

## A Review of the Last Decade (1994-2004) of Quail Studies in Turkey

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### Abstract

Quails were first imported from Europe and then bred in Turkey for scientific and commercial purposes virtually 50 years later than the initiation of quail breeding for intensive purposes in Japan. Having been utilized as model animals in universities, the quail attracted the attention of consumers with its poultry and eggs leading to the foundation of quail breeding farms. While only a few researchers paid particular attention to quail breeding as model animals as well as commercial production at first, with a low feed consumption level and short generation interval, it soon became a model animal to be studied scientifically for many researchers with limited research facilities. This particular study aims to outline the researcher profile and potential in order to build up prospective policies by disclosing the number of scientific studies on quails, which are becoming a popular issue for study recently. With this study, a nominal inventory of the scientific studies on nutrition, management, breeding, physiology, health and other related areas in regard to quail breeding published in national and international journals and meetings like congresses, symposiums etc. between 1994 and 2004 was made filing them according to the particular field of study. Despite the fact that the number of studies couldn't maintain a stable ascending line during those years, it was proved that the studies presented in journals and meetings illustrated a steady rise in time. The number of articles in the journals listed in the Web of Knowledge was 1378 between 1994-2004, while, in Turkey, it was 130 in the same interval of time showing that scientific studies produced by Turkish scholars comprised 9.43 % of those produced in total. However, only in 2004, the number of articles on quails published in journals listed in the web of knowledge written by Turkish scholars comprised 42.30 % of total number of articles published, which points up a significant rise. Therefore, it is highly suggested to encourage those working in the field and poultry breeders as well so that they can subsidize researches and increase their productive capacity by bringing in some quality studs.

**Key words:** Japanese quail, survey, statistics, Turkey

### Türkiye' de Bildircin Çalışmalarının Son On Yılı Üzerine (1994-2004) Bir İnceleme

#### Özet

Türkiye'ye bildircinin bilimsel ve ticari amaçlı kullanım için Avrupa'dan getirilmesi ve yetiştirilmesi, Japonya'da entansif amaçlı bildircin yetiştiriciliğinin başlamasından 50 yıl sonrasına denk gelmektedir. Önceleri üniversitelerde model hayvan olarak kullanılan bildircinin et ve yumurta gibi ürünleri tüketicin ilgisini çekmiş ve bildircin işletmeleri kurulmasına yol açmıştır. Başlangıçta az sayıda araştırmacının gerek model hayvan gerekse üretim amaçlı ilgilendiği bildircin; az yem tüketmesi, kısa generasyon aralığı vb. nedenlerden dolayı zamanla kısıtlı araştırma olanaklarına sahip çok sayıda araştırmacının ilgilendiği ve bilimsel çalışmalar yaptığı model hayvan haline gelmiştir. Bu çalışma, zaman içerisinde önem kazanan bildircinlerde yapılmış bilimsel makale sayısını ortaya çıkararak, bu konuda çalışan araştırmacı profilini ve potansiyelini ortaya çıkarmak, geleceğe yönelik politikalar oluşturmayı hedeflemektedir. Bu çalışma ile 1994 yılları ile 2004 yılları arasında bildircinlerde ıslah, maneman, besleme, fizyoloji, sağlık ve diğer alanlarda yapılmış uluslararası ve ulusal bilimsel dergilerde, kongre, sempozyum vb. etkinliklerde yayınlanmış bilimsel çalışmaların çalışma alanlarına göre sayısal envanteri çıkarılmıştır. Yıllar itibariyle dengeli bir dağılım söz konusu olmasa bile yıllar boyunca çeşitli bilimsel dergi ve etkinliklerde yapılmış çalışma sayısında önemli artış olduğu ortaya konulmuştur. 1994-2004 arası web of science tarafından taranan dergilerde yayınlanan makale sayısı toplamı 1378, aynı periyotta Türkiye çıkışlı makale sayısı toplamı 130 olup, bu da bu dönemde Türkiye çıkışlı makalelerin dünya makale sayısı toplamının %9.43'ünü oluşturduğunu göstermektedir. Ancak 2004 yılında web of science tarafında taranan dergilerde yayınlanmış Türkiye çıkışlı bildircinlerle ilgili makale sayısı, toplam yayınlananların %42.30'ünü oluşturduğu görülmüş olup bu oldukça önemli bir rakamdır. Bu yüzden Türkiye'de bu konuda çalışanların daha fazla desteklenmesi, büyük tavukçuluk firmalarının nitelikli damızlık materyal temin ederek hem bilimsel çalışmalara destek vermesi hem de daha büyük üretime yönelmesi gerekmektedir

**Anahtar kelimeler:** Japanese quail, inceleme, istatistik, Türkiye

## Introduction

Intensive quail breeding first started in Japan in 1920's and then spread to the U.S, Europe, Near East and Middle East between 1930's and 1950's (Minvielle, 2004). Researches on Japanese quails started simultaneously and quails were regarded as an appropriate model animal for fowls for both its eggs and its meat. Since then, many scholars made carried out researches and published articles on Japanese quails. Besides, many quail breeding farms have been founded in various places around the world especially including Japan, the U.S.A and European countries. Until 2004, however, a detailed analysis regarding the number of publications and particular fields of study on quails was still missing. French researcher Francis Minvielle provided an inventory of scientific publications on genetics, breeding, physiology, diseases, characteristics of quails as well as quails as model animals between 1992 and 2002 in a paper presented in the XXII. World Poultry Congress and in his article published in the World's Poultry Science Journal in 2004. During the period of analysis, he observed a decline in the number of articles and called for several precautions to raise consciousness on the subject.

The history of first scientific quail breeding studies in Turkey dates back to 1970's while the first commercial trials could only set off in 1980's. In an interview made with Prof. Dr. Orhan Kavuncu in 1986, he stated that the first quail breeding studies was launched in Ankara University Faculty of Agriculture, which is situated in the capital city and the central Anatolia, with some lines brought from Germany in 1970. He also said that quail breeding for commercial purposes following the studies in universities started just before 1980 and there were farms in big cities like Istanbul, Ankara and Izmir as well as in small ones such as Denizli, Konya, Samsun, Zonguldak and Içel (Kavuncu, 1986).

The first study made on Japanese quails was "Egg Production in Japanese Quails and the Study on the Effects of Additive and Non-Additive Genes on the Characteristics of Breeding" presented by Prof Dr. Tahsin Kesici from Ankara University in the IV. Science Congress in Ankara on November 5-8, 1973 (Kesici, 1973). In this study, two Japanese quail lines bred in Germany and France were used, which were delivered to many universities and poultry breeders later on.

Shortly after that, Japanese quails were brought from Germany to Ege University Faculty of Agriculture,

which is situated Izmir, on the West Coast of Turkey, also the third biggest city, in order to be used in scientific studies and delivered to poultry breeders in the region. The first short review, "Quail Breeding" was published in "DortMevsim" (FourSeasons) by Prof. Dr. Cetin Kocak from Ege University in 1974 (Koçak, 1974). On June 3, 1983, a Quail Breeding seminar was held at Ege University Agricultural Research and Extension Center to inform poultry breeders. The first article from Ege University Faculty of Agriculture, "Studies on Various Production Characteristics of Japanese Quails", was presented in National Poultry Congress in Istanbul in 1991 (Koçak ve ark., 1991). Subsequently, scientific researches on quails began (and still ongoing) in the research centers of faculties of agriculture and veterinary and also in those administered by Ministry of Agriculture. Meanwhile, public interest towards quail poultry and eggs arose in time bringing about many more quail breeding farms. Since 1970's, many researchers working on poultry science studied quails and published a great deal of works. Nevertheless, a survey on the number of articles and quail breeding stations, and also on the amount of the production and consumption of quail poultry and eggs seem to be lacking. The aim of this study, therefore, is to illustrate the quality and the quantity of researches on quails in Turkey between 1994 and 2004, which will eventually provide a considerable assistance based on these results.

## Methods

For this study, a form of questionnaire has been developed in order to be sent to twenty departments in the faculties of agriculture in several universities, seventeen deans of the faculties of veterinary, related departments of the faculties of applied science working on the subject, related units of Ministry of Agriculture and research centers and they have been asked to focus on the following points:

- The number of studies on nutrition, management, breeding (genetics, breeding, biotechnology), physiology, health and other related areas published in journals listed in web of knowledge between 1994-2004 and classified according to the year of publication.
- The number of studies on nutrition, management, breeding (genetics, breeding, biotechnology), physiology, health and other related areas published in national journals between 1994-2004 classified according to the year of publication.

- The number of papers on nutrition, management, breeding (genetics, breeding, biotechnology), physiology, health and other related areas presented in international congresses and symposiums between 1994-2004 classified according to the year of publication.
- The number of papers on nutrition, management, breeding (genetics, breeding, biotechnology), physiology, health and other related areas presented in national congresses and symposiums between 1994-2004 classified according to the year of publication.
- The number of books on quails published within last ten years.
- The number of MA and Ph.D. dissertations on quails within last ten years.

After the evaluation of questionnaire forms, studies published in journals listed in Web of Knowledge (<http://isi15.isiknowledge.com/portal.cgi>) and Pubmed (<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi>) were also reviewed with computer assisted systems. Moreover, the number of studies on quails published in journals listed in Web of Science between 1994 and 2004 was specified.

A regression analysis was carried out in order to determine the yearly rise and fall in the number of articles and papers for each group of the questions. Only the regression analysis of the studies published in journals listed in Web of Knowledge was found meaningful ( $P=0.06$ ;  $y=3.567+0.206x$ ).

### Web of Knowledge

The figures about the articles published in journals listed in Web of Knowledge for each year are illustrated in Table 1. While 1378 articles in total were published in journals listed in Web of Knowledge between 1994 and 2004, 130 articles in total were published in Turkey within the same period of time where only 1 article was published in 1994; whereas it turned out to be 44 articles in 2004. Total number of studies published in Turkey between 1994 and 2004 comprises 9.43 % of those published worldwide. A significant rise was recorded in the number of articles published, especially for the last two years (22 articles in 2003 and 44 in 2004, which makes up 13.84 % and 42.30 %, respectively, of total worldwide publications).

Table 1. Annual number of the articles published in national and international journals and meetings between 1994 and 2004.

Years	Web of Knowledge	Pubmed	National Journals	International Meeting	National Meeting	World (Web of Knowledge)
1994	1	0	5	0	0	137
1995	5	1	17	6	0	142
1996	4	1	17	3	2	136
1997	5	0	8	7	3	121
1998	8	0	9	1	1	125
1999	15	1	8	5	2	126
2000	2	0	9	0	0	109
2001	10	4	8	2	0	111
2002	14	5	10	0	0	108
2003	22	8	4	0	1	159
2004	44	10	5	4	1	104
Sum	130	30	100	28	10	1378

Table 2. The statistical distribution of the annual number of the articles published in national and international journals and meetings between 1994 and 2004 according to the particular field of study.

	Web of Knowledge	Pubmed	National Journals	International Meeting	National Meeting
Breeding	23	2	15	10	1
Management	8	0	17	2	4
Nutrition	61	15	28	9	2
Physiology	19	9	30	7	2
Health	12	2	8	0	1
Other	7	2	2	0	0
Sum	130	30	100	28	10

The distributions of the articles in terms of the year and the field of publication are shown in 2 and 3. Most of the studies (in order) were done on nutrition (61), breeding (23), and physiology (19) (Table 2), even so, the number of publications increased in all fields alike. While, there was only 1 on other related areas publication in 1994, there were 22 on nutrition, 2 on management, 17 on breeding, 2 on physiology, 5 on health and 1 on other related areas in 2004 (Table 3).

The distribution of the articles published in the journals listed in Web of Knowledge considering the universities in Turkey is shown in Table 4. According to the classification based on the first author, Fırat University seems to be heading with 24 articles, followed by Ege University with 18 articles and Selçuk University with 13 articles.

Table 3. The statistical distribution of the annual number of the articles published in journals listed in Web of Knowledge between 1994 and 2004 according to the particular field of study.

Years	Breeding	Management	Nutrition	Physiology	Health	Other	Sum
1994	0	0	0	0	0	1	1
1995	1	1	2	1	0	0	5
1996	1	0	3	0	0	0	4
1997	1	0	2	2	0	0	5
1998	3	1	1	2	0	1	8
1999	5	0	6	2	2	0	15
2000	1	0	0	0	1	0	2
2001	0	1	5	3	2	0	10
2002	2	1	7	2	2	0	14
2003	2	2	13	5	0	0	22
2004	7	2	22	2	5	1	44
Sum	23	8	61	19	12	3	130

Table 4. The statistical distribution of the annual number of the articles published in journals listed in Web of Science between 1994 and 2004 classified according to the authors and their universities.

Universities	Breeding	Management	Nutrition	Physiology	Health	Other	Sum
Adnan Menderes	1	1	2	1	0	0	5
Akdeniz	0	0	3	1	0	0	4
Ankara	2	0	3	1	0	0	6
Boğaziçi	0	0	0	0	0	3	3
Çukurova	0	0	6	0	0	0	6
Dicle	1	0	0	0	0	0	1
Ege	15	1	1	1	0	0	18
Erciyes	0	0	6	1	4	0	11
Fırat	0	0	16	3	2	3	24
Gaziosmanpaşa	1	0	0	0	0	0	1
İstanbul	1	0	0	0	2	0	3
Kafkas	1	0	4	0	0	0	5
Kocatepe	0	0	4	0	0	0	4
Mersin	1	0	0	0	0	0	1
Mustafa Kemal	0	2	0	1	0	0	3
Ondokuz Mayıs	1	1	5	2	0	0	9
Onsekiz Mart	0	0	1	0	0	0	1
Selçuk	0	1	6	5	1	0	13
Süleyman Demirel	0	0	0	2	0	0	2
Sütçü İmam	0	0	0	0	2	0	2
Uludağ	1	2	0	0	0	1	4
Elazığ Vet.Kont.Arş.	0	0	3	0	1	0	4
Sum							130

Table 5. The statistical distribution of the annual number of the articles published in journals listed in Web of Science between 1994 and 2004 classified according to the journals they were published.

Name of the Journals	Number
Animal Learning and Behaviour	2
Archiv Fur Geflügelkunde	15
Archiv Fur Tierernahrung	1
Archiv Fur Tierzucht	1
Archives of Animal Nutrition	2
Asian-Australasian Journal of Animal Sciences	4
Behaviour Research and Therapy	1
Biological Trace Element Research	3
Biotechnology and Biotechnological Equipment	1
British Poultry Science	10
Faseb Journal	3
Indian Veterinary Journal	8
Journal of Animal and Feed Sciences	1
Journal of Animal Breeding and Genetics	1
Journal of Applied Animal Research	4
Journal of Nutrition	5
Journal of Reproductive Immunology	1
Journal of Veterinary Medicine Series A-Physiology Pathology Clinical Medicine	2
Journal of Veterinary Medicine Series B-Infectious Diseases And Veterinary Public Health	1
Journal of Veterinary Medicine Series C-Anatomia Histologia Embryologia	1
Nutrition Research	4
Research in Veterinary Science	4
Revue De Medecine Veterinaire	5
South African Journal of Animal Science	6
Turkish Journal of Veterinary & Animal Sciences	36
World's Poultry Science Journal	1
Nutrition and Cancer-An International Journal	1
B Vet I Pulawy	1
J Trace Elem Exp Med	1
Indian J of Animal Science	1
Vet Hum Toxicol	1
Journal of Animal Physiology and Animal Nutrition	2
Sum	130

The articles were also categorized on the basis of the journals they were published, which is shown in Table 5. Turkish Journal of Veterinary & Animal Science is the leading journal with 36 articles, followed by Archiv für Geflügelkunde with 15 articles and British Poultry Science with 10 articles.

### **Pubmed**

The number of articles published in the journals listed in Pubmed for each year is shown in Table 1. Thirty articles in total were published between 1994 and 2004. Although there was no publication in 1994, 10 articles were published in 2004, which proves a considerable

rise in the number of articles, especially for the last two years (8 articles in 2003 and 10 in 2004).

The distributions of the articles in regard to the field and the year of publication are shown in Table 2 and Table 3. The published studies mainly focused on nutrition (15 articles) and physiology (9 articles) (Table 2). While there was no article found in the list in 1994, 7 articles on nutrition, 1 on breeding, 1 in physiology and 1 in other related areas were listed in Pubmed, on the other hand, no articles were published on management and health in 2004 (Table 6).

#### **Other (National Journals)**

The articles published in the other journals were classified according to the year of publication and given in Table 1. Between 1994 and 2004, 100 articles in total were published, exhibiting a dramatic rise in 1995 and 1996 (17 articles), followed by 2002 with 10 articles.

The distributions of the articles in years with reference to the field and the year of publication are shown in Table 2 and 7. Most of the studies were carried out on physiology (30), nutrition (28), management (17) and breeding (15), showing no constant rise in the quantitative data.

#### **International Meetings**

The number of papers published in the proceedings of international meetings (congress, symposium etc.) was classified annually and given in Table 1. Between 1994 and 2004, 28 papers in total were published, which

reached its highest point in 1995 (6 papers) and 1997 (7 papers).

The papers were also assorted in regard to the field and the year of publication in Table 2 and 8. The majority of papers were published on breeding (of 10 papers in total, 4 were published in 1999), nutrition (9 papers most of which were published in 1995) and physiology (of 7 papers in total, 2 papers were published in 1995, 2 in 1997 and 2 in 2004) (Table 8). Only two papers published on management, while none was published on health and other related areas.

#### **National Meetings**

The number of papers published in the proceedings of national meetings (congress, symposium etc.) was classified annually and given in Table 1. Between 1994 and 2004, 10 papers in total were published, which peaked in 1997 (3 papers) and 1999 (2 papers).

The papers were also sorted out in respect to the field and the year of publication in Table 2 and Table 9. Management happened to be the most popular field with 4, which was followed by nutrition and physiology with two papers for each (Table 2). Out of those 4 (management), 2 papers were published in 1999; while only one paper in 1997 was presented on breeding. On physiology, one paper in 1996 and one in 1997 were presented and only one paper was published on health in 2004. No paper was found to be presented as far as other related areas are concerned.

Table 6. The statistical distribution of the annual number of the articles published in journals listed in Pubmed between 1994 and 2004 according to the particular field of study.

Years	Breeding	Management	Nutrition	Physiology	Health	Other	Sum
1994	0	0	0	0	0	0	0
1995	0	0	1	0	0	0	1
1996	1	0	0	0	0	0	1
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
1999	0	0	1	0	0	0	1
2000	0	0	0	0	0	0	0
2001	0	0	2	0	1	1	4
2002	0	0	0	5	0	0	5
2003	0	0	4	3	1	0	8
2004	1	0	7	1	0	1	10
Sum	2	0	15	9	2	2	30

Table 7. The statistical distribution of the annual number of the articles published in national journals between 1994 and 2004 according to the particular field of study.

Years	Breeding	Management	Nutrition	Physiology	Health	Other	Sum
1994	0	0	1	1	3	0	5
1995	1	4	3	6	3	0	17
1996	3	1	4	7	2	0	17
1997	1	3	2	2	0	0	8
1998	3	2	2	2	0	0	9
1999	3	2	2	1	0	0	8
2000	0	2	3	3	0	1	9
2001	0	1	3	3	0	1	8
2002	3	1	1	5	0	0	10
2003	0	0	4	0	0	0	4
2004	1	1	3	0	0	0	5
Sum	15	17	28	30	8	2	100

Table 8. The statistical distribution of the annual number of the articles published in international meetings (congresses, symposiums, etc.) between 1994 and 2004 according to the particular field of study.

Years	Breeding	Management	Nutrition	Physiology	Health	Other	Sum
1994	0	0	0	0	0	0	0
1995	0	0	4	2	0	0	6
1996	1	0	2	0	0	0	3
1997	1	2	2	2	0	0	7
1998	0	0	0	1	0	0	1
1999	4	0	1	0	0	0	5
2000	0	0	0	0	0	0	0
2001	2	0	0	0	0	0	2
2002	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0
2004	2	0	0	2	0	0	4
Sum	10	2	9	7	0	0	28

Table 9. The statistical distribution of the annual number of the articles published in national meetings (congresses, symposiums, etc.) between 1994 and 2004 according to the particular field of study

Years	Breeding	Management	Nutrition	Physiology	Health	Other	Sum
1994	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0
1996	0	1	0	1	0	0	2
1997	1	0	1	1	0	0	3
1998	0	1	0	0	0	0	1
1999	0	2	0	0	0	0	2
2000	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0
2003	0	0	1	0	0	0	1
2004	0	0	0	0	1	0	1
Sum	1	4	2	2	1	0	10

### **Books and Dissertations**

5 books in total were printed on quails between 1994 and 2004, accompanied by 10 MA and 5 PhD dissertations within the same period.

### **Conclusion**

Retrospectively thinking, intensive production of Japanese quail first started in Japan in 1920's and then spread to the U.S, Europe, the Near East and the Middle East between 1930's and 1950's; and in Turkey it could only begin almost fifty years later (c. 1970's).

Through a 35 year's experience, a significant progress has been made in quail breeding for scientific and commercial purposes. It seems that we have ample data about the number of studies done and the capacity of poultry egg production for all these years. Minvielle (1) conducted the first serious and inclusive worldwide survey on Japanese quails so that he could specify the number of studies and map out the particular fields of study. Considering the data acquired in his survey, for the last ten years, one can maintain that there is a considerably decreasing tendency in quail breeding works, every year four studies less than the previous one. Contrary, in our study, there is increasing tendency, every year 3.5 studies more than previous one with the journals listed in Web of Knowledge. Although we couldn't find a "stable equilibrium" in terms of yearly distribution of the studies, it can be asserted that there is an outstanding increase in the number of quail studies between 1994 and 2004, which may be partly the consequence of the new rules of academic promotion, which urges the academicians to produce papers to be published in international journals. Moreover, the rise in the number of poultry researchers may have triggered the interest towards Japanese quails, which have proved to be easier and more economical for scientific studies.

Considering the fact that Turkish researchers managed to produce 13.84% of all scientific publications in the field in 2003 and 42.30% in 2004, potentially, Turkish researchers in the field appear to be sufficiently enough. Therefore it is highly recommended to pay attention to the studies on quail breeding that they do deserve and promote and encourage the researchers in the field more than ever. Besides, the production and consumption of quail poultry and eggs, which make up an important part of overall poultry production and consumption, must be urgently and scientifically analyzed and documented. Finally, leading companies in the field need to embrace the struggles to produce quail poultry and eggs and subsidize the researches on the field by providing some quality studs.

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