies the need for them not only in their own market, but also to be supplied in large volumes to other countries of the world [1].

The territory from the southeast to the northwest of East Kazakhstan is crossed by the Irtysh River. Along the right bank of the Irtysh River stretches the mountain system of the Southern Altai with the Ubinsky, Ivanovsky, Ulbinsky, Kholzunsky, Narymsky and Kurchumsky ridges. These are low mountains covered with deciduous and coniferous forests, shrubs and mixed grass meadow vegetation. There are three types of honey-bearing lands in East Kazakhstan: mountain-forest, mountain-steppe and steppe. Apiaries are mainly located on mountain-forest and mountain-steppe lands [2].

More than 60% of bee colonies are concentrated in the farms of the region and about 70% of marketable honey in Kazakhstan is produced.

For East Kazakhstan, beekeeping is a traditional agricultural industry. In Soviet times, the region produced 25-30 thousand tons of honey, most of which was exported. During the transitional economy of the agro-industrial complex, because of the privatization of the state system of apiaries, the annual production of a sweet product decreased to 500-600 tons per year [3].

According to the existing plan of breed zoning in the East Kazakhstan region, the KZOSP recommended keeping and breeding bees of the Carpathian, Carniolan honeybeeand European dark bee breeds, despite the fact that the European dark is a breed imported more than 200 years ago [4]. Long-term maintenance and adaptation of bees of the European dark breed in the conditions of East Kazakhstan led to the creation of a population of bees with valuable economically useful traits (winter hardiness, productivity, disease resistance)

An analysis of many years of research has shown that purebred breeding is necessary for productive beekeeping. According to preliminary data, at present, bees of the European dark breed of the local population remained only in remote, hard-to-reach areas of the Katon-Karagai and Kurchum regions [5,6].

An analysis of the results of research by a number of authors shows the need for selection and breeding work to increase the number of bee colonies with a high percentage of purity, which will lead to the creation of purebred breeding bee colonies in the context of breeds, populations, taking into account the peculiarities of the natural and climatic geobotanical zones of Kazakhstan.

In this aspect, scientific and practical work is carried out with each breed of the population in their habitats, with the determination of the feasibility of breeding a particular breed of bees based on determining the economic efficiency of their breeding in a particular, separate zone of the country.

Materials and methods

In order to determine productive economically useful traits, bred species of honeybees in the east of the country, we identified six farms located in three districts of the East Kazakhstan region (table 1). To achieve this goal, we have studied, in addition to productive and economically useful indicators, morphometric characteristics, which are the mainindicators of the existing indicators involved in determining the breed affiliation, and the percentage showing the purity of a particular breed.

Samples of working individuals obtained from apiaries of 6 farms of Katon-Karagay, Ulan, Glubokovsky districts of the East Kazakhstan region

served as a material for studying the diversity of honeybee breeds.

To determine the breed, a morphometric assessment was carried out according to the methods of Alpatov V. and Berezin A. [7].

An assessment was made of productivity and economically useful traits in terms of honey productivity and the behavior of families in the apiary. To determine the breed

Results

Monitoring of apiaries in Katon-Karagai, Ulan, Glubokovsky districts was carried out. When studying apiaries in these areas, it was found that bees mainly have signs of the (A.m. carnica), Carpathian (A.m. carpatica) and European dark (Apismelliferamellifera). All farms are specialized in honey and bee breeding field.

Natural and climatic indicators of a given area are of great importance for beekeepers, which undoubtedly affects the efficiency of production. In this regard, we have studied the natural and climatic

affiliation of bee colonies, samples of bees were taken (30-50 bees from each colony), the percentage of compliance with the breed was calculated using the MorphoXL program. All measurements of exterior characteristics were carried out on preparations fixed with adhesive tape using an MBS-10 binocular microscope.

indicators in the area where the basic beekeeping farms are located.

The farm of IE "Bunkovykh" is located in the forest-steppe zone of the Glubokovsky district. The climate is moderately hot. The maximum precipitation falls in July and August. Frosts stop on average in the first and second decades of May. In some years, frosts are observed at the end of May. Autumn frosts usually occur in late August, early September. The relief is mountain-steppe. Thereis astationary apiary, it is planned to organize an isolated breeding center.

Table 1 - Number of bee colonies in the studied farms

Districts	Nameoffarms	Number of bee colonies, pcs.
Ulansky	Shuliko	800
Glubokovsky	Bunkovapiary	320
Katon-Karagai	Chekanin Bera Mikhail Tynybek	1470

The farm "Shuliko" is located in the steppe zone of the Ulansky district and is engaged in selection and breeding work with the Carniolan breed of bees (karnika) in the amount of 800 bee families. In the Katon-Karagaydistrict there are three farms: "Chekanin", the farm "Bera", the farm "Mikhail" with a total of 1470 bee colonies. They are located in the mountain forest zone. The climate is moderately hot. The average annual rainfall is 325 mm. Frosts stop on average in the second and third decades of May. In some years, frosts are observed in early June. Autumn frosts usually occur in late August, early September. The average duration of the frost-free period is 120-140 days.

Snow cover reaches an average of 800-1250 mm, forms in the second decade of October, the first decade of November, and melts in the first decade of April. Vegetation - represented by deciduous, aspen, birch. Shrubs are represented by acacia and Tatar honeysuckle. Herbal plants are represented by fireweed, oregano, St. John's wort, sage, rosearhodiola, hatma, mallow, meadow and wormwood-feather grass associations [8].

In bee farms, gradingis carried out annually at the end of the season (September - October) during the main autumn revision. At the same time, healthy overwintered bee colonies participating in the honey collection of the current year are assessed. Table 2 shows data on honey productivity, winter hardiness, strength of the family of bees bred in the conditions of six farms in the East Kazakhstan region.

Table 2 - Evaluation of bee colonies by honey productivity, strength and winter hardiness of bee colonies

Farm name	Average honey productivity in the apiary, kg	The strength of the family, the number of streets with bees (at the time of leaving the winter quarters)	Winter hardiness, % departure of bees compared to the strength of the colony in autumn
Chekanin	70	5,6±0,3	15
Bunkov apiary	65	5,9±0,5	15
Shuliko	120	6,5±0,2	10
Bera	70	6,1±0,5	10
Mikhail	55	6,0±0,3	15

| Tynybek | 75 | 6,2±0,2 | 15 |

Among the bee farms, high rates of honey productivity (120 kg) and family strength (6.5) turned out to be the bees of the Shuliko farm, where honey productivity was higher by 37.5-54.1% compared to bee families of other basic farms, and in terms of family strength - by 4.6-13.8%. Apparently, this is influenced by the best work on the selection of bees. At the same time, they were inferior to others by 33.3% for the winter hardiness of the bee colonies of farm "Bera", which has the same winter hardiness. Thus, the annual grading is carried out in order to determine the strong and weak bee colonies and to further determine the tasks for the next year and improve the qualitative composition of the bred breed of honeybees.

For the correct conduct of selection and breeding work, it is necessary to study in a comparative aspect the exterior data of queen bees, her daughters, drones in order to conduct selection to create a maternal and paternal line within the breed and population of honey bees.

When visually assessing body color, it can also be a good helper for characterizing bee colonies. Of great importance for beekeepers is the behavior of bees (peacefulness, aggressiveness of bees during inspection).

In this regard, we have studied the economically useful and exterior indicators of bees (Table 3)

Table 3 - Exterior and economic useful features of bee colonies in the East Kazakhstan region

| Farm name | Body color ation | Probos cis leng th mm | Discoidal displacement | | | Cubit al index | Wei ght, mg. | Comb cappin g | bee behavior | |
			+	-	0				When opening the nest	On examinatio n
Chekanin	gray	6,48	56,7	14	0	38,5	105	White	peaceful	Remain on the honeycomb
Bunkov apiary	gray	6,58	86,7	3,3	10	40,0	104	White	peaceful	Remain on the honeycomb

Shuliko	gray	6,66	100	0	0	37,2	105	White	peaceful	Remain on the honeycomb
Bera	gray	6,50	85	15	0	41,8	106	White	peaceful	Remain on the honeycomb
Mikhail	gray	6,45	30	67	3	49,9	104	White	Relatively peaceful	Remain on the honeycomb
Tynybek	light gray	6,40	3	97	0	52,6	102	White	aggressive	leave the frame

Table 3 shows that in all farms, the body color of the bees was mainly gray, with the exception of the light gray color of the bees of the farm "Tynybek". There were no special differences in the length of the proboscis; it was in the range from 6.40 to 6.66 mm. It should be noted that in terms of discoidal displacement, the highest positive was also from the bees from the farm "Shuliko", and the largest negative was in the bees of the farm "Tynybek" (-97). At the same time, according to the cubital index, the bees from the farm "Tynybek" outperformed the others by 5.13-28.7%. However, the bees of this apiary were aggressive. Thus, according to the exterior and economically useful features, to allow scientists and practitioners to determine which bee colonies to leave for further breeding, preserving and increasing purebred bees.

To conduct a morphometric assessment of breed affiliation, it is mainly based on three indicators: cubital and dumbbell index and discoidal displacement. The bee colonies of basic farms were assessed according to the main three indicators, determined on the basis of the indicators of the front wing of honey bees (table 4)

Table 4 - Evaluation of the morphometric parameters of the wing of honey bees

Indicators	Name of farms					
	Chekanin	Bunkova piary	Shuliko	Bera	Mikhail	Tynybek
Cubital index, CI	2,790± 0,095	2,580± 0,060	2,787± 0,076	2,497± 0,067	2,099± 0,041	1,917± 0,047
Dumbbell index, HI	1,005± 0,014	0,963± 0,010	1,092± 0,014	1,038± 0,014	0,878± 0,009	0,876± 0,011
Discoidald	2,359±	2,996±	5,195±	2,527±	-1,469±	-2,399±

isplacement, DsA	0,377	0,281	0,297	0,395	0,212	0,293
Breedmatchingpercentage	Carnica 47%	Carnica 86%	Carnica 100%	European dark 2%	European dark 28%	European dark 55 %

The table shows that according to the cubital index, the bees of the farm "Shuliko" surpassed the bees of all other farms from 3.5% of the farm "Chekanin" to 31.2 farm "Tynybek". According to the dumbbell index, the indicators of Shuliko's HC were also better and amounted to 1.092, which is 8-10.8% more than the others. According to the discoidal displacement in the average fluctuation $M \pm 1.738 \pm 0.367$.

When determining the conformity of the breed using the Morpho XL program, the conformity of the carnica breed in the experimental groups was 78.3%, and in general, when covering the entire bee colony, the percentage of conformity was 56%.

The average conformity rate of the Carniolan breed of 56% indicates the need for selection and breeding work with breeding groups in general for the breed in order to raise the compliance level to 95%, which is an indicator of the purebred bee colonies of the generally bred breeds of honey bees in Kazakhstan.

On thefarm "Shuliko" breeding of a pure breed of honey bees Carniolan is shown. This is evidenced by 100% coincidence, 86% coincidence was in Bunkov's apiary.

To a certain extent, the bees of the farm "Tynybek" differ from other farms, since 55% of them correspond to the European dark breed, and in the Bera and farm "Mikhail" these percentages are 2 and 28%, which indicates a sufficient number of bee colonies of the Carpathian breed. Based on the data obtained, it can be recommended as breeding reproducers for the European dark breed of honey bees.

Results of the morphometric analysis of the family 257-8 (Appendix No. 1)

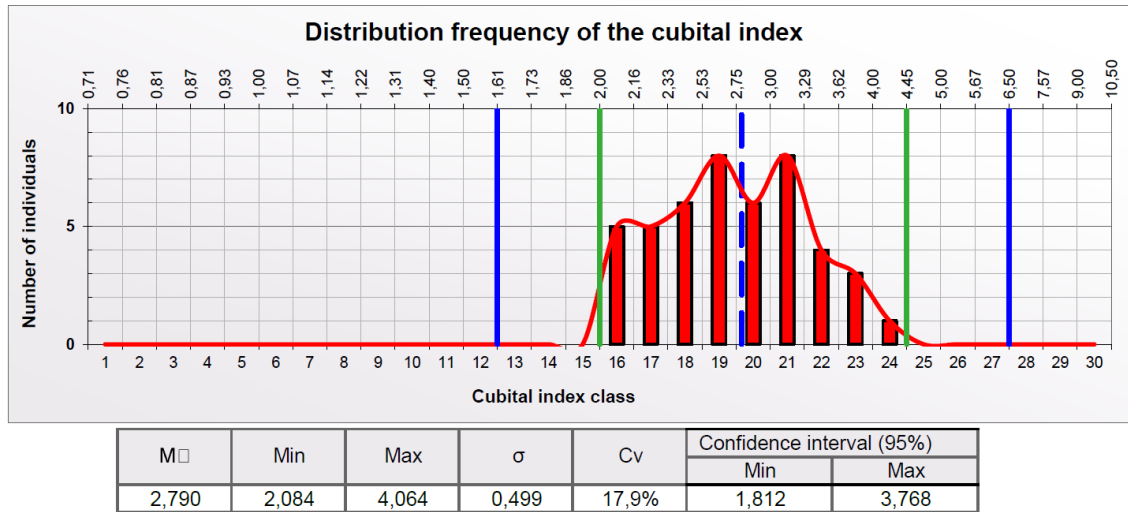| M̄	Min	Max	σ	Cv	Confidence interval (95%)	
					Min	Max
2,790	2,084	4,064	0,499	17,9%	1,812	3,768

Figure 1. The results of the morphometric analysis of farm "Chekanin" bee colony No. 257-8

All three main indicators: cubital dumbbell indexes and discoidal displacement were evaluated by bees of all basic farms. As an example, we present the data in the form of a graph, the results of a morphometric analysis of bees of the farm "Chekanin". All these indicators confirm the correctness of the data obtained for other farms.

Thus, according to the results of morphometric studies, it was found that the bred bees in two farms of the Shuliko and Bunkov farms (100-86%) are highly consistent with the Apismelliferacarnica honey bee breed.

To the conditions of East Kazakhstan, the honey bees of the

Discussion

The study of morphological breed-determining features of bees in the context of the natural and climatic

Carniolan breed are well acclimatized and adapted to the industrial technology of keeping, especially to the natural and climatic conditions of the base farms. This proves the effectiveness of targeted selection and breeding work with this breed of honey bees. Increasing the number of bee colonies with a high percentage of compliance with a particular breed and a high level of honey productivity contributes to an increase in the level of gross volume of honey to meet the need for honey and other products per capita, which will allow in the future to exportbeekeeping products.

zones of the East Kazakhstan region showed that the zones are dominated by Carniolan and European dark

breeds. The choice of a breed of bees that is most adapted to the conditions of existence in a given area is important for increasing honey yields, labor productivity and developing effective methods for caring for bee colonies. Geographic location has a significant impact on body weight and morphometric characteristics of working honey bees [9].In the East Kazakhstan region, it is recommended to breed bees of European dark (Apismellifera) and Carniolan (Apiscarnica) breeds. For the organization of practical work, it becomes necessary to determine the breed affiliation of bee colonies in the apiary and select the most valuable purebred colonies according to economically useful traits [10]. The need to breed purebred families is due to the fact that the most valuable economically useful traits in such families are inherited.

Breeding bees in purity will allow you to create highly productive honey bees on the mother's side and on the father's side. To achieve this goal, it is necessary to create breeding groups using the high genetic and phonetic qualities of bees in the context of bee families and breeds of honey bees adapted and acclimatized to harsh, hot climatic conditions.As a result of purposeful work to expand the breeding zone of bees with a large coverage of the territory with underutilized species of nectar-containing plants, it will be possible to determine the breeding zones of each breed and population of honey bees, preventing the process of hybridization, and further breed each breed in purity and create its own domestic gene pool of honey bee breeds with high honey-productive ability.

The active work of scientists on scientific support, improvement of existing and development of new technologies for the development of beekeeping, obtaining and using beekeeping products will raise the industry to a new stage of development in accordance with new world trends.

In the future, the developed beekeeping of the country will, to a certain extent, contribute to the development of the economy of the Republic of Kazakhstan.

Conclusions

A high percentage of compliance of 86-100% with the Carniolan breed was established in the Shuliko and Bunkov farms, and they were identified as breeding reproducers.

The possibility of conducting selection and breeding work, aimed at increasing the number of breeding bee colonies, is determined, which will allow, in the future, creating pure breeding bees.

The conducted morphometric study using the MorphoXL program made it possible to determine the percentage of compliance with the breeding breeds of honeybees in Kazakhstan.

A comprehensive study of economically useful, productive qualities of honeybees bred in six farms of the East Kazakhstan region, differing in breed and climatic conditions, made it possible to determine the level of compliance with one or another breed of honeybees. The characteristic is given according to economically useful features, exterior indicators.In some farms, it became possible to create an array of breeding bees with the opportunity to become a breeding reproducer for the European dark breed of bees, since in the farm "Tynybek" the percentage of compliance with the European darkbreed was 95%. Based on the results obtained, a recommendation was given to farms on breeding acclimatization ability.

Reference

1. Rib D. R. Qazaqstannyń Bal ósimdikteri / / oqýlyq, 1. Bal D.
2. Rıb D. R. Qazaqstan omartashysy / / oqý basylymy,2. - Óskemen,2016. -776 B.
3. Mınkov S. G. Qazaqstannyń baldy ósimdikteri. - Almaty: Qaınar, 1974.-204s.
4. Qazaqtyń Omartashylyq tájirıbe stansıasy. Qazaq Omartashylyq tájirıbe stansıasynyń jumysy týraly aqparat. Qazksr sharýashylyq basqarmasy. Ýpr. nasıhattaý jáne ǵylymı.- tehn. aqparat. - [Almaty] : Qaınar, 1973. - 16 b.; 25

sm.-(Aýyl sharýashylyǵy boıynsha ǵylymı-tehnıkalyq aqparat; 2. Arnaıy. vyp.)

5. Michael Kuhlmann and George R. Else and Anna Dawson and Donald L.J. Quicke Molecular, Biogeographical and phenological evidence for the existence of three western European sibling species in the Colletes succinctus group (Hymenoptera: Apidae), journal (Organisms Diversity & Evolution),volume 7,number 2,pages 155-165, 2007. Issn 1439-6092,doi https://doi.org/10.1016/j.ode.2006.04.001,

6. Vengjınovıch, Pavel, Gerýla, Darıýsh, Benkovsk, Malgojata jáne Panasúk, Beata. "Ara kolonıalaryndaǵy qysqy reısterdiń sebepteri men aýqymy (Apis Mellifera Carnica)" ara sharýashylyǵy jýrnaly, 58-tom, №1, 2014, 135-143 better. https://doi.org/10.2478/jas-2014-0014

7. V. V. Alpatov. Bal arasynyń tuqymdary.- M. Mosk. tabıǵat áýesqoılary týraly, 1948.

8. Jerar M., Marshall L., Martınet B. jáne Mıshel D. (2021), landshafttyń bólinýi men klımattyń ózgerýi ótken ǵasyrdaǵy bambldardyń dene mólsheriniń ózgerýine áseri. Ekografıa, 44: 255-264. https://doi.org/10.1111/ecog.05310.

9. Iý, Lın shen, Lú, Fan, Hýan, Sısı, Bı, Shoýdýn, Szýn, Chao jáne Van, Tánshý. "Hýanshandaǵy (Qytaı) apis cerana popýlásıasyn morfometrıalyq taldaý" ara sharýashylyǵy jýrnaly, 57-tom, №2, 2013, 117-124 better. https://doi.org/10.2478/jas-2013-0022

10. 10.Ǵazalıev, A .M. Qazaqstan Respýblıkasynda ara popýlásıasyn saqtaý [Mátin] / A. M. Ǵazalıev, a. p. Andreeva // Qaraǵandy qalasynyń ekologıalyq máseleleri jáne olardy sheshý perspektıvalary: ǵylymı-praktıkalyq konferensıa tezısteriniń jınaǵy. - Qaraǵandy: Qarmtý, 2011. - B. 61-63

ШЫҒЫС ҚАЗАҚСТАН ОБЛЫСЫНДАҒЫ БАЛ АРАЛАРЫНЫҢ МОРФОМЕТРИЯЛЫҚ ЖӘНЕ ШАРУАШЫЛЫҚҚА ПАЙДАЛЫ БЕЛГІЛЕРІ

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Түйін

Мақалада Шығыс Қазақстан облысындағы аралардың морфометриялық көрсеткіштерінің өнімді және шаруашылыққа пайдалы белгілерін зерттеу нәтижелері келтірілген. Бал ара тұқымдарының морфометриялық көрсеткіштері бойынша баға берілді.

Омарталардағы ара ұяларының мінез-құлқы және бал өнімділігі бойынша шаруашылыққа пайдалы белгілеріне салыстырмалы баға берілді. Аралардың морфологиялық белгілері белгілі бір дәрежеде жылдың климаттық және ауа-райына байланысты өзгеруі мүмкін, дегенмен олар әртүрлі табиғи-климаттық жағдайларда тұрақты түрде көбеюде. Барлық шаруашылықтарда негізінен карника тұқымды аралар басым екендігі анықталды, араларды тексеру кезінде кәрезде ынтымақшыл болып қалады. Тек "Тыныбек" ШҚ аралары ерекше болып келеді, олардың мінез-құлқы орта-орыс ара тұқымына тән. "Шулико" ШҚ-дағы бал өнімділігі 120 кг құрады, басқа шаруашылықтармен салыстырғанда бұл көрсеткіш 37,5-54,16% - ға жоғары болды. "Шулико" ШҚ және "Буньков" ШҚ-дағы карника тұқымына 86-100% жоғары тұқымдық сәйкестік белгіленді, бұл селекциялық жұмыстың жоғары деңгейімен, асыл тұқымды материалдың мұқият

таңдалуымен және оқшауланған аймақта аналық аралардың шағылысуын бақылауға алуға байланысты.

Кілт сөздер: морфометрия; бал өнімділігі; бал; омарта; омарта шаруашылығы; ара тұқымы.

МОРФОМЕТРИЧЕСКИЕ И ХОЗЯЙСТВЕННО-ПОЛЕЗНЫЕ ПРИЗНАКИ МЕДОНОСНЫХ ПЧЕЛ В ВОСТОЧНО-КАЗАХСТАНСКОЙ ОБЛАСТИ

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Аннотация

В статье представлены результаты исследования продуктивных и хозяйственно-полезных признаков морфометрических показателей пчел в Восточно-Казахстанской области. Дана оценка по морфометрическим показателям медоносных пород пчел.

Дана сравнительная оценка хозяйственно-полезным признакам по медовой продуктивности и поведения пчелосемей на пасеках. Морфологические признаки пчел в определенной степени, могут изменяться в зависимости от климатических и погодных условий года, хотя они достаточно устойчиво воспроизводятся в различных природно-климатических условиях. Установлено что во всех хозяйствах в основном преобладают пчелы породы карника, пчелы миролюбивы при осмотре остаются на сотах. Исключение составляют пчелы КХ «Тыныбек», поведение которых типично для среднерусских пчел. Медопродуктивность в КХ «Шулико» составила 120 кг, по сравнению с другими хозяйствами этот показатель был выше на 37,5-54,16%, установлен высокий процент соответствия 86-100% к породе карника в КХ «Шулико» и КХ «Буньковых» что связано с высоким уровнем селекционной работы, тщательным подбором племенного материала и контролем спаривания пчелиных маток на изолированном облетнике.

Ключевые слова: морфометрия; медопродуктивность; мёд; пасека; пчеловодство; порода пчел.