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The effect of the fattening period on the economic efficiency of calves fattening fields in the north of Nineveh governorate for the year 2021

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Abstract: The study aimed to estimate the effect of the time period of fattening on the weight efficiency of calves, as the study relied to achieve its objectives on the quantitative economic analysis in addition to the descriptive economic analysis. Through the preliminary data obtained from the paragraphs of the questionnaire form that was prepared and designed by the researcher specifically for the random sample that included (12) fields that included (645) local calves and included 20% of the research community. The research used mathematical methods to obtain the desired results from the research. The study dealt with a group of fields in the north of Nineveh Governorate during the productive year 2021. The results indicated that there is a direct relationship and positive between the fattening period and the daily and total weight rates to a certain extent because it is subject to the law of diminishing yields. As it was shown from the results that the maximum fattening period for fattening reaches (240) days and after this period the law of diminishing yields begins to work and the economic returns (profits) decrease. The researcher suggests not to sell and the marketing of fattened animals only after reaching 6 months (180) fattening days as a minimum and 8 months (240) fattening days as a maximum, taking into consideration the other economic factors and variables involved in the fattening process.

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أثر فترة التسمين على الكفاءة الاقتصادية لحقول تسمين العجول شمال محافظة نينوى لعام ٢٠٢١

غدير غانم فرحان
مديرية تربية نينوى
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المستخلص

هدفت الدراسة الى تقدير تأثير الفترة الزمنية للتسمين في الكفاءة الوزنية للعجول إذ اعتمدت الدراسة لتحقيق اهدافها على التحليل الاقتصادي الكمي بالإضافة الى التحليل الاقتصادي الوصفي، من خلال البيانات الاولية التي تم الحصول عليها من فقرات استمارة الاستبيان التي اعدت وصممت من قبل الباحث خصيصا للعينة العشوائية التي شملت (12) حقلا تضمنت (645) عجلا محليا واشتملت على نسبة 20% من مجتمع البحث واستخدم البحث الاساليب الرياضية في الحصول على النتائج المرجوة من البحث وتناولت الدراسة مجموعة من الحقول في شمال محافظة نينوى خلال العام الانتاجي 2021، وأشارت النتائج ان هناك علاقة طردية وايجابية بين فترة التسمين ومعدلات الوزنية اليومية والكلية الى حد معين كونهِ يخضع لقانون الغلة المتناقصة، إذ تبين من النتائج ان فترة التسمين القصوى للتسمين تصل الى (240) يوم وبعد هذه الفترة يبدا قانون الغلة المتناقصة بالعمل وتتناقص المردودات الاقتصادية (الارباح) ويقترح الباحث بعدم بيع وتسويق الحيوانات المسمنة الا بعد بلوغها 6 أشهر (180) يوم تسمين كحد ادنى و8 أشهر (240) يوم تسمين كحد اقصى، مع الاخذ بنظر الاعتبار العوامل والمتغيرات الاقتصادية الأخرى الداخلة في عملية التسمين.

الكلمات المفتاحية: العجول، فترة التسمين، الزيادة الوزنية.

Introduction

Despite the importance of red meat as a basic substance in human nutrition because it contains a high percentage of proteins, and the percentage of what red meat contains of protein is greater compared to the protein that we get from plant products that the individual eats in all countries of the world (Abdul Rahman, 2000). Iraq owns four groups of cows (Al-Janoubi, Al-Sharabi, Al-Rustaki, Al-Karadi) (Al-Qudsi and Elia, 2010) and in good numbers estimated at (2 million) cows (Arab Organization for Agricultural Development, 2016), and given that Nineveh governorate alone has the largest number of cows (Nineveh Directorate of Agriculture, 2017), however, most studies expect a frightening decrease in the per capita daily share of protein, to reach in the future (6.1131) kg / Iraqi person in the year 2022 (Abdul Majeed and Jabara, 2016), and because the local product obtains rewarding profits as a result Investing in beef cattle breeding projects (Farhan and Mudhi, 2012: 27). Therefore, the

productive agricultural economic policy must work to improve the productivity of the agricultural sector, in both its plant and animal parts, in a way that is appropriate and achieves a balance between supply and demand in the market. For the locality and export of the surplus and according to the comparative price and quality advantage of the produced commodity and through the encouragement and study of small-scale projects. Therefore the need to study the effect of the fattening period emerged as one of the factors affecting the economic efficiency represented by the rate of weight gain of the beef calves fattening fields as one of the important projects for the advancement of livestock and what contributes to the increase Local production of red meat in Iraq.

Research problem: The research problem stems from the insufficiency of the total supply of red meat to cover the demand for it as a result of some factors. During the random fattening periods, which caused them to move away from efficiency in managing their production projects.

research importance: The importance of the research stems from the importance of red meat that the individual needs and demands because it has a high nutritional value and the importance of the studied region as it has a high comparative advantage in quantity and quality in the production of red meat. The process of fattening calves of beef cattle, represented by the fattening period.

Research hypothesis: The study assumes that the period taken by the calves fattening process, starting from the first day in the live calves fattening process until it is marketed from the field, has a significant effect on the average final weight of the animal. It also assumes that prolonging the fattening period can contribute to increasing the total production despite the restrictions of the law of productive yield. The decreasing effect on the fields and projects of the veal fattening sector, and then reducing the size of the gap between local supply and local demand for the commodity.

Search target: The research aims to estimate the optimal fattening period that leads to achieving efficiency by bringing breeders to the optimal productive weights and at the lowest possible cost.

Research style and approach: In his study, the researcher relied on two methods of analysis, namely:

1. The descriptive analysis approach based on the concepts and principles of economic theory that are relevant to the subject of the research.

2. The quantitative analysis approach based on mathematical methods and methods to explain the effect of the fattening period on the rate of weight gain.

Data sources: The research requirements were obtained from the following sources:

1. Basic periodic field data from owners of calves breeding and fattening fields through a questionnaire designed by researchers and a random sample consisting of (12) fattening fields that included (645) local calves.
2. Statistical and official governmental publications, as well as theses, university dissertations, and Arabic and foreign books that dealt with the subject of the research.

Weight gain rate: This productive characteristic "weight gain rate" reflects the extent of economic success and the percentage of economic efficiency in the projects and fields of fattening calves for meat. The fast-growing animal reaches the economic weight at a higher rate, with a shorter fattening period and a younger age compared to the slow-growing animal. The cattle of meat breeds are biological machines that convert low-quality fodder into high-quality beef rich in proteins, and its production projects play an important role in enhancing food security, reducing poverty among people, providing job opportunities, increasing family income and investment opportunities, and providing fertilizer for sustainable agriculture, and from economic studies It was found that the calves fattening fields are profitable, especially the fields with small holdings (Yassin et al., 2014), and the speed of growth is considered a major influence in increasing the level of profits that the producer aims for because it works to reduce fattening days and reduce feed consumption and thus increase the economic efficiency of fattening fields (Garip et al, 2010), and where efficiency means the maximum output from the available resources or the achievement of certain outputs at the lowest possible cost (Al-Habil, 2013: 26). It depends on it to determine the degree of efficiency of animal growth and the extent of its response to the process of fattening and meat production, as well as the rate of weight gain is used to calculate the increase The total weight, which is equal to the difference between the initial and final weight of the animal during the fattening period (Topcu and Uzundumiu, 2009). As the degree of efficiency is calculated for each

production unit in the following formula: Efficiency = sum of weighted outputs / sum of weighted inputs (Ozcan, 2008: 387).

As for calculating the average daily weight gain of a live fattened calf, it will be through the following formula:

a = Wt - W o/t

Since:

a = Average daily weight gain of a live calf.

Wt = final animal weight.

Wo = the initial weight of the animal.

t = number of fattening days. (Muizniece and Kairisa, 2012).

Reference review of the effect of the fattening period on the rate of weight gain:

1. (Jan Syrueek, et al., 2017: 56) in a study of the technical efficiency of fattening bulls in the GZECH region for the production year 2013 and the production year 2014 indicated that the fattening period has a significant impact on the rate of daily weight gain, the final weight and the net weight, so at fattening periods (104, 270, 421, 428) days, the daily weight gain was (0.377, 0.872, 1125, 1092) gm/day/head, respectively, while the average total live weight gain was about (73, 497, 649, 970) kg/head, respectively. respectively, the average body weight of the slaughtered calf was about (43, 277, 632, 374) kg meat/head.
2. (Panjaitan, et al, 2014: 116-118) presented a study entitled the growth of fattened Balinese bulls with Leukaina breed in the province of Sumbawa, Indonesia, where the study was conducted on 21 small family farms in the province of Sumbawa, for a fattening period of 11 months, and for the production year 2012. 2013, where it became clear from the results of the study that the rate of weight gain for the total herd decreases when the fattening period exceeds 8 months, after reaching 0.875 kg / day during the first 8 fattening months, it decreased to 0.70 as an average at the end of the fattening period for the year 2013. The best daily weight gain was between 6-7 months, when it reached (9.5 - 8.85 kg/day), at an average of 9.125 kg / day / head of a calf, at the level of the research sample.
3. (1172-1169: Topcu & Uzundumlu, 2009) completed their study in analyzing the factors affecting the cost of live weight gain for cow fattening projects as a case in Erzurum province, based on the primary data of (129) fattening fields randomly selected as a sample for several regions

in Erzurum. Through the results of the descriptive analysis, it was found that the length of the fattening period leads to an increase in the rate of weight gain for the living body, and that the increase in the rate of weight gain leads to a reduction in the fattening period and the animal's arrival to the marketing age in a shorter time, which reduces production costs in the study area.

4. (1660-1654: Eung et al, 2009) presented in their study the effect of the fattening period on the growth rate, carcass characteristics and the relative ability to produce fat in Al-Hanoud calves, by selecting 45 Hanwoo calves for three consecutive fattening periods of 25 months, 27 months, and 29 months. month, and the results of the study showed that the average daily weight gain during the fattening period was 25 months, which exceeded the period of 27 months and 29 months, as it amounted to (0.83, 80, 0.77 kg / day), respectively, and the efficiency of feed conversion was (9.44, 10.06, 10.96 kg / diet kg live weight) for the successive fattening periods, and the characteristics of the carcass had no significant effect between the three fattening periods, except that the carcass weight (clean weight) was lower in the fattening period 25 months than 27 months and for 29 months of fattening due to the decrease in the percentage of moisture in the animal's body with age.
5. (VU, DD & Thanh, 2007) presented a study to show the effect of the fattening period on weight gain, meat composition and economic efficiency of beef cattle. A bull for the production of meat of the Lai sind breed. The average daily weight gain was (922, 804, 799) gm/day/ head for fattening periods of 3 months, 4 months, and 5 months, while the total increase was (183, 197, 119) kg / head. for successive fattening periods, and the second group included 27 bulls of the Brahman breed. The average daily weight gain for the three fattening periods amounted to (1014, 1060, 893) g / day / head, respectively, and the total weight gain in general amounted to (91, 127, 134) kg For the fattening period of 3 months, 4 months, and 5 months, respectively, and the third group included 15 bulls of the type Culld Lia Sind, where the average daily weight gain for the three fattening periods was (741, 597, 570) g / day / head, while the rate of increase was Total weight (67, 72, 86) kg for successive fattening periods.

The study showed that the best fattening period was at 3 months for the first group, 4 months for the second group, and 3 months for the third

group, as the best daily weight gain rate for the three groups was (922, 1060, 741) g/day/head. This indicates that the fattening period has a major role in the rate of weight gain and meat formation.

Materials and working methods: Economic theory aims to explain economic phenomena with traditional concepts, as well as to identify the nature of the relationship that links economic variables with the nature of descriptive knowledge because they are conclusions that depend on assumptions that are not known in advance and the extent of their applicability to reality or not.

And when the prevailing traditional economic theory for the goals of productive institutions was the need to achieve the largest possible amount of profits, so many studies unanimously agreed on the need to direct agricultural production, including animal production, to maximizing output through the optimal use of economic resources and knowing the factors influencing this maximization and the extent of their contribution to efficiency Aiming to raise the economic level of the country.

And according to the hypothesis of the research that there is a relationship between the period of fattening and the weight gain of the animal size in the fields of breeding and fattening calves for the selected sample in the northern plain region of Nineveh Governorate, and for the study period that lasted (9) months for the production year 2021, the study relied on quantitative economic analysis in addition to the descriptive economic analysis to achieve its goals. Through the primary data obtained from the paragraphs of the questionnaire form that was prepared and designed by the researcher specifically for the random sample that included (12) fields that included (645) local calves and included 20% of the research community during the study period, as well as the use of research and studies precedent that dealt with the subject under study.

Data description: The study relied on a set of economic criteria to calculate the relationship between the fattening period and the total weight gain and daily weight gain for each field of the sample and then for each of the fattened calves through the following formulas:

1. The rate of total weight gain of the live fattened calf, so it will be through the following formula:

   a = Wt - W o

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Where: a = rate of total weight gain of the live calf, Wt = final weight of the animal.

Wo = the animal's starting weight.

2. The rate of daily weight gain of the live fattened calf = the rate of total weight gain in kg / fattened

calf divided by the period of the fattening process (day). (Muizniece and Kairisa, 2010)

Results and discussion: After collecting, sorting and tabulating the data, it was possible to develop Table (1), which shows the relationship between the fattening period and the daily weight gain, including the total weight gain for each live calf, and then at the level of each field of the studied sample.

Table (1): shows the results of field data analysis of the effect of the fattening period on the rate of weight gain for a sample of calves fattening fields in the Northern Plain region of Nineveh Governorate for the production year 2021

Production field number	Number of calves/fields	fattening period/day	The initial age of the calf/month	Calf starting weight/kg	Calf final weight/kg	Total weight gain rate kg/calf	Average daily weight gain gm/calf/day
1	45	150	6-12	105	208	103	686
2	72	165	6-12	120	234	114	690
3	80	178	6-12	124	244	120	674
4	52	190	6-12	114	247	133	699
5	68	210	6-12	140	289	149	709
6	50	225	12-14	107	290	183	811
7	34	230	14-16	112	300	188	819
8	55	240	14-18	130	327	197	820
9	42	250	14-20	120	318	198	794
10	47	262	18-24	120	320	200	762
11	70	270	18-24	123	323	200	741
12	30	280	18-24	117	319	202	723
مجموع/ معدل	645	----	-----	119	286	165.5	744

Source: prepared by the researcher based on the field questionnaire data.

By reviewing the results of Table (1).

it is clear that the lengthening of the time period of the fattening process has a clear effect on the total weight gain rate and the daily weight

gain rate for fattening calves in the research sample fields, as with every increase in the number of fattening days, the total and daily weight gain rates increase in a fluctuating manner. Because there are other factors affecting the fattening process, such as (primary age, type of feed, animal size, management, temperatures, veterinary care, weaning period, variety,..... etc.), then at the fattening period ((150) days, the average total weight gain was (103) kg/calf in field No. (1), while it reached, during the fattening period (240) days, about (197) kg / calf in field No. (8), that is, an increasing total weight gain, then The rate of increase began to decrease, and this was evident in field (12), where it reached about (203) kg / calf, with a fattening period of (280) days, and the total weight gain rate for the total calves of the sample fields was about (165.5) kg / live fattened calf. In order to prove and enhance the validity of these results (the total weight gain rates), the results of the daily weight gain rates came to confirm the validity of the research hypothesis that the animal production sector operates under the law of diminishing productive returns, especially in the projects and fields of fattening calves of beef cattle shown in Table (1). The daily weight gain of fields (1, 8, 12) was about (686, 820, 723) gm / calf / fattening day, and for fattening periods (150, 240, 280) days, while the average daily weight gain of the total calves of the sample fields was about (740) g / calf / fattening day, and the above results can be illustrated by chart (1):

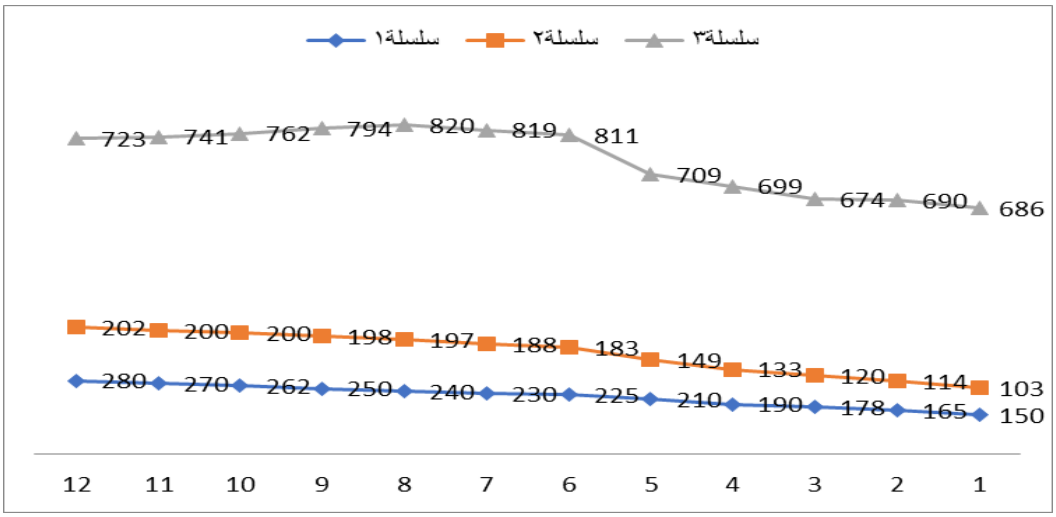

Figure (1): The relationship between the length of the fattening period (day) in blue, the rate of total weight gain (kg / calf) in red, and the rate of daily weight gain (gm / calf / day) in green

Source: prepared by the researcher based on the data of Table (1).

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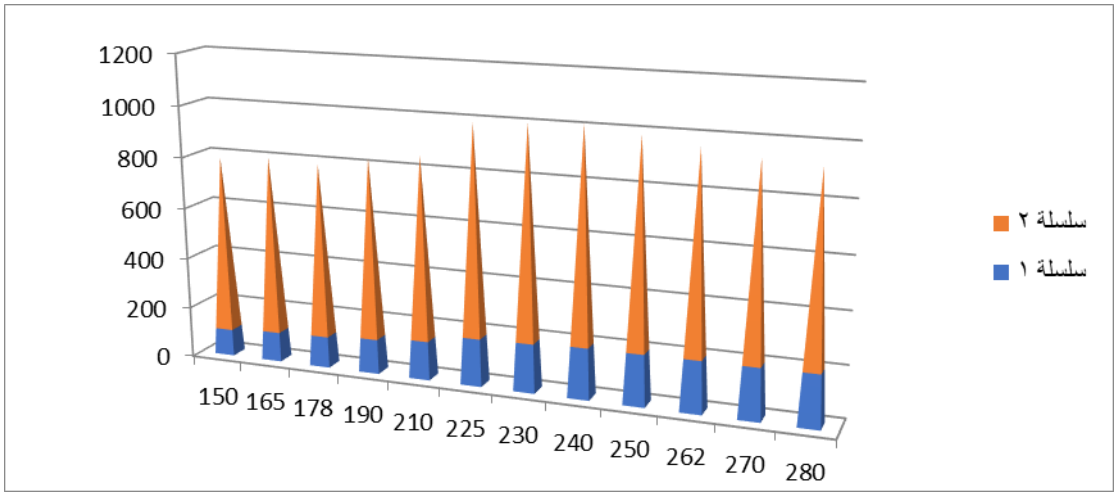

Figure (2): The relationship between the fattening period (day) and the rate of total weight gain (kg / calf) series 1 in blue and the rate of daily weight gain (g / calf / day) series 2 in red

Source: prepared by the researcher based on the data of Table (1).

Conclusions:

1. The rates of total and daily weight gain increase with the increase in fattening periods, but to a certain extent, the law of diminishing returns begins to work, so the increases are decreasing in the weights of calves, which causes costs to exceed revenues.
2. There are other factors related to the fattening process other than the optimal number of days that negatively affect the fattening process, including the animal species, age, type of feed and vaccinations.
3. The quality of calves is not suitable for the local environment because the Iraqi local market is linked to the regional markets in this field.
4. The lack of control over vaccines and imported calves, which is reflected in the efficiency of food conversion, which makes it difficult to determine the optimal period for fattening.

Proposals:

1. The researcher suggests not to sell and market fattened animals until they reach 6 months (180) fattening days as a minimum and 8 months (240) fattening days as a maximum, taking into account other economic factors and variables involved in the fattening process.
2. Providing a diet with balanced nutritional components, the results of which are reflected positively on the weight gain of calves.

3. Introducing calves of young ages and excellent varieties suitable for the area in which the project takes place, and this is reflected in the productive efficiency of the field.

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Conflict to Interest

Author declares no conflicts of interest regarding he publish this article

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