



## RESEARCH ARTICLE

### The development of organic egg production in Turkey

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### Türkiye’de organik yumurta üretiminin geliştirilmesi

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#### Öz

**Amaç:** Bu çalışmada, organik yumurta üretiminin nasıl yapılacağına dair, uygun coğrafi konum, kafes, tavuk ırkları ve işletme idaresi için çeşitli yaklaşımlar ve öneriler verilerek saha çalışması yapılmıştır.

**Gereç ve Yöntem:** Organik yumurta tavukçuluğunun hangi şartlarda yapılması gerektiğine yönelik bilgi araştırması yapıldı. Aynı zamanda saha çalışması için ticari bir firmada mevcut olan kümeslerden birine 3000, diğerine 1500 olmak üzere toplam 4500 adet yumurta tavuğu pilici (ISA Brown) konularak, organik yumurta üretimi yapıldı.

**Bulgular:** Tavukların verim dönemleri boyunca yumurta verimlerinin %59.92-77.21, günlük yem tüketimlerinin 120-135 g/gün, yemden yararlanma oranlarının 2.85-3.27, yumurta ağırlıklarının ise 55.34-66.19 g arasında değiştiği tespit edildi. 78. hafta sonunda ise mortalite oranının %16.96 olduğu görüldü.

**Öneri:** Hem organik yumurta tavukçuluğunun, hem de diğer organik üretimlerin en kısa zamanda ülke genelinde yayılmasına, geliştirilmesine önderlik edilmelidir.

**Anahtar kelimeler:** Organik yumurta tavukçuluğu, kümes, beslenme, performans

#### Abstract

**Aim:** In this study, several approaches and suggestions were adopted regarding how to establish organic egg production, selection of suitable geographical location, dimension of cage and poultry breeds, finally leading to management of the unit and field trial were executed or considered.

**Materials and Methods:** A research was conducted, about any circumstances in which organic egg poultry should be done. In addition, in a commercial company, organic egg production has been made by 4500 ISA Brown-laying hens which were placing 3000 and 1500 layers in two separate coops.

**Results:** During the production period of the layers, egg production, daily feed consumption, feed conversion ratio and egg weights were determined 59.92-77.21%, 120-135 g/day, 2.85-3.27 and 55.34-66.19%, respectively. At the end of 78 week of age, mortality was 16.96%.

**Conclusion:** A leadership on both organic layer farming and other types of organic production in near future is of importance for becoming them more common throughout the country.

**Keywords:** Organic laying hens, coop, feeding, performance.



## Introduction

Organic layer farming is a type of production that recommends feeding animals by non-synthetic and natural feed, allowing animals to behave as they do in nature, including also pasture feeding, focusing on animal welfare. Eggs obtained by layers fed in that way are called "organic egg". The major reason to pursue organic farming can be considered as friendly environmental production, improving animal welfare standards, for consumer demand to produce high quality, healthy products, and to increase producers' income levels because of expensiveness of organic products (Malaga 2000, Pekel and Unalan 2001, Sundrum 2001). Despite some difficulties in organic egg production method, it has been spreading in Europe in recent years (Kijlstra and Eijck 2006). There are about 8 million organic laying hens especially in England, Germany and Holland (Zeltner and Maurer 2009).

One of the most important points in organic egg production is the number of hens housed. Having too many hens causes an increased incidence of mortality and cannibalism (Bestman and Wagenaar 2006). Besides, reduced incidence of cannibalism was found for the Free-range chickens (Nicol et al 2003) also supported by others (Bestman and Wagenaar 2003). Regarding this, it has been reported that having more than 1.000 of laying hens could cause varying types of problems and that therefore, 500 laying hens as the border line were advised per hen (Hirt et al 2000). High ammonia levels have been reported in organic poultry cages due to feces (Elbe et al 2005) resulting in deterioration of air quality and performance with decline of productivity.

In this study, several approaches and suggestions were adopted regarding how to run organic farm, selection of suitable geographical location, dimension of cage and poultry breeds finally leading to management of the unit.

## Materials and Methods

### *Beginning of organic layer farm*

Primarily, any company who desired to built or establishes organic layer farming, applies to Turkish Ministry of Agriculture (TMA) for a certification which is given by a certified organization with allowance and under the control of TMA. However, for a final decision, some more procedures need to be practiced.

### *Transition process*

This stage is the time beginning from the signing of the contract between the TMA and concerned company until the company gets the certification to start organic layer farming after the final decision given by the TMA. 16 weeks old pullets were purchased from any company for organic egg pro-

duction. The eggs from these animals fed with organic feed for at least six weeks, at the end of the 22 nd week called as "organic product".

### *Poultry-house location and construction*

The location of poultry-houses should be away from residential areas and main roads, and should have water and electricity. Poultry-houses should be well-planned before construction, and materials used should not be harmful to animals and human beings. They should be 4 m in length for every 100 m<sup>2</sup> area. The Poultry-houses should be well ventilated keeping ammonia level to a minimum and providing little moisture for good performance. There should be no competition for water and feedstuff among animals. Poultry-houses should have an 18 cm long perch and 120 cm<sup>2</sup> laying nesting-box per bird. Six animals should be placed in per m<sup>2</sup> inside the poultry house while 4 animals/m<sup>2</sup> should be provided outside including pasture. The maximum number of laying hens should not be more than 3000 in a poultry-house. Animals should be allowed to go outdoors in nice weather in certain times of the year in organic poultry.

### *Pullet selection*

Pullets can be obtained from any breeding firm. In order to have organic eggs pullets should be fed with organic rations at least for six weeks. 16-weeks-old pullets should be purchased from clean, disease free flock that was fed well and without the risk of salmonella.

### *Feedstuffs for organic laying hens*

Organic feedstuffs could be obtained from organizations having organic certification, or grown in the farms in which the company has permission to do organic feed production. Organic feeds should be certainly labeled. Different kinds of vegetable and animal feedstuffs are used in organic egg production. For vegetable-based feedstuffs, the followings are used: Grains, cereals, oil seeds, oily fruits, legume seeds, round or lumped feedstuffs, other seeds and fruits, green and dried rough feedstuffs and other plants along with by-products of all varieties of feedstuffs above.

For animal-based feedstuffs; milk and milk products, fish and other sea animals, eggs and eggs from the laying hens are used. As the mineral-based feedstuffs; sodium, calcium, phosphorus, magnesium and sulphur are used. Trace elements, vitamins, pro-vitamins and chemically well-defined substances with similar effects, enzymes, some microorganisms, protectors, products preventing solidification and chemicals binders are used as feed supplements. In addition to these, some antioxidant substances and yeast could be used in organic livestock farming (Unal 2004, Anonim 2014).





### Feedstuffs and supplements prohibited in poultry rations

Slaughterhouse residuals (meat meal, meat-bone meal and blood meal, etc), oily seed meals extracted with solvents like hexane and heptan or some other chemicals, urea, animal fertilizers, genetically modified feedstuffs, synthetic amino acids, synthetic color substances, synthetic preservatives, synthetic growth factors and stimulants and synthetic appetizers are prohibited in laying hen rations used in organic poultry (Unal 2004).

### Veterinary medical intervention

One of the most important rules in organic poultry is that the genetic structure of the hens should not be changed, and genetically modified products should not be used in animal feeding. Antibiotics, coccidiostats and other artificial substances that help animal growth, hormones or similar substances used to control reproduction are prohibited. Cutting beaks of pullets and plucking should never be tried. Antibiotic application should be done according to some principles. First of all, herbs and herbal extracts should be used in trace amounts as herbal medication instead of chemical drugs. Appropriate documentation should be provided if this kind of medication is used. A local (Konya) company was established and run according to the criteria mentioned above for this study.

### Field trial

In a commercial company, organic egg production has been established 4500 ISA Brown-laying hens which were placed in two separate coops like 3000 and 1500 layers. During the production period of the layers, egg production, daily feed consumption and egg weights were recorded between 26-69 weeks.

## Results

Some performance parameters of organic laying hens in this study are shown in Table 1. During the production period of the layers, egg production, daily feed consumption, feed conversion ratio and egg weights were recorded as 59.92-

77.21%, 120-135 g/day, 2.85-3.27 and 56.73-63.72%, respectively. At the end of 78 week of age, mortality was 16.96%. Number of organic layer in turkey amongst 2007-2010 were 18.847-68.219 and organic egg production in turkey amongst 2008-2010 were 4.424.000- 17.898.809 (Table 2).

### Discussion

16 weeks old, 4500 ISA Brown laying hens were fed with organic feed in a poultry house specifically designed for organic poultry production. Laying hens started producing organic eggs after 22nd week following six weeks of organic feeding. Some data for laying hens is shown in Table 1. As seen from the table, the production periods of the hens are classified as Period I (between the weeks of 26 and 29), Period II (between the weeks of 46 and 49) and Period III (between the weeks of 66 and 69). The egg production of the hens was determined as 77.21% in Period I, 70.13% in Period II and 59.92% in Period III (Table 1). Although in the first period, the egg production was high, there was some reduction due to the fact that the hens were getting older. Average 73.5% of egg production between the weeks of 21 and 68 in Brown laying hens fed with organic feed was observed in another study (Danish Poultry Council 2003). In a study using two different species fed with 100% organic stuff, 76.22% and 78.50% egg production was reported at the end of 71 weeks carried out by Fiks-van Niekerk and Reuvekamp (2009). In another study using different species of laying hens (New Hampshire, White Legorn, ISA Brown) fed with organic feed 84.6% of egg production in ISA Browns was observed as reported by (Sorenson and Kjaer 2000). The egg production

Table 1: Some performance parameters of organic laying hens.

	Periods (Weeks)		
	I 26-29.	II 46-49.	III 66-69.
Egg productions, %	77.21	70.13	59.92
Feed conversion ratio	2.85	2.92	3.27
Egg weight, g	56.73	61.15	63.72
Mortality ratio, %	5.33	11.08	16.96

Table 2: Some data on organic poultry production by years in Turkey.

	Years			
	2007	2008	2009	2010
City number	4	7	8	9
Producer number	4	7	9	14
Laying hens number	18.847	21.928	42.610	68.219
Organic eggs number	No data	4.424.000	11.767.400	17.898.804



observed in these studies is higher than our study. This could be because of different genotypes of the strains of laying hens, higher nutritional values of the feed stuff and different values of digestive capacity of the hens used in these studies.

The exact daily feed consumption per hen could not be determined in the study since the hens were fed in groups. The average daily feed consumption as 120-135 g/d per hen was observed. In the study carried out by Fiks-van Niekerk and Reuvekamp (2009) using two different species and feeding them 100% organically, the average daily feed intake was reported to be between 129.4 and 132.6 g/d. Similar results as in our study were reported in another study by Danish Poultry Council in 2003.

As seen in Table 1, the ratios of the feed conversion in 3 different periods were found to be 2.85, 2.92 and 3.27 kg. While there was a reduction in egg production, there was an increase in the feed conversion ratio with the hens getting older. The feed conversion ratios were reported to be between 2.58 and 3.30 kg in a study comparing different hen strains (Hegelund et al 2006). The feed conversion ratio between the weeks of 21-68 was found as 2.81 kg, feeding the Brown laying hens organically (Danish Poultry Council 2003), which is close to the results from our study.

The weight of the eggs produced by the hens fed organically as well as conventionally increases as the animals gets older. The average weight of the eggs in our study, produced in the periods I, II and III were 56.73, 61.15 and 63.72 g, respectively. While these values were found lower than that of reported by Fiks-van Niekerk and Reuvekamp (2009), they were higher than that of in another study (Sorenson and Kjaer 2000). These differences might be due to differences in feedstuff given to animals and/or different feed values of the fields that the hens pastured on.

One of the biggest problems in organic poultry is the mortality ratio. The deaths are generally because of *E. coli* and coccidiosis like parasites, cannibalism, and infectious bronchitis. The most important parasites in egg poultry are *Dermanyssus gallinae*, coccidia (*Eimeria* spp.) and gastric-enteric helminths (especially *Ascaridia galli* and *Heterakis gallinarum*). The mortality ratios vary in different countries. For example, this ratio is 11% in average (0-21) in Holland (Fiks-van Niekerk and Reuvekamp 2009), it is 8% (3-25) in Switzerland (Bio Suisse 2006). The mortality ratios were 5.33%, 11.08% and 16.96% at weeks 29, 49 and 69, with the average ratio of 11.12% in our study. While the average mortality ratio in Brown laying hens (ISA Brown) was 19.9% reported by Sorenson and Kjaer (2000), this ratio was 22% in an organic egg production study carried out by Hegelund et al (2006). Another study reported mortality ratio of 14.8% in Brown laying hens between the weeks of 21 and 68 (Danish Poultry Council 2003). These mortality rates are higher than

that of our results. This could be because of the differences in the genotypes of the hens used in the studies and/or management deficiencies related to feeding and caring of hens. In addition to these, faulty feeding of chicks, keeping them in a crowded poultry-house when they are growing, having more than enough numbers of hens in the poultry house during production period and going outdoors for pasture insufficiently might have caused the high mortality ratio.

Organic egg production was first started by 4 producers in 4 different cities in 2007, using 18.847 organic laying hens in our country (Table 2). In 2008, 7 producers using 21.928 organic laying hens produced 4.424.000 organic eggs in 7 cities, with an increase of 16.35% of organic laying hens compared to that of in 2007. In 2009, 11.767.400 organic eggs were produced by 9 producers in 8 cities. There was an increase of 94.32% compared to that of the previous year (Table 2). This might be due to consumers' interest in organic eggs. However, the egg production ratio obtained from laying hens in the same year was observed to be higher than the previous year. While the egg production ratio from organic laying hens was approximately 55.27% in 2008, this ratio was 75.66% in 2009 (Table 2). This might have resulted from having been paid more attention to organic eggs farming, feeding them better and applying better management programs. In 2010, 17.898.804 organic eggs were produced by 14 producers in 9 cities, using 68.219 organic laying hens. A 60.11% increase was observed in the number of organic laying hens compared to that of the previous year (Table 2). It is estimated that there will be around 100.000 organic laying hens in our country in 2011. Raising public awareness in the health aspects of organic production will increase the tendency towards consuming organic products.

## Conclusion

The organic poultry is not well known in our country and the community is not aware of it. Therefore, some precautions should be taken by the authorities. These included as follows: More importance should be given to organic farming (vegetable) and animal production. Producers (farmers) should be informed about organic production methods and techniques. Foods produced organically should be introduced to the general public and their importance should be explained by the media (press, television, etc). Organic production and investment incentives should be encouraged. TMA should support the investments or individuals producing organic matter. Organic vegetable and animal production studies suitable for environmental conditions should be carried out in our country. High priority should be given to projects on organic production submitted to The State of Planning Office (DPT), The Scientific and Technological Research Council of Turkey (Tubitak, Teydeb) and project centers at the universities. High-quality egg and resistant to environmental conditions genotypes for laying hens, in our country should be prefer-





red. The profitability of organic production should be emphasized. Knowledge and experiences of the individuals or establishments doing organic production should be utilized. Public should be given lectures by individuals doing organic production or academicians working on the subject.

## References

- Anonim 2014. [http://www.tarim.gov.tr/Files/Files/Yonetmelikler/organiktarimin\\_esaslari\\_veuygulanmasina.pdf](http://www.tarim.gov.tr/Files/Files/Yonetmelikler/organiktarimin_esaslari_veuygulanmasina.pdf). Erişim tarihi; 02.02.2014.
- Bestman MWP, Wagenaar JP, 2006. Feather pecking in organic rearing hens. Joint Organic Congress, May 2006, Odense, Denmark, pp: 30-31.
- Bestman, MWP, Wagenaar JP, 2003. Farm level factors associated with feather pecking in organic laying hens. *Livestock Produc Sci*, 80, 133-140.
- Bio Suisse, 2006. Calculation of Production Costs (Internal Document).
- Danish Poultry Council, 2003. Yearly Report (in Danish) Copenhagen, Denmark, p: 151.
- Elbe U, Ross A, Steffens G, Van Den Weghe H, Winckler C, 2005. Organic Layers In Large
- Fiks-van Niekerk T, Reuvekamp B, 2009. Options to realise a 100% organic feed for laying hens. Poultry Welfare Symposium Cervia, Italy, 18-22 May, p: 115.
- Hegelund L, Sorensen JT, Hermansen JE, 2006. Welfare and productivity of laying hens in commercial organic egg production systems in Denmark. *NJAS*, 54-2.
- Hirt H, Hordegen P, Zeltner E, 2000. Laying hen husbandry: Group size and use of hen-runs. In: Eds: Alfoldi T, Lockeretz W, Niggli U, Proceedings 13th International Ifoam Scientific Conference, Basel, p: 363.
- Kijlstra A, Eijck IAJM, 2006. Animal health in organic livestock production systems: A review. *NJAS*, 54-1.
- Malaga H, 2000. Ecological Alternatives in Agricultural and Livestock Production, United Nations Environment Programme, Division of Technology, Industry and Economics, Geneva, Switzerland.
- Nicol CJ, Potzsch C, Lewis K, Green LE, 2003. Matched concurrent case-control study of risk factors for feather pecking in hens on free-range commercial farms in the UK. *British Poult Sci*, 44, 515-523.
- Pekel E, Unalan A, 2001. Hayvansal üretimde ekolojik tarımın yeri ve Türkiye için önemi, Türkiye I. Ekolojik Tarım Sempozyumu (21-23 Haziran 1999), İzmir, Türkiye, pp: 17-24
- Sorenson P, Kjaer JB, 2000. Non-commercial hen breed tested in organic system. In: Ecological animal Husbandry in the Nordic Countries, DARCOF Report No.2, Eds: Hermansen JE, Lund V, Thuen E, Tjele, Denmark, pp: 59-63.
- Sundrum A, 2001. Organic livestock farming: A critical review. *Livestock Produc Sci*, 67, 207-215.
- Unal S, 2004. Organik hayvancılığın esasları ve hayvan besleme. 1st International Congress on Organic Animal Production and Food Safety. 28 Nisan-1 Mayıs 2004, Kuşadası-Türkiye, pp: 54-60.
- Zeltner E, Maurer V, 2009. Welfare of organic poultry. Poultry Welfare Symposium Cervia, 18-22 May, Italy, pp: 104-112.