



COMPARISON OF GOOSE BREEDING ACTIVITIES IN UŞAK AND AFYONKARAHISAR PROVINCES

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Abstract: This study was carried out in order to reveal the current situation of goose breeding in extensive and semi-intensive conditions in Afyonkarahisar and Uşak provinces and to determine the important problems encountered in breeding. The material of the study; consists of a total of 200 survey data, 125 from the villages of the Merkez, Bolvadin, Sinanpaşa, Sultandağı, Çobanlar, and İhsaniye districts of Afyonkarahisar province, 75 from the Central, Banaz, Sivasslı, and Karahallı districts of the Uşak province. According to the research findings, it has been determined that more than half of the producers in Afyonkarahisar and Uşak have an average of 1-10 years of goose breeding. It has been determined that the number of breeding male geese per farm is 1-5, and the average number of breeding female geese is 3-20 (M/F: 1/3-5/20). It has been determined that 64% of the goose shelters in Afyonkarahisar and 50.6% in Uşak are made of briquettes or bricks. In conclusion, it can be said that the main problems of the producers are feed costs, inadequacies in care and feeding, breeding with low-yielding domestic breeds, difficulties in the supply of breeding animals, and problems in marketing. Expanding the scope of the goose incentive will provide an opportunity to prevent losses in our goose stock and to increase our goose presence again in the future.

Keywords: Goose, Breeding, Problems, Solution proposals

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1. Introduction

In general, goose breeding is concentrated in areas with cold climatic conditions. According to FAO's 2022 data, more than 87.20% of goose production in the world is made in the Asian continent, while approximately 98% of the production in the continent takes place in China. After the Asian continent, approximately 6.70% of goose production is in the African continent, in countries such as Mozambique, Egypt, and Madagascar, and 5.30% in the European continent, Poland, Romania, Hungary, and Türkiye, etc. taking place in countries. Türkiye accounts for about 5% of the European goose production. The American continent, on the other hand, meets only 0.20% of the world goose production (Akin, 2022; FAO, 2022). As in the whole world, the share of goose breeding in total poultry production in Türkiye is quite low, less than 1%. The low egg production of the geese and the long slaughtering period have a significant effect on this situation. In addition, hot and dry climatic conditions make cultivation impossible (Şengül and Yeter, 2020). Despite the mentioned negativities, in recent years, goose breeding has been increasing its importance among alternative livestock activities that attract attention in Türkiye as well as all over the world. Goose breeding is mostly produced for meat in line with the demands of consumers, liver, and feathers are in demand in European countries. In Türkiye, goose breeding is

common in rural areas at the level of small family businesses and consists of 10-15 geese flocks (Boz, 2015; Akin, 2022; Akin, 2023).

Although goose breeding is carried out in all regions in Türkiye, in the North East Anatolia Region where cold climatic conditions exist; it is concentrated around Kars, Ardahan, Erzurum, Ağrı, and Muş. Goose breeding is common in Samsun and Çorum in the Central and Western Black Sea Regions, Yozgat and Kırşehir in Central Anatolia, Isparta in the Mediterranean, and Kütahya, Afyonkarahisar, and Uşak in the Central Aegean (İşgüzar and Pingel, 2003; Saatçi, 2008; Çelik and Bozkurt, 2009; Tilki et al., 2011; Yakan et al., 2012; Boz, 2015; Akin and Çelen 2020; Akin, 2022). Since geese have higher grazing abilities compared to other poultry species, they can consume weeds and they can resist difficult environmental conditions, goose breeding is done more in cold and rural areas than in other regions. Production is carried out in the form of grazing on open pastures under extensive conditions and is carried out by small-scale familial enterprises consisting of 10-15 heads of geese. In familial farms, the production of domestic goose breeds, which are usually divided into black, white, gray, and tawny varieties, is common (Selçuk et al., 1983; İşgüzar and Pingel, 2003; Boz et al., 2014). With the increase in demand for goose meat in recent years, the number of commercial enterprises producing semi-



intensive and intensive production with a capacity of 100-1,000 head of goose is increasing (Akin, 2022). Generally, goose breeding is carried out in order to meet the animal protein needs of the family, and the leftover production is sold in local markets and contributes to the family economy.

The mentioned provinces are very suitable for goose breeding in terms of climatic conditions and draw attention as an important livestock activity in rural areas. In the Aegean Region, as in other provinces, the traditional extensive production system has been adopted. The geese are grazed in the pasture for up to 1-1.5 months before slaughter, and they are fed with grains such as corn, wheat, and barley, as well as bread and food scraps as supplementary feeding. It has been observed that the use of factory feed is at very low levels (Akin, 2022; Akin, 2023). As in all livestock activities in Türkiye, feed costs are the biggest problem in sustainable livestock breeding. In addition, as a result of the loss of qualifications of many agricultural lands, livestock activities become increasingly difficult and producers have to withdraw from the sector.

According to TUIK 2022 data, there has been a decrease in all livestock activities and product amounts in Türkiye compared to the previous year. According to 2021, laying hen production from 120 million to 110 million, broiler production from 270 million to 251 million, turkey production from 4.7 million to 3.6 million, goose production from 1.4 million to 1.3 million, and duck presence from 500 thousand, It was announced that this number decreased to 400 thousand (Akin, 2023; TUIK, 2023a; TUIK, 2023b). The presence of geese in regions in Türkiye between the years 2013-2022 is shown in Table 1. The presence of geese in the Aegean Region is in Table 2, and the presence of geese at the district level of Afyonkarahisar and Uşak provinces is in Table 3 and Table 4 (TUIK, 2023a). According to the data for 2022 in Türkiye, the North Anatolian Region is in the 1st place with the number of geese exceeding 690 thousand, and it constitutes approximately 50% of the goose population of Türkiye. Afterward, Central Anatolia ranks 2nd with more than 121 thousand geese and 9% of the total production, and South East Anatolia ranks 3rd with nearly 104 thousand geese and meets 8% of the total production.

The Aegean Region, on the other hand, has a share of 6% in the total production with the number of geese approaching 85 thousand. The geese presence in the region continued to increase periodically every year, from 68,000 in the first 5 years. While the goose population of the region increased by 40% to 96,000 in 2017, it increased from 102,000 to 104,000 by 2020 in the second 5-year period, and then decreased to 85,000 at the end of 2022, with a decrease of 18% compared to 2021. Afyonkarahisar, Kütahya, and Uşak have an important place in goose breeding in the Aegean Region. In the first 5-year period covering the years 2013-2017, Afyonkarahisar ranked first in the region with around

30,000 geese, and the share of geese in the region (SGR) was around 40%. As of 2017, Kütahya ranked first with a goose production exceeding 44,000 (SGR 45%). On the other hand, Uşak doubled the number of geese (SGR 4%) from 3.000 as of 2017 and exceeded 6.000. In the second 5-year period covering the years 2018-2022, Kütahya decreased from 42,000 geese to 33,000 as of 2022, while Afyonkarahisar decreased from 32,000 to 21,000. In this period, Uşak increased from 9,000 units to 23,000 units as of 2020 (SGR 22%), then decreased to 18,000 units (SGR 18%), and then to 12,000 units by 2022 (SGR 14%). In Afyonkarahisar, goose breeding is concentrated in İhsaniye, Sinanpaşa, Merkez, Bolvadin, Sultandağı, and Çobanlar districts. In the last 10 years, covering the years 2013-2022, 5 districts met 95% of the total goose production. In Uşak, Merkez and Banaz are the districts with the highest production in the province, and Uşak province constitutes 95% of goose production. This study; has tried to present information about the existence and share of geese in Afyonkarahisar and Uşak provinces in the Aegean Region, demographic characteristics of breeders in both provinces, comparison of goose breeding activities, problems of breeders, and solutions to their problems.

2. Materials and Methods

The study was formed from the survey data conducted with the goose breeders in the villages of Bolvadin, Çobanlar, İhsaniye, Merkez, Sinanpaşa, and Sultandağı districts of Afyonkarahisar province, and the goose breeders in the villages of Banaz, Karahallı, Merkez and Sivashlı districts of Uşak, according to the data of TUIK for the year 2022, in February-May 2023. The questionnaire forms used in the study were prepared by making use of the previously arranged questionnaires on zootechnics and agricultural management (Alkan and Eren, 2019; Şengül and Yeter, 2020; Akin, 2023). While determining the sample size of the study, a grouped one-stage random probability sampling method based on population ratios was used (Şengül and Yeter, 2020). In determining the sample size, the following formula (equation 1), which was used in limited societies as reported by Karasar (1994), was used (Akin, 2023).

$$n = \frac{z^2 * N * p * q}{(N * d^2 + z^2 * p * q)} \quad (1)$$

here; n: Sample volume, z: "Z" table value corresponding to 95% significance level, N: Number of main masses, p: The probability of occurrence of the investigated event in the main mass is taken as 50%, q: The probability that the investigated event will not occur (1-p), d: Accepted margin of error (In this study, margin of error was taken as 5%).

According to the equation; It was determined that a survey should be conducted with 125 enterprises in Afyonkarahisar and 75 enterprises in Uşak, and one-on-one interviews were conducted with the enterprises. 15 surveys were conducted in Bolvadin, 50 surveys in İhsaniye, 15 surveys in the Center, 35 surveys in

Sinanpaşa, and 5 surveys each in Çobanlar and Sultandağı. Since almost all of the production in Uşak is in the Center and Banaz districts, 45 surveys were conducted in the Center, 20 in Banaz, and 5 each in Karahallı and Sivaslı. In the study, the average number, gender, age, breeding characteristics of the geese, feeding of the geese, egg production, the reason for the goose

breeding, infrastructure opportunities, shelters, slaughter time and slaughter age, marketing methods of goose products, as well as the advantages and disadvantages of goose breeding were investigated. The data of the study were evaluated in the SPSS 16.0 package program and expressed as descriptive statistics and percentage values.

Table 1. Türkiye geese production amounts 2013-2022 (Akin, 2023; TUIK, 2023a)

Region	Years									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
İstanbul TR1	3013	3025	2571	2428	2072	2177	3455	8294	3390	6552
West Marmara Aegean TR3	32596	36130	37164	37997	39883	41478	41621	41207	42791	40558
East West Mediterranean TR6	68666	72463	73410	76791	96340	102739	104784	104239	101654	84886
Middle Anatolia TR7	30960	29966	30791	31227	36289	41837	48652	59079	63973	53367
West Black Sea TR8	22189	25210	25934	28292	33336	35023	37879	44737	45050	38992
East Black Sea TR9	17102	15776	17858	18937	29328	37041	45800	47211	48903	40510
Northeast Anatolia TRA	52026	50332	52845	59704	67849	74354	82343	98065	130936	121132
Middle East Anatolia TRB	51584	59210	66749	71027	85407	143037	116671	123381	115582	102275
Southeast Anatolia TRC	891	1325	962	1281	1636	2385	6869	11189	10556	10253
Total	297818	432142	366648	426678	388849	403425	471099	474022	668351	690692
	52026	50332	52845	59704	67849	74354	82343	98065	130936	92447
	67819	63506	57431	58467	74119	74664	73518	162800	105566	103843
	755286	911990	850694	933353	978384	1080190	1157049	1373960	1477569	1385507

Table 2. Aegean Region geese production amounts 2013-2022 (Akin, 2023; TUIK, 2023a)

Aegean Region	Years									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Afyonkarahi	30944	32130	32130	33086	29568	32534	34835	27743	30460	21407
Aydın	2374	2674	2717	2836	3214	4330	3125	3135	3037	3032
Denizli	1837	2822	2531	3455	4683	4723	5421	5201	5676	5537
İzmir	1979	2641	2953	3522	4030	4554	4515	4862	4412	4041
Kütahya	23940	24675	24738	25087	44427	42211	42321	33742	34394	33539
Manisa	1327	1455	1594	1421	1732	2011	2109	3261	2703	2680
Muğla	2835	3055	3217	3169	2656	3526	3518	3099	2307	2338
Uşak	3430	3011	3720	4215	6020	8850	8940	23196	18665	12312
Total	68666	72463	73410	76791	96340	102739	104784	104239	101654	84886

Table 3. Goose production amounts of Afyonkarahisar Province and its districts 2013-2022 (TUIK, 2023a)

Afyonkarahisar Districts	Years									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Merkez	10200	10404	10405	10716	6600	8000	11549	6700	8500	1500
Bayat	360	357	357	368	450	440	420	445	483	495
Başmakçı	660	673	673	693	768	756	750	505	480	110
Bolvadin	1335	1377	1377	1418	1852	2445	2100	1865	1902	1845
Dazkırı	230	235	234	242	333	205	182	181	165	100
Dinar	2850	2907	2907	2994	1414	1410	1110	1116	955	990
Emirdağ	340	357	356	368	360	361	375	355	315	250
Evciler	600	612	613	630	440	365	345	260	215	164
Hocalar	99	102	102	105	150	150	158	50	260	250
Kızılören	240	214	213	220	200	220	210	150	120	100
Sandıklı	1500	1530	1530	1576	1790	1850	1725	665	670	638
Sinanpaşa	2750	2805	2805	2889	4000	4000	3956	4100	4200	4395
Sultandağı	430	306	307	315	252	315	350	841	916	1035
Çay	1000	1020	1020	1051	600	700	725	2005	1979	300
Çobanlar	3400	3417	3417	3520	1040	1200	950	1100	1050	1000
İhsaniye	3800	4488	4487	4623	6103	6805	6850	6000	7000	7500
İscehisar	800	816	817	840	2700	2800	2600	900	850	350
Şuhut	350	510	510	518	516	512	480	505	400	385
Total	30944	32130	32130	33086	29568	32534	34835	27743	30460	21407

Table 4. Goose production amounts of Uşak Province and its districts 2013-2022 (TUIK, 2023a)

Uşak Districts	Years									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Merkez	2500	2200	2500	2950	4230	5000	5000	14656	13180	8285
Banaz	700	565	930	1000	250	2750	3000	7162	4664	3385
Eşme	125	141	120	110	800	110	140	160	120	0*
Karahallı	20	35	85	70	250	210	180	407	156	202
Ulubey	0*	0*	0*	0*	200	250	105	299	130	0*
Sivaslı	85	70	85	85	300	530	515	512	415	440
Total	3430	3011	3720	4215	6030	8850	8940	23196	18665	12312

*The number of geese in the relevant year for the Şaphane District was stated as "0" by TUIK.

3. Results and Discussion

The socio-demographic characteristics of the breeders who participated in the survey in the study area are shown in Table 5, the reasons for breeding goose, the breeding period, the presence of geese, and their desire to increase are shown in Table 6. When the socio-demographic characteristics of the breeders participating in the survey were examined in both provinces, 15.2% and 22.7% of the goose breeders in Afyonkarahisar and Uşak were aged between 18-39, while the rate of those aged 40-59 was 52.0% and 22.7%. It was determined as 64.0. These results showed that goose breeding is done by young populations in both provinces and it is promising for the future of goose breeding. Similarly, Akin (2023) stated that goose breeding is done by the young population in Kütahya province. Boz et al., (2014), 58% of breeders are 40-59 years old and 23% are 20-39 years old, Demir et al., (2013) mean age is 41.9, Alkan and Eren (2019), 49.67% of them are 40-59 years old,

30.46% are 60-80 years old, Şengül and Yeter (2020) stated that 42.8% are younger than 40 years old, 26.7% are 50 years old and over the age stated. While the proportion of households with 1-6 persons in the goose breeders was determined as 83.2% and 88%, respectively, 55.2% and 29.3% of the education level were primary school, 17.6% and 24.7% were secondary school, 19.2 of them and 45.3 of them were high school and university. In previous studies, number of households and education level; In Kütahya, 87.2% have 1-6 people, 72.8% are primary school-secondary schools, in Ağrı 56.29% are 4-6 people, 48.34% are primary school, in Yozgat breeders are It was stated that 86% of them consisted of 1-6 people, 75.5% of them were at primary-secondary school, 89.5% in Muş was at primary school-secondary school, and 75% in Ardahan was at primary school level (Demir et al., 2013; Boz et al., 2014; Alkan and Eren, 2019; Şengül and Yeter, 2020; Akin, 2023).

Table 5. The socio-demographic characteristics of the goose breeders

Age	Family (n)	R.F. (%)	Education	Family (n)	R.F. (%)	Number of individuals	Family (n)	R.F. (%)
Afyonkarahisar								
18-39	19	15.2	Illiterate	10	8.0	1-3	34	27.2
40-59	65	52.0	Primary	69	55.2	4-6	70	56.0
60-80	33	26.4	Secondary	22	17.6	≥7	21	16.8
>80	8	6.4	High	17	13.6	-	-	-
-	-	-	University	7	5.6	-	-	-
Total	125			125				
Uşak								
18-39	17	22.7	Illiterate	2	2.7	1-3	22	29.3
40-59	48	64.0	Primary	22	29.3	4-6	44	58.7
60-80	7	9.3	Secondary	17	24.7	≥7	9	12.0
>80	3	4.0	High	27	36	-	-	-
-	-	-	University	7	9.3	-	-	-
Total	75			75				

n= number of families surveyed, RF= relative frequency.

Table 6. Distribution of goose producers according to their breeder's activities in Afyonkarahisar and Uşak Provinces

Breeding Reason	Afyonkarahisar		Uşak	
	Family (n)	SIF (%)	Family (n)	SIF (%)
Addition to Livelihood	44	35.2	32	42.7
Meat Need-Consumption Habit	70	56.0	38	50.7
Hobby	7	5.6	2	2.7
No other income	4	3.2	3	4.0
Breeding Times (year)				
0-5	14	11.2	14	18.7
6-10	54	43.2	29	38.7
11-20	34	27.2	20	26.7
21-30	15	12.0	7	9.3
>30	8	6.4	5	6.7
Number of geese (number)				
1-10	27	21.6	15	20.0
11-20	65	52.0	10	13.3
21-50	22	17.6	41	54.7
51-100	9	7.2	7	9.3
>100	2	1.6	2	2.7
Desire to increase the presence of goose (number)				
No	7	5.6	15	20.0
Yes (11-20)	23	18.4	10	13.3
Yes (21-50)	46	36.8	41	54.7
Yes (51-100)	40	32.0	7	9.3
Yes (>100)	9	7.2	2	2.7
Person Responsible for Care and Feeding				
Myself	66	52.8	63	84.0
Wife/husband	35	28.0	3	4.0
Mother/Father	8	6.4	2	2.7
Kids and the whole family	15	12.0	7	9.3
Goose herder	1	0.8	0	0.0
Poultry Presence Other than Goose				
None	8	6.4	2	2.7
Hen	88	70.4	59	78.7
Turkey	10	8.0	5	6.7
Duck	14	11.2	7	9.3
Quail, partridge, and other	5	4.0	2	2.7

n= number of families surveyed, SIF= share in investigated family.

While 56% of the breeders in Afyonkarahisar stated that 50.7% of the breeders in Uşak carried out goose breeding in order to meet the meat needs of the family, the ratio of those who stated that they did not contribute to their livelihood and had no other income was 38.4% and 46.7%. 54.4% of goose breeders in Afyonkarahisar and 57.4% in Uşak stated that they have been playing an active role in goose production for 1-10 years, and according to this result, goose breeding is a relatively new alternative livestock activity in Afyonkarahisar and Uşak compared to other provinces can be said to be Akin (2023) stated that the rate of those who have been engaged in breeding activities for 1-10 years in the province of Kütahya is 64%.

In a study conducted by Şengül and Yeter (2020), the average rearing period in Muş was 17 years and 38.2% of the respondents stated that this period was 20 years or more. stated that they were engaged in aquaculture in order to obtain While this period was reported as 18.6 years in Ardahan, 79.3% of them stated that goose breeding is an important source of income, 48% of the breeders in Yozgat have been breeding geese for less than 10 years and 85.5% It has been reported that they do breeding as a consumption habit, 63.58% of them have been breeding geese for 1-10 years and 64.9% of them are producing as a consumption habit (Demir et al., 2013; Boz et al., 2014; Alkan and Eren, 2019). 52.8% of the breeders in Afyonkarahisar and 84.0% of the breeders in Uşak reported that they were interested in the care and management of geese, and 52.0% in both cities reported that they raised an average of 11-20 geese in a year. 70.4% in Afyonkarahisar and 78.7% in Uşak stated that they raised chickens other than geese, 94.4% and 80.0% stated that they wanted to increase the number of geese. Alkan and Eren (2019) stated that 71.52% of non-goose hens were raised and 85.43% of them were goose breeding in addition to other livestock activities. 73.51% of the breeders stated that they wanted to increase the presence of geese and that woman and children generally took an active role in the care and feeding of geese. In the study conducted in Kütahya, it was stated that 65.6% of the breeders themselves took care of the care and management of geese, an average of 11-20 geese were raised in a year, while 73.6% of them raised chickens other than geese. In this study, it was also stated that 88.0% of the breeders wanted to increase the number of geese (Akin, 2023). In Afyonkarahisar and Uşak, 60.8% and 73.4% of the breeders, respectively, keep an average of 1-5/3-20 male/female (M/F) breeder digs, while 28.9% and 17%, 3 of them reported that they do not have breeding geese. 57.6% and 80.0% of the breeders, respectively, reported that they obtained the gosling broody/hatching, and 89.6% and 90.7% of them raised domestic goose breeds. It was determined that 56.8% of them in Afyonkarahisar and 56.0% of them in Uşak preferred variegated and white varieties. The ratio of breeders who do not make supplementary feeding is 16.0% and 8.0% in these two

provinces. Among the breeders, those who make supplementary feeding, respectively; 36.8% and 36.0% preferred corn, 20.8% and 26.7% preferred wheat, 18.4% and 18.72% preferred barley, while the others preferred bread and food scraps they stated that they used. In these two provinces, 88.8% and 96.0% of the goslings are taken to the pasture within the first two weeks. While the proportion of those who did not use any equipment was 18.4% in Afyonkarahisar and 10.7% in Uşak, the ratio of those who stated that they used at least one piece of equipment was 81.6% and 89.3%. Alkan and Eren (2019) stated in their study in Ağrı that breeders keep 4-6 breeding geese in their hands, and the goslings and breeders are obtained by hatching. He explained that almost all of the breeders in Ağrı prefer the domestic goose breed and that the variegated variety is more popular among the domestic goose varieties. The researchers stated that in this study, the goslings were released to the pasture after an average of 2-3 weeks.

In the study conducted in Ardahan, it was stated that the geese were generally fed on pasture and that 88.8% of the people used barley for supplementary feeding, while in the study conducted in Yozgat, wheat, barley, and corn were preferred as supplementary feeding, and also bread and food scraps were evaluated in feeding (Demir et al., 2013; Boz et al., 2014). While 70.4% of the breeders in Afyonkarahisar and 85.3% of the breeders in Uşak stated that they get an average of 1-15 eggs from a goose in a year, the rate of those who stated that they received 26+ eggs among the breeders was 4.8% and 2.7% detected. As in the study conducted in Kütahya, it was observed that breeders who stated that they received a high number of eggs in these two provinces preferred high-yielding breeds such as Chinese, Linda, and Mast (Akin, 2023). In these two provinces, 88.8% and 96.0% of the goslings are taken to the pasture within the first two weeks. While the proportion of those who did not use any equipment was 18.4% in Afyonkarahisar and 10.7% in Uşak, the ratio of those who stated that they used at least one piece of equipment was 81.6% and 89.3%. Alkan and Eren (2019) stated in their study in Ağrı that breeders keep 4-6 breeding geese in their hands, and the goslings and breeders are obtained by hatching. He explained that almost all of the breeders in Ağrı prefer the domestic goose breed and that the variegated variety is more popular among the domestic goose varieties. The researchers stated that in this study, the goslings were released to the pasture after an average of 2-3 weeks. In the study conducted in Ardahan, it was stated that the geese were generally fed on pasture and that 88.8% of the people used barley for supplementary feeding, while in the study conducted in Yozgat, wheat, barley, and corn were preferred as supplementary feeding, and also bread and food scraps were evaluated in feeding (Demir et al., 2013; Boz et al., 2014). While 70.4% of the breeders in Afyonkarahisar and 85.3% of the breeders in Uşak stated that they get an average of 1-15 eggs from a goose in a year, the rate of those who stated that they received 26+

eggs among the breeders was 4.8% and 2.7% detected. As in the study conducted in Kütahya, it was observed that breeders who stated that they received a high number of eggs in these two provinces preferred high-yielding breeds such as Chinese, Linda, and Mast (Akin, 2023).

The number of broody/chick, breeder geese, breeder supply and selection, keeping time in breeder, and breeder egg price of both provinces are shown in Table 7. While 57.6% of the breeders incubated an average of 21-50 eggs in Afyonkarahisar, it was determined that the number of chicks hatched was 11-30, and the hatchability was found to be 55-60% in Afyonkarahisar, as in the study carried out in Kütahya. The rate of those who stated that they put an average of 1-30 eggs in the incubation in Uşak was determined as 59.7%, and the number of chicks hatched was found to be 1-20. It has been observed that the hatchability of Uşak province is at

the level of 60-65%. The ratio of those who provide breeding geese from their own resources was determined as 76.3% in Afyonkarahisar, 74.2% in Uşak, and 21.7% and 19.4% from neighbors and local animal markets. 53.6% of breeders in Afyonkarahisar and 45.1% in Uşak stated that they consider body size and egg production in the selection of breeding goose.

The rate of those who chose randomly was 26.8% and 43.5%, respectively. While the rate of those who keep breeding geese for 1-6 years is 93.8% in Afyonkarahisar, and 95.2% in Uşak, the rate of those who keep the breeder geese above 7-8+ was found to be 6.2% and 4.8%. While the rate of producers who stated that the prices of breeding eggs were between 20-40 TL on average, was 79.2% in Afyonkarahisar and 80.0% in Uşak, the rate of those who said they did not buy or sell eggs was 12.8% and 10.7%.

Table 7. Number of hatching eggs and chicks, number of breeding geese, breeding geese supply and selection, period of keeping in breeding and breeding egg price

Hatching egg (E) / Chick (C)	Family (n)		SIF (%)	
	Afyonkarahisar		Uşak	
1-20 E / 0-10 C	32	25.6	28	45.2
21-30 E / 11-20 C	26	20.8	9	14.5
31-50 E / 21-30 C	46	36.8	17	27.4
51-100 E / 31-70 C	16	12.8	8	12.9
>100 E / >70 C	5	4.0	0	0.0
Number of breeding geese (M/F)				
Not has breeder geese	28	28.9	13	17.3
1-3 M / 3-10 F	40	41.2	38	50.7
4-5 M / 11-20 F	19	19.6	17	22.7
6-10 M / 21-50 F	9	9.3	7	9.3
>10 M / >50 F	1	1.0	0	0.0
Breeding geese supply				
From own resources	74	76.3	46	74.2
Neighbors	15	15.5	7	11.3
Animal markets	6	6.2	5	8.1
Other provinces	2	2.1	4	6.5
Breeding selection				
Randomly	26	26.8	27	43.5
Size/Body	20	20.6	17	27.4
Egg yield	32	33.0	11	17.7
Feather color	12	12.4	4	6.5
Race	7	7.2	3	4.8
Period of keeping in breeding (year)				
1-2	7	7.2	16	25.8
3-4	35	36.1	34	54.8
5-6	49	50.5	9	14.5
≥7-8	6	6.2	3	4.8
Breeding egg price (TL)				
No buying or selling	16	12.8	8	10.7
20-30	39	31.2	18	24.0
31-40	60	48.0	42	56.0
>40	10	8.0	7	9.3

n= number of families surveyed, SIF= share in investigated family.

Boz et al., (2014) stated that the average egg production is 11, the number of chicks obtained from hatching is 8, the hatchability is 73%, the average retention period of the breeders is 2 years, and the breeder male/female ratio is 1/3. In a study conducted in Kırşehir, the average number of eggs per farm was 53.13, and the number of chicks was 45.11. The breeder male/female ratio was reported as 1.14/4.83, and the period of keeping in breeders was 2-12 years, while the rate of those who gave priority to body size in the selection of breeders was reported as 35%. It is said that 30% of the breeders care about egg production in the first place in the selection of breeders (Taşkın et al., 2017). Slaughter time, slaughter age, live and carcass weight, feather plucking method, feather usage situation, and place of sale, type, and price of goose are shown in Table 8. 52.0% of the producers in Afyonkarahisar and 48.0% in Uşak stated that the slaughtering process was done in December-January. In Afyonkarahisar, 42.4% of the breeders stated that the geese were slaughtered when they were 13-15 months old, 60.8% were 4-7 kg live weight, and 51.2% stated that they obtained an average of 3-5 kg of carcass. In Uşak, 58.7% of them stated that they slaughtered geese at the age of 10-12 months, 71.3% of them 4-7 kg of live weight, and 69.4% of them obtained an average of 3-5 kg of carcass. While those who preferred the wet plucking method were 72.8% in Afyonkarahisar and 65.3% in Uşak, the proportion of those who said they discarded goose feathers without making any use of them was 80.8% and 86.7%. In the study conducted in Yozgat, it was stated that geese were slaughtered in October, November, and December, while some breeders carried out slaughter in January-February. In this study, it was observed that the slaughter age was 8 months and the carcass weight was 3.7 kg on average, and 96% of the breeders preferred wet plucking to remove the feathers. The rate of those who use goose feathers in making quilts and pillows was found to be only 2.5%. Researchers have stated that 77% of breeders consume geese fresh without waiting (Boz et al., 2014). In order for the goose feathers, which are extremely valuable and have high economic value, to be evaluated, it is urgently necessary to bring feathers to the economy by establishing various organizations affiliated with the Municipality, Ministry of Agriculture and Forestry, and feather collecting units.

92.4% of the goose breeders in Afyonkarahisar and 89.3% in Uşak sell the geese they produce as live or carcasses. The rate of those who sell to neighbors and local markets in the village is 89.8% in Afyonkarahisar, 86.7% in Uşak, the rate of those who state that they earn 300-500TL from an average live goose in Afyonkarahisar is 79.6%, while in Uşak it is 300-450. The rate of those who stated that they earned TL income was 82.7%. While 50.4% of breeders in Afyonkarahisar and 58.7% in Uşak state that they see goose breeding as a profitable business and will continue, 33.6% and 28.0% do not see it as a profitable business. They stated that he would continue because of the habit. 41.6% of the respondents

in Afyonkarahisar, 57.3% in Uşak fried goose meat, 14.4% and 12.0% boiled it, 8.8% and 9%, 3 of them stated that they prefer to consume it by using it in local dishes. Şengül and Yeter (2020) stated that in Muş, 55.2% of live geese are generally sold in the city center and 44.8% in villages, while Taşkın et al., (2017) stated that the highest sales by breeders are in local markets (40%), it was stated that it was then made to the merchant (25%) and the immediate environment (15%).

"Do the geese have a special shelter, is disinfection applied?" to the question; 85.6% of the breeders in Afyonkarahisar for shelter and 68.8% for disinfection, in Uşak 82.0% and 57.3% answered "Yes". In Afyonkarahisar and Uşak, 92.0% of the breeders struggle with their own means in adverse conditions such as disease, 8.0% in Afyonkarahisar receive support from Veterinarians and Agriculture Organizations, 8.0% in Uşak only indicated that they received veterinary support. In general, it was observed that the losses occurred in the first week after hatching (17.6% in Afyonkarahisar, 12.0% in Uşak). Şengül and Yeter (2020) In Muş, goose shelters are 50 m² in size on average, and the shelters are made of briquettes, wood, etc. stated that it was made of materials. While 67% of the breeders reported that they did not take any precautions against diseases, he stated that very few of the geese died. Boz et al., (2014) reported that breeders kept the geese in the same shelter as other animals, 61.5% did not apply any disinfection, and 98.5% stated that their animals never got sick. 50.4% of the breeders in Afyonkarahisar and 26.7% in Uşak evaluated the fact that geese are compatible with pasture and more resistant to diseases than other poultry as an advantage. 32.8% in Afyonkarahisar and 48.4% in Uşak consider goose breeding as an advantageous livestock activity because it meets the meat needs of the family and creates additional income. "What do you think are the biggest problems and difficulties you face in goose breeding?" for the question 52.8% of the producers in Afyonkarahisar, 77.3% in Uşak stated high feed costs, 17.6% and 14.7% low egg yield, 5.6% and 20.7% of them drew attention to the difficulties experienced in the supply of breeding animals. Similarly, "What do you think is necessary for the development of goose breeding in our province, region and country, what are the deficiencies, what are your demands against the problems you experience?" for the question 49.6% of the breeders in Afyonkarahisar and 44.0% in Uşak drew attention to the advertisement, promotion, and marketing of the products obtained from the geese. While the rate of those who want to goose breeding with high-yielding breeds is 16.0% in Afyonkarahisar, 32.0% in Uşak, 26.4% of the breeders in Afyonkarahisar and 20.0% in Uşak have slaughterhouses, feather my way stated that a cold storage is needed. Taşkın et al., (2017) reported that 50% of breeders stated that geese are easy to sell and resistant to diseases as an advantage. Researchers stated, that 40% of breeders; that they attach importance to goose breeding at the point of

meeting meat consumption and that they also state that the geese are compatible with the pasture as an advantage. It was stated that 50% of the breeders considered high feed prices and low egg production of geese as problems among the difficulties and difficulties

they faced. Researchers reported that 20% of the producers declared that geese damage their farmland. As a result of this study, it was seen that goose breeders expect support, especially in terms of high feed costs and breeding animal supply.

Table 8. Slaughter time, slaughter age, live and carcass weight, feather plucking method and feather usage situation, place of sale, type and price of goose

Slaughter time	Family (n)		SIF (%)	
	Afyonkarahisar		Uşak	
October-November	21	16.8	26	34.7
December- January	65	52.0	36	48.6
February-March	36	28.8	11	14.7
Other months	3	2.4	2	2.7
Slaughter age (month)				
6-9	12	9.6	12	16.0
10-12	40	32.0	44	58.7
13-15	53	42.4	14	18.7
16-18	17	13.6	5	6.7
≥19	3	2.4	0	0.0
Live weight (kg)				
Do not know	40	32.0	10	7.9
2-3	2	1.6	3	4.0
4-5	38	30.4	42	56.0
6-7	38	30.4	16	21.3
≥7	7	5.6	4	5.3
Carcass weight (kg)				
Do not know	47	37.6	13	17.3
2-2.5	1	0.8	1	1.3
3-4	25	20.0	41	54.7
4.5-5	39	31.2	11	14.7
≥5	13	10.4	9	12.0
Feather plucking method				
Dry plucking	12	9.6	14	18.7
Wet plucking	91	72.8	49	65.3
Dry or wet plucking	22	17.6	12	16.0
Feather usage situation				
Throwing	101	80.8	65	86.7
Pillow/quilt making	20	16.0	7	9.3
Selling to trader	4	3.2	3	4.0
Place of sale				
No sale	7	5.9	3	4.0
Neighbor / friends in the village	47	39.8	48	64.0
Local animal markets	59	50.0	17	22.7
Web / social media	5	4.2	7	9.3
Sale type				
No sale	7	5.9	3	4.0
Live	72	61.0	51	68.0
Carcass	37	31.4	16	21.3
Customer Request (Live/carcass/piece)	2	1.7	5	6.7
Sale price (TL)				
200-300	7	5.9	7	9.3
301-400	17	14.4	23	30.7
401-450	30	25.4	24	32.0
451-500	47	39.8	15	20.0
>500	17	14.4	6	8.0

n= number of families surveyed, SIF= share in investigated family

4. Conclusion

Among these provinces, Kütahya and Afyonkarahisar, which were 42,000 and 35,000 in 2019, decreased to 33,000 and 21,000 at the end of 2022, and from 23,000 in 2020 to 12,000 at the end of 2022 in Uşak. This study has also shown that high feed costs are the most important problem for the sustainability of animal husbandry in Türkiye. In addition, "Goose Products, Collection and Sales Units, etc." within the scope of Municipal and Agricultural Organizations for the supply of breeding animals and the sale of goose products. should be created. These units can provide support to growers in the marketing of their products. Considering the goose production potential of Kütahya; The scope of the goose incentives stated by the Ministry of Agriculture and Forestry in "Supporting Economic Investments Based on Agriculture within the Scope of Rural Development Supports 2022-2023 Application Period, Communiqué No: 2022/24" is quite limited. In the relevant communiqué, it is stated that "applications for new facilities in 81 provinces, completion of partially made investments, capacity increase and technology renewal and/or modernization" will be taken into consideration only for turkey and goose breeding. In the continuation of the Communiqué, there is the statement "...No grant support is given for breeding eggs and/or egg production in goose breeding" (Anonymous, 2023). However, our breeders reported that they had the most problems with the supply of breeding eggs and breeding animals. Expanding the scope of the goose incentive will provide an opportunity to prevent losses in our goose stock and to increase our goose presence again in the future.

Author Contributions

The percentage of the author contributions is presented below. The author reviewed and approved the final version of the manuscript.

	Y.A.
C	100
D	100
S	100
DCP	100
DAI	100
L	100
W	100
CR	100
SR	100
PM	100
FA	100

C=Concept, D= design, S= supervision, DCP= data collection and/or processing, DAI= data analysis and/or interpretation, L= literature search, W= writing, CR= critical review, SR= submission and revision, PM= project management, FA= funding acquisition.

Conflict of Interest

The author declared that there is no conflict of interest.

Ethical Consideration

This study was conducted within the scope of the decision of Uşak University Research and Publication Ethics Committee (protocol code: 2023/03-11 and date: 27 April 2023).

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