Productive Performance Of Two Strains Of Japanese Quail by adding basil and mint seeds and their mixture

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Abstract

The study was conducted on 320 chicks from two strains (white and brown) of quail birds in the poultry hall that belongs to animal field. This chicks were randomly distributed into four treatments, the first (control) without any addition, the second, mint seeds were added at a level of 0.8 gm, the third, basil was added at a level of (0.8 g mint), and the fourth, a mixture of (0.8 g mint + 0.8 g basil) was added to the quail chicks' diets for 35 days. This study aimed to investigate effect of adding mint and basil seeds and their mixture to quail rations on the productive performance of quail chicks. The results of the study showed a significant effect (P≤0.05) of the strain on rates of live body weight, daily weight gain, feed intake, feed conversion, adhesive ratio and mortality between the white and brown strains, and the result was in favor of the brown quail. As for the effect of some medical additives, the results confirmed presence of significant differences (P≤0.05) on live body weight of birds at ages (3 and 5) weeks, and in the weight gain rate at all ages and feed conversion rate at ages (4-5) and (1-5) weeks, as well as in percentages of purification and mortality. As for the interaction between the two strains and medical additives, the results showed significant differences (P≤0.05) in all studied traits. We conclude from the current study that the brown quail strain fed mint at a level of 0.8 g was significantly superior in live body weight, weight gain and feed conversion compared to the white quail strain and other levels of basil addition and their mixture.
Keywords:White quail,Brown quail,Mint,Basil,Mortality.

Introduction

Quail is one of the smallest types of poultry that have been raised to produce meat and eggs, where it is considered an economic alternative to chicken (as a source of protein). These birds have also gained economic importance as a commercial type that provide meat with a unique special flavor with high economic value[13]. As a result of the continuous population growth and to cover the food shortage, studies ,researches and increasing interest began at the twenty –first – century , most countries have turned to find new ways to increase production to encourage the chicken projects to produce meat and eggs with different types of poultry and with varying degrees, including quail [2] This bird has an economic importance in scientific experiments for several reasons, the most important of which are the early sexual maturity, simple requirements in space, and adaptation to various environmental conditions, including infection with several types of diseases that effect on the other birds species [4].There are several studies conducted by researchers who found significant differences in the productive characteristics among Japanese quail strains. The differences are due to the large genetic and physiological differences within these breeds, effective programs have been created to improve the most important productive traits[29.[

In a study conducted by [37].on white, desert and brown quail strains, significant effects of the strain were observed on the trait of the live

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body weight at the age of 6 weeks, as the desert quail strain outperformed both the brown and white strains, reached (277.3 g ,271.37g, 255.33 g) respectively [9]. noted also in their study of the strains of growing quail desert and white quail, that the strain has a significant effect on the live body weight, weight and carcass traits.

On the other hand, bird feeding is considered one of the points that must be taken into consideration in bird breeding and feeding projects. Therefore, the feed provided must meet the birds' needs for nutrients vitamins [21.[

Basil seeds have medical and nutritional importance because they contain active materials that have a positive effect and improve the productive and health status of birds . These active compounds activate the endocrine gland [5] . by stimulating the thyroxine hormone which is responsible for growth and metabolism to improve growth and production and enhance the immune system [7]. The same applies to mint seeds, which are useful in expelling gases and are considered antispasmodic, appetite stimulant and digestive stimulant [15] .When adding these plants (basil and mint seeds) one or both of them to the feed improves and increases production because they help improve digestion and increase production. Many researchers have studied the effect of basil or mint seeds on the productive characteristics of broilers and Japanese quails, where it was mentioned [12] in their study of the effect of basil leaf powder on the productive performance of Japanese quail ,where the use the ratios (0.5,1,1.5)%improving the live body weight and the rate of weight gain and reducing feed intake for treatments containing basil ratios. but [34].indicated in their study to compare among the effect of basil seed oil, lamycin and bronxin on the performance of broilers, where four (0, 200, 400, 600) parts per million were used. They noticed significant differences in the productive characteristics, as the treatment with the level of 200 parts per million was the best in reducing abdominal fats. As for [1].study, he found the effect of parsley and basil on the performance of broiler chickens, where four types of feed were used (0.3 g fenugreek, 3 g parsley, 3 g basil) / kg feed. The results showed that chicks fed on basil feed showed a significant increase in body weight compared to other treatments, which led to improve productive performance, while [36] .in their study on the effect of mint on the productive performance of Japanese quail, they used the ratios (0, 1.5, 0.75)%, they found that the body weight was higher in birds fed on feeds containing mint, as well as some body measurements (head length, head width, body length, leg length), While [31]. indicated in their study on the effect of using wild mint in feeding feeds , where there were no significant differences in body weight, feed consumption rate and feed conversion efficiency. The main objective of this study is to identify the productive performance of two strains of Japanese quail (white, brown) and knowing whether the white or brown quail breed is better in terms of production and the effect of adding basil seeds, mint seeds and their mixture to the feed in different proportions on the productive characteristics.

Methods & Materials

This experiment is conducted in the poultry field of the Animal Production Department / College of Agriculture and Forestry / University of Mosul for the period from 26/8/2024 to 30/9/2024. Birds (320) of one-day-old are used from two strains of Japanese quail (brown and white) with (160) birds for each strain. The chicks are distributed into four treatments, each with (40) chicks, with four replicates for each treatment. The number of chicks in each replicate is (10) chicks. Four ratios are used. The first treatment is the comparing treatment, the second treatment (0.8 g basil seeds/kg feed), the third treatment (0.8 g mint seeds/kg feed), and the fourth treatment (0.4 g basil + 0.4 g mint). The hall used is equipped with all the necessary components of ventilation, lighting, and set the temperature . The hall is also cleaned and sterilized before starting of the experiment. The special preventive program is followed to protect the chicks from diseases during the raising period, and the necessary vaccines and vitamins are given .

A single-level feed of energy and protein is used during the starter and growth stages , and it is given to the birds during the experimental period, which continues from (1-35) days. The protein ratio is 22% and the energy represented is 2969 kilocalorie /kg feed, as shown in Table (1), as stated by [23],[6]. The requirements and needs of birds are taking into consideration like energy and protein according to what was stated in [30] ,and the feed and water were provided freely, three times daily .

Table (1) : Components of feed and their chemical analysis

The components	**(%)**	**Calculated chemical Analysis**	**Value**
Yellow corn	40	ME(KCal/ Kg diet)	2905
Soybean meal	36	Crude Protein(%)	23.94
Sunflower oil	2	Crude fiber (%)	3.62
Wheat	13	Ash(%)	4.91
Protein center	8	Ether extract(%)	4.27
Limestone	0.50	Soluble carbohydrates(%)	51.49
Vitamins and minerals	0.25	Calcium(%)	1.08
Table salt	0.25	Available phosphorus(%)	0.43
The total	100	Lepsin(%)	1.33
		Methionine	0.57

The chicks are weighed at the beginning of the experiment and at the end of the third week and again at the end of the fifth week at the end of the experiment to determine the weight increasing of each bird. The amount of feed consumed for each replicate is also calculated, as well as the feed conversion treatment , It is according to [32] .Mortalities are recorded daily, and 6 birds are slaughtered for each treatment. The data are statistically analyzed using the SAS[33] program according to the completely

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randomized design program by using the following mathematical model :

$$Yijk = M + Hi + Tj + (HT)ij + eijk$$

Yijk = Effect of observations in treatment j of birds k
M = general average
Hi = effect of strain
Tj= effect of treatment
)TH) ij=effect of interaction (interference) between strain i and treatment j.
eijk = estimate the experimental error
The difference among the averages is also tested in case of existing significant differences according to Duncan's test to balance the averages.

Results and Discussion

It is clear from the results obtained in Table (2) that the strain has a significant effect ($p \le 0.05$) of the average live body weight at the age of one day, while these differences are not significant at the age of (3,5) weeks, but the brown quail is higher mathematically than the white quail at the two mentioned ages, where the average of weight at the age of 5 weeks is (208.56, 206.63) g, respectively. This is contrary to what was found by [38] , [37] , [9 [.

As for the effect of adding mint and basil seeds and their mixture, it is
noted from Table (2) that there are significant differences ($p \le 0.05$) at the age of (3.5) weeks in the average of live body weight, where the treatment (0.8 g mint seeds) recorded a significant superiority over the rest of the treatments at the age of 3 weeks, while the treatment (0.8 g mint seeds) and (0.4 g mint + 0.4 g basil) are significantly superior to the rest of the treatments at the age of 5 weeks for the live body weight. While the comparison treatment came with the lowest average of the live body weight compared to the rest of the treatments. The reason may be attributed to the fact that mint has properties of antioxidant, building immune system and diuretic and contains phenolic compounds, which positively affect digestion [15]. it works as an appetite stimulant and stimulates the secretion of digestive enzymes[13].This result was consistent with what was found by[17], [3],[14] . As for the interaction (interference) between the strain and feeding treatments in the characteristic of average of the live body weight,
it is noted from Table (2) that Japanese quail with 0.8 g of mint seeds at the age of 3 weeks is significantly superior ($p \le 0.05$) to all treatments, while 0.8 g of mint with white quail is significantly superior ($p \le 0.05$) at the age of 5 weeks in all interactions under study. In general, the interaction effect of these treatments can be attributed to the effect of each of these factors on the characteristic of the live body weight, and thus the result is the whole effect of these factors altogether.

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Table (2) Averages of live body (g)± standard error of quail at the age (one day(

Treatment		Live body weight (g/bird)		
		1 day	3 weeks	5 weeks
Effect strain				
White quail		0.23 ± 10.42 a	1.37 ± 112.25 a	2.66 ± 206.63 a
Brown quail		0.27 ± 9.25b	1.93 ± 113.38 a	2.78 ± 208.56 a
Effect of adding basil and basil seeds				
zero		0.49± 9.33 a	1.92 ± 109.50 b	1.40 ± 193.34 c
0.8 g mint seeds		0.47 ± 10 .17 a	1.37 ± 117.77 a	1.95 ± 215.62 a
0.8 g basil seeds		0.42 ± 10 .50 a	2.19 ± 111.37 b	2.24 ± 210.32 b
0.4 g mint seeds+ 0.4g basil seeds		0.44 ± 9.83 a	2.30± 113.67 a	0.83 ± 210.00 b
Interaction between Strain and adding of basil and mint seeds				
White quail	Zero	0.38 ±1 0.36 a	0.82 ± 110.35 c	2.10 ± 193.34 c
	0.8g mint	0.37 ± 11.00 a	2.18 ± 118.33 abc	1.18 ± 216.00 a
	0.8g basil	0.33 ±10.83a	3.21 ± 114.00 abc	3.06 ± 207.32 b
	0.4gmint+0.4g basil	0.57 ± 10.07 ab	0.88 ± 109.37 c	1.32 ± 210.02 ab
Brown quail	Zero	0.31 ± 8 .67 b	2.96 ± 108.68 c	2.34 ± 193.34 c
	0.8gmint	0.33 ± 9.34 ab	0.51 ±119.06 a	2.20 ± 215.37 ab
	0.8g basil	0.30 ± 9.63 ab	2.14 ±108.69 c	3.30 ± 213.32 ab
	0.4gmint+0.4g basil	0.8±9.76 ab	2.46 ± 118.00 ab	1.15 ± 210.02 ab

The results in Table (3) for the increased weight rate trait indicate that there are significant differences (p≤ 0.05) between the white and brown quail strains for the ages (1 - 3) and (4-5) weeks, where the brown quail outperforms the white quail, while there are no significant differences between the two strains at the age of (1-5) weeks. This is consistent with what was found by [22], [18],[39]. The reason for this may be attributed to the fact that there are many environmental factors that affect the growth rate in the early stages of life, some of which compensate for the genetic structure in a higher increase in the advanced stages of life, called compensatory growth [27 . [

As for the feeding treatments, it is noted from Table (3) that there are significant differences (p≤0.05) in the rate of weight increasing at the ages of (1-3), (4-5) and (1-5) weeks. The second treatment 0.8 g of mint seeds outperformed all treatments at the age of 1-3 weeks, while the second and third treatments of 0.8 g of mint seeds and 0.8 g of basil seeds outperformed all treatments for the ages of (4-5) and (1-5) weeks. The reason for this may be due to the active materials found in basil and mint, basil is a rich source of vitamins necessary for building the body , and mint is an appetite stimulant.[11]and this result is consistent with what was reached by [1],[26],[10],[3], while the interaction between the strain and the feeding treatments in the trait of weight increasing rate, we find from Table (3) that the brown quail strain with 0.8 mint seeds is significantly outperformed (p≤0.05) at the ages of (1-3), (4-5), and (1-5) weeks, while the comparison treatment recorded the lowest significant weight (p≤0.05) compared to all interactions .

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Table (3) rate of weight increasing (g) ± standard error for quail at the age (1-3) (4-5) (1-5) weeks for the different experiment treatments

Treatment		Average of weight gains (gm/bird)		
		1-3weeks	4-5 weeks	1-5 weeks
Effect strain				
White quail		0.99 ± 60.06 b	0.77 ± 69.55 b	2.36 ± 154.63 a
Brown quail		1.27 ± 64.25 a	1.38 ± 74.38 a	4.08 ± 150.76 a
Effect of adding basil and basil seeds				
zero		2.02 ±61.50 b	1.92 ± 69.60 b	1.63 ± 154.04 b
0.8 g mint seeds		1.47 ± 66 .07 a	2.37 ± 75.17 a	1.55 ± 164.12 a
0.8 g basil seeds		1.42 ± 59.80 b	1.19 ± 73.17 a	2.24 ± 149.32 a
0.4 g mint seeds+ 0.4g basil seeds		1.74 ± 69.53 b	2.30±69.57 b	0.83 ± 156.33 ab
Interaction between Strain and adding of basil and mint seeds				
White quail	Zero	1.18 ± 58.06 c	1.82 ± 67.65 c	1.40 ± 143.64 c
	0.8g mint	1.03 ± 63.00 bc	0.18 ± 70.63 bc	1.34 ± 163.02 ab
	0.8g basil	2.13 ± 61.33 bc	1.21 ± 76.70 bc	4.06 ± 155.32 abc
	0.4gmint+0.4gbasil	2.0 7 ± 58.03 c	1.28 ± 69.37 c	1.32 ± 156.62 abc
Brown quail	Zero	2.31 ± 65.07 ab	2.16 ± 71.68 bc	2.34 ± 146.34 c
	0.8gmint	0.57 ± 69.04 a	0.81 ±79.66 a	2.70 ± 156.37 a
	0.8g basil	1.80 ± 58.33 c	1.54 ±75.69 ab	4.10 ± 143.32 c
	0.4gmint+0.4g basil	1.52± 65.06 ab	2.46 ± 69.70 c	1.05 ± 156.02 abc

Averages that have common letters within a single column do not differ significanatly at a probability of (p≤0.05.(

Table (4) shows the effect of the amount of feed consumed during ages (1-3), (4-5), and (1-5) weeks. We notice from the table that there are significant differences (P ≤ 0.05) between the strains at the age of (4-5) weeks, while they are not significant at the other ages.
While Table (4) shows, with regard to the feeding treatment, significant differences (P ≤ 0.05) between the feeding treatments for ages (1-3) and (4-5) weeks , where the 0.8 g basil treatment has less feed consumption than the rest of the treatments, while there are no significant differences among the treatments at the age of (1-5) weeks. The reason for the significant superiority may be attributed to the basil and mint containing active materials, which lead to improve feed palatability and this is consistent with what was found by [1] , [29], and[35.[
As for the interaction, we find from Table (4) that there are significant differences (P ≤ 0.05), where the brown quail treatment with 0.8 g of basil has lower feed consumption at the age of (1-3) and (4-5) weeks than the rest of the other experimental treatments. As for the feed consumption rate at the age of(1-5) weeks, we notice the presence of significant differences (P ≤ 0.05), and the comparison treatment with the brown quail strain has lower feed consumption. The reason may be due to the genetic susceptibility of each strain to growth speed rate, which requires feed consumption proportions with the needs of birds

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Table (4) Rate of feed consumption (g) ± standard error of quail at the age (1-3) (4-5) (1-5) weeks for the different experiment treatments

Treatment		Weekly feed intake (gm/bird)		
		1-3weeks	4-5 weeks	1-5 weeks
Effect strain				
White quail		0.49 ± 160.32 a	1.67 ± 270.75 b	3.10 ± 412.43 a
Brown quail		0.87 ± 159.38 a	1.38 ± 276.68 a	3.38 ± 343.76 a
Effect of adding basil and basil seeds				
zero		0.82±160.34a	2.62 ± 275.29 ab	6.63 ± 414.79 a
0.8 g mint seeds		1.47±160.87 a	0.37 ± 278.27 a	4.15 ± 411.22 a
0.8 g basil seeds		0.32±157.04 b	2.09 ± 270.47 b	3.24 ± 394.92 a
0.4 g mint seeds+ 0.4g basil seeds		0.68 ±160.33a	2.60±270.67 b	2.23 ± 413.83 a
Interaction between Strain and adding of basil and mint seeds				
White quail	Zero	1.18 ± 160.96 a	0.52 ± 272.25 a	1.41 ± 413.64 a
	0.8g mint	1.23 ± 160.80 a	1.18 ± 277.83 a	1.70 ± 420.42 a
	0.8g basil	0.73 ± 158.73 a	1.21 ± 266.80 a	2.86 ± 389.02 a
	0.4gmint+0.4gbasil	0.6 7 ± 160.76 a	3.08 ± 266.07 a	1.32 ± 418.22 a
Brown quail	Zero	2.31 ± 159.67 a	2.16 ± 278.71 a	3.14 ± 363.04 b
	0.8gmint	0.78 ± 160.94 a	0.81 ±279.06 a	2.15 ± 402.37 a
	0.8g basil	1.80 ± 155.33 b	1.54 ±274.09 ab	3.50 ± 391.82 a
	0.4gmint+0.4g basil	1.52± 162.03 a	2.46 ± 275.30 b	1.85 ± 409.42 a

Averages that have common letters within a single column do not differ significanatly at a probability of (p≤0.05.(

We conclude from Table (5) that there are significant differences (P ≤ 0.05) between the brown and white quail strains for the trait of feed conversion factor at ages (4-5) and (1-5) weeks, while they are not significant at the age of (1-3) weeks. This result is contrary to what was found by [25] and [18], while it is consistent with what was found by [8 .[

Table (5) shows that there are significant differences (P ≤ 0.05) between the treatments related to nutrition at the age of (1-5) weeks, and the superiority is for the 0.8 basil seeds treatment, where it is the best conversion treatment compared to the rest of the treatments, while at ages (1-3) and (4-5) weeks, the differences are not significant. This result is consistent with what [29], [1] found.

Table (5) also shows significant differences (P ≤ 0.05) for the interaction between the strain and the feeding treatments. The values of the feed conversion treatments of the brown quail strain with 0.8 g basil shows a significant superiority for the ages (1-3) and (1-5) weeks compared to the rest of the interactions, while the interactions are not significant at the age of(4-5) weeks. The reason may be that the bird consumes large amounts of feed as a result of its increased size and complete skeletal structure, so the increasing in weight becomes limited [24 .[

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Table (5) Feed conversion treatments feed kg /kg increasing in weight for quail at the age (1-3) (4-5) (1-5) weeks for different experiment treatments.

Treatment		feed conversion efficiency (kg feed intak / kg weight gain)		
		1-3weeks	4-5 weeks	1-5 weeks
Effect strain				
White quail		0.09 ± 2.66 [a]	1.27 ± 3.85 [b]	0.06 ± 2.63 [b]
Brown quail		0.07 ± 2.52 [a]	3.13 ± 3.38 [a]	0.04 ±2.36 [a]
Effect of adding basil and basil seeds				
zero		2.02 ± 2.60 [a]	1.92 ± 3.70 [a]	0.03 ± 2.84 [a]
0.8 g mint seeds		0.07 ± 2 .69 [a]	0.63 ± 3.67 [a]	0.05 ± 2.64 [b]
0.8 g basil seeds		0.09 ± 2.47 [a]	1.19 ± 3.64 [a]	0.04 ± 2.45 [c]
0.4 g mint seeds+ 0.4g basil seeds		0.07 ± 2.63 [a]	0.07±3.75 [a]	0.03 ± 2.60 [b]
Interaction between Strain and adding of basil and mint seeds				
White quail	Zero	0.08 ± 2.74 [abc]	0.10 ± 3.92 [a]	0.03 ± 2.87 [a]
	0.8g mint	1.03 ± 2.62 [ab]	0.01 ± 3.91 [a]	0.07 ± 2.70 [b]
	0.8g basil	0.04 ± 2.52 [ab]	0.09 ± 3.77 [a]	0.06 ± 2.45 [d]
	0.4gmint+0.4gbasil	2.0 7 ± 2.76 [a]	0.88 ± 3.83 [a]	0.02 ± 2.62 [c]
Brown quail	Zero	0.11 ±2.45 [ab]	0.06 ± 3.80 [a]	0.03 ± 2.78 [ab]
	0.8gmint	0.17 ±2.76 [a]	2.61 ±3.06 [a]	0.04 ±2.37 [cd]
	0.8g basil	0.09 ± 2.43 [b]	0.04 ±3.51 [a]	0.05 ± 2.44 [d]
	0.4gmint+0.4g basil	0.02±2.46 [ab]	0.10 ± 69.67 [a]	0.05 ± 2.54 [cd]

Averages that have common letters within a single column do not differ significanatly at a probability of (p≤0.05.(

As for the ratio of net at the age of 5 weeks, it is clear from Table (6) that there are significant differences (P ≤ 0.05) between the two strains, and superiority is in favor of the brown quail. The same is with the case for the feeding treatments, where the third treatment, 0.8 g of basil, achieved a significant superiority (P ≤ 0.05) over the rest of the treatments. This result is consistent with what was found by [29], [19]. The reason for this is that this trait is affected by several factors, including gender, age, and the live weight of birds, which are affected by environmental and nutritional conditions. The interaction between the strain and the feeding treatments has a significant effect (P ≤ 0.05) on the net ratio.It is noted from Table (6) that the brown quail strain with all feeding treatments has a higher value than the white quail strain with feeding treatments and that is due to the genetic factors that the brown quail strain possesses. While Table (6) shows significant differences (P ≤ 0.05) for the mortalities rate trait between the white and brown quail strains and feeding treatments, as well as for the interaction between the strain and feeding treatments at the age of 5 weeks.This result is consistent with what was reached by [28, 32,8,39 .[

Table (6) Rate of net and ratio of mortalities ± standard error for quail at age 5 weeks of different experiment treatments

Treatment		Dressing percentage	Mortality percentage
Effect Strain			
White quail		0.51 ± 62.91 [b]	0.06 ± 3.02 [b]
Brown quail		0.47 ± 67.84 [a]	0.04 ± 1.99 [a]
Effect of adding basil and basil seeds			
zero		1.26 ± 65.04 [a]	0.21 ± 2.47 [b]
0.8 g mint seeds		1.18 ± 65.98 [a]	0.27 ± 2.44 [b]
0.8 g basil seeds		1.29 ± 66.42 [a]	0.16 ±2.37 [a]
0.4 g mint seeds+ 0.4g basil seeds		1.33±64.00 [b]	0.26±2.42 [b]
Interaction between Strain and adding of basil and mint seeds			
White quail	Zero	0.89 ± 62 .80 [bc]	0.02 ± 2.93 [b]
	0.8g mint	1.47 ± 63.97 [b]	0.19 ± 3.01 [bc]
	0.8g basil	0.26 ±63.78 [b]	0.25 ± 2.75 [b]
	0.4gmint+0.4gbasil	0.43±61.08 [c]	0.08±3.32 [c]
Brown quail	Zero	0.04 ± 67.28 [a]	0.50 ± 1.99 [a]
	0.8gmint	0.94 ± 67.99 [a]	0.14 ± 1.83 [a]
	0.8g basil	0.89 ± 69.20 [a]	0.02 ± 2.09 [a]
	0.4gmint+0.4g basil	0.08±66.99 [a]	0.03±2.12 [a]

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Averages that have common letters within a single column do not differ significanatly at a probability of (p≤0.05.(

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