

The Role and Importance of Cattle Breeders Association on Bovine Breeding in Turkey: A Case Study in Western Part of Turkey

O. Murat Koçtürk

School of Applied Sciences, Celal Bayar University, Manisa, Turkey

Abstract: The Pedigree System was introduced under Turkish-German (GTZ) and Turkish-Italian (ANAFI) projects and the legislation was begun to be issued in 2000. In the legislative research, the rules of European countries, the EU legislation and the ICAR (Internal Committee for Animal Recording) have been taken into account. With approval of the Minister's Office, the Cattle Breeders' Central Association was delegated the authority to conduct the herdbook system in Turkey. The aim of this study is to outline the activities of the cattle breeding unions, which were started to be founded in 1995 and to have a close look and to have a close look at the Cattle Breeders' Association of Manisa. Sixty percent of the cattle in Turkey are now within the scope of pedigree and prepedigree system. The percent in Manisa is approximately 91%. Producers who use the pedigree system state that the system does not have much effect on their income and welfare. The main problem here is that the production costs are high but the price of the milk is low. To overcome this problem the organization process of CBAT cooperatives has to be completed.

Key words: Livestock, bovine breeding, cattle breeders association, pedigree, herdbook, Turkey

INTRODUCTION

Historically, livestock and livestock products have played important roles in the Turkish agricultural economy and rural society. Mixed farming is the predominant farming system, with 86% of farms practice livestock and crop production together (Anonymous, 2004a). Stock raising has always been a sector of vital importance economically and socially in Turkey as it is in the world. Stock raising has an important share in agricultural system in Turkey as well as the world (Anonymous, 2004b). Dairy animal breeding, in particular, is the most common branch in every part of the world (Ghaffar *et al.*, 2007; Ferreira *et al.*, 2007; Musalia *et al.*, 2007; Bayemi and Webb, 2009; Rekhis *et al.*, 2007; Yildirim *et al.*, 2008; Koçturk, 2009).

Productivity in livestock farming rose dramatically throughout the developed world during the second half of the twentieth century as a result of efficient breeding programs, improved understanding of animal nutrition and disease control and better designed housing systems (Anna *et al.*, 2006). Herdbooks for dairy cattle have registered animals for more than a hundred years. The animal were identified individually and only records on breeding were registered. In the 1950s several countries started to identify animals for animal health programs (Wismans, 1999). In all over the world, there is an increasing tendency among livestock breeders for inbreeding and artificial selection to improve the productivity. These are called as culture breeds having

high productivity traits, but their resistance to harsh environmental conditions and diseases were not taken into account during selective breeding. Those negative factors seriously threaten the future of lots of species and breeds. On the other hand, animal breeds still having genetic variations are insurances of the future since those might be regarded as genetic resources (Arat, 2006).

The most prominent factors behind the level of productivity reached in developed countries are production unions and their efforts in establishing registry systems which lead to the betterment of the livestock. In these countries, thanks to the genetic and environmental betterment studies, the level of productivity and production quality per animal is quite high (Güngör, 2005). Genetic selection programmes, which are a part of combining desirable merits of breeds through crossing, are an important means of achieving such productivity increases (Mwacharo and Drucker, 2005). Genetic evaluation and selection of animals as well as the level of nutrition, management and health conditions will influence individual animal and herd performance as well as profitability of dairy farms (Rhone *et al.*, 2008).

Cattle breeding organizations throughout Europe and North America quickly evolved breed improvement programmes based on studies utilising the new Artificial Insemination (AI) technology. Initially, young sires were offered by herdbook breeders and progeny tested by the AI cooperatives but soon elite cows were being identified through the recording systems and contracted to produce sons by the newly proven sires (Bichard, 2002).

In Turkey, in order to improve cattle breeding and thus the standard of living of the producers many projects have been implemented. With the help of these projects by the state and the private sector, solutions have been offered to overcome the problems of cattle breeding. To ensure a much more active participation of producers into the studies, cooperative projects were started with other countries in the late 80s. Cattle Breeders' Associations were founded in 08.09.1995 according to the regulations published in the 22369 issue of Resmi Gazete (Official Gazette). Minimum requirements to establish a cattle breeders' association is to have at least seven producers gathered and cattles of five different races. Once these requirements are fulfilled, the producers can apply Ministry of Agriculture and Rural Affairs to form a union (Inan and Basaran, 2004).

The first cattle breeders' association was founded in Bursa, in 1995 and the number of these associations have increased steadily (Ekmen, 2003). Cattle Breeders' Association of Manisa was founded in 1995 with 16 members and it has become with its 2640, one of the most important producers' organization.

MATERIALS AND METHODS

The material of this study is the data gathered from Cattle Breeders' Association of Turkey and Cattle Breeders' Association of Manisa. In this study, a survey study was carried out on the members of Cattle Breeders' Association of Manisa. The number of producers to be interviewed was decided by the proportional sampling formula (Newbold, 1995). Method has 10 % error margin

$$n = \frac{Np(1-p)}{(N-1)\sigma_{px}^2 + p(1-p)}$$

Where:

n = The scale

N = The total number of producers in that area

σ_{px}^2 = Variance of proportion

The purpose of the study was to reach the maximum scale. To achieve this goal, P was taken as p: 0, 50 and (1-p): 0, 50. Sixty six farmers were interviewed. To see whether, there was a difference between farms regarding their size, the farms were divided into three groups:

Group I = Farms that have 1-10 animals (15 farms)

Group II = Farms that have 11-30 animals (26 farms)

Group III = Farms that have more than 31- + animals (25 farms). Information acquired from farmers by this survey were analyzed and evaluated by SPSS

RESULTS AND DISCUSSION

Turkey is one of the prominent countries of the world in animal breeding. It is observed in the last 40 years that animal stock is decreasing. Although, an improvements in productivity seems to compensate the loss, Turkey from time to time, imports animal products. In order to solve the essential problems of animal breeding eugenics is considered crucial in activities of betterment.

Pedigree system for cattle in Turkey: The Pedigree System is conducted under Animal Breeding Law no 4631, the Directive of Pedigree and Prepedigree of Animals issued under that law, the Instruction of Pedigree of Breeding Dairy Cattle issued in 2000 and specific directives and correspondences issued at various times. As explained before, The Pedigree System was introduced under Turkish-German (GTZ) and Turkish-Italian (ANAFI) projects and the legislation was begun to be issued in 2000. In the legislative work, the rules of European countries, the EU legislation and the ICAR (Internal Committee for Animal Recording) have been taken into account. With approval of the Minister's Office, the Cattle Breeders' Central Association was delegated the authority to conduct the herdbook system in Turkey. At present, the Cattle Pedigree Activities are conducted by the Cattle breeders' Central Association under the Ministry's control and support. The pedigree system is conducted with a computer program, which operates through the Internet. The software of the program has been designed by the staff of the Central Association with advice from MARA. The pedigree system includes the following activities (Anonymous 2006a):

- Identification
- Milk yield
- Herd records
- Classification
- Certification
- Program
- Herd management consultancy
- Breeder value estimation

The pedigree activities are conducted by 51, 775 holdings in 69 provinces, where there are Provincial Associations that are members to Turkey Cattle Breeders' Central Association and currently 1.828.486 cattles are registered in the system (Anonymous, 2007; Anonymous 2009a). Apart from its (TCBCA) activities within the country it also is a member of European Holstein Confederation, International Committee for Animal Recording and Interbull and thus improves its registry

and breeding levels to E.U standarts. Turkey Cattle Breeders' Central Association also works on three projects with Ministry of Agriculture and Rural Affairs. These are:

- Pre-pedigree project
- Pedigree project
- Progeny control project

With the help of these projects, it is the first time that heardbooks are formed in Turkey. Turkey counted 11.04 million heads of bovine animals in 2007 and a total slaughtering of 2.6 million heads. Out of the 2.2 million cattle holdings, about 50% of the cattle are kept by small holders (1-4 cattle). The marketing takes place in 47 authorised animal bourses and markets. Turkey has a non-compulsory national beef carcass classification system.

When it is examined livestock number of Turkey after 1970, an important decline can be seen in all livestock asset apart from bovine animals (Table 1). Also such decline in bovine animals can be recognized after 1995. However, it can be claimed that after the pedigree activities, there is a significant progress in animal breed quality.

The milk sector in Turkey counted in 2004 about 3.8 million dairy cows producing 9.6 million tones of milk (in addition 771, 716 tones of sheep milk, 259, 087 tones of goat milk and 39, 279 tones of buffalo milk). The sector is highly fragmented since approximately 60% of the holdings involved in cow milk production have less than 4 animals. Only 60% of the raw milk is delivered to the dairies. On farm consumption and direct sales prevail in rural areas. Dairy farmers are helped with both direct income support and structural support if the milk is delivered to milk processing plants licensed by Ministry of Agriculture and Rural Affairs (Anonymous, 2006b).

Milk prices in Turkey emerge depending on the market conditions. On the other hand, due to fact that most of dairy farmer's unions and modern dasiry plants are accumululated in the western (Marmara and Aegean) parth of country, auction prices occured in this part of the country become effective all over the country (Uzmay, 2009). The main problem of dairy industry in Turkey has appeared to be the supply inadequacies and

inferior quality of raw milk. On of the primary reasons to this problem are small sizes and low milk productivity per cattle of the dairy farms (Tosun *et al.*, 2007; Sahin, 2009). The dairy farmers' responses indicate that low raw milk price and fluctuation in market and higher feed prices are the other major problems in Turkey (Azabagaoglu, 2004).

Annual subsidies in cattle sector: Animal breeding subsidies in Turkey are distributed according to the amount announced by the cabinet. Bigger share of these subsidies go to producers who are members of Cattle Breeders' Association of Turkey and Agricultural Development Cooperative. These contributions are very important in encouraging producers to form organizations and in endeavours of animal improvement.

Livestock supports are the much debated questions in Turkey. These supports, which are given to farmers varies in ratio each year (Table 2). As it can be seen in Table 2, governmental supports increase for the farmers who merge pedigree system. This situation explains the increase of the number of the cattles in pedigree system.

In milk production, incentive pay is very important. The first payment made in 1987 corresponded to 25.9% of the price of milk and to 24.1% of the price of animal feed. In 2003, the amount of the support was 10% for enterprises who keep a herdbook and 5.2% for enterprises who are not. But because of the fluctuations in milk prices has reduced this rate to 7.2%. Three hundred and fifty four out of 637 cooperatives supported by MARA between the years 1990-2005 are dairy cattle cooperatives. The number of cattle breedind cooperatives has reached 157 in five years since 2000. In recent years the support given to cattle breeding unions is increasing gradually.

It can easily be understood by the explanations up to this point that producer organizations are considered very important. Incentive paysgiven to Cattle Breeders' Associations are to encourage the forming of unions.

Cattle Breeder's Association of Turkey (CBAT): Central Union Foundation, dated 10.03.2001 and numbered 24338 published in the Official Gazette no. 4631 of the Animal Breeding Act was prepared pursuant to the 19 December 2001 and numbered 24615 published in the Official Gazette, the Association of Correctional Training Purposes and Establishment Services on Regulation

Table 1: The count of livestock in Turkey

Livestock	1970	1975	1980	1985	1990	1995	2000	2004	2007
Cattle	12,756,000	108	125	98	89	92	84	79	11,036,000
Sheep	3,6471,000	113	133	117	111	93	78	69	25,501,000
Hair goat	15,040,000	101	102	75	64	56	45	42	6,286,000
Angora goat	4,443,000	80	82	47	29	16	8	5	-
Buffola	1,117,000	94	92	49	33	23	13	9	84,000

Anonymous (2009c). Ministry Agriculture and Rural Affairs (MARA), TURKSTAT (2008), Turkish Statistical Istitute. Animal Production Statistics

Table 2: Some of the livestock support payment (2008)

Type of subsidies	Animal kind	\$/head or kg
Milk support	-	0.024
Vaccine supports	Food and mouth disease bovine breeding	0.45
	Food and mouth disease sheep and goat	0.30
	Cattle Brucelosisi (S-19 yang)	0.90
	Sheep Brucelosisi (Rev-1 yang)	0.30
	Breed of cattle	150
Payment of head	Breed of cattle with pedigree	+30 in addition
	Cow pedigree areas free of diseases	+30 in addition
	Buffola	150
	Sheep and goat	6
	Bovine breeding	216
Animal genotip resources	Sheep and goat	39
	Taret project province	0.60

Anonymous (2009c), Ministry Agriculture and Rural Affairs (MARA)

and 4 September 2003 and numbered 25219 published in the Official Gazette of the Union Correctional Institution-Purpose Training and Services about 87^{inci} Article of the Regulations to modify the regulation of the date 16.04.2004 and published in the Official Gazette No. 25435 of the Breeding Purposes Breeders Association Establishment and Services about the Regulation of the 16th, 26th, 31st, 53rd, 54th and 58th, were organized according to the changes in substanceAssociations, Law No. 4631 and given to them by this regulation in relation to employment are subject to the supervision and control of the Ministry. The Ministry of the Union and Central Union administrative, financial, legal, technical and animal health aspects of the audit of the Audit Committee meeting or through controller.

Central Union's purpose; superior productive animals to grow you need for domestically grown needed from abroad were imported and the indigenous race of the genetic potential to improve MARA determined regional or national level breeding program implementation, efficiency increasing, their pedigree and pre-pedigree records be kept, collected data evaluation and insurance operations to be done, union staff training provision, regional and national level competitions to be organized, union demands for and supply with the production of domestic and overseas marketing, product evaluation necessary for plant establishment of other countries and relations regulation, development and operation issues such as the Animal Breeding and the National Committee will recommend the Ministry to work determined to do all kinds of animal breeding, animal husbandry is to produce policy.

The count of pedigree and pre-pedigree records by the Project commonly application MARA and CBAT (Table 3). Sixty percent of the cattle in Turkey are now within the scope of pedigree and prepedigree system.

Cattle Breeder's Association of Manisa (CBAM): Cattle Breeders' Association of Manisa was founded in 1995 with 16 members and it has become, with its 2640, one of the

most important producers' organization. It's main purpose is the same of The Central Union's purpose (Table 4). 55.49% members of CBAM are cooperative members, 44.01% farms and 0.05% private company. When we examined the number of cattle, the average cattle number is 9.62 in cooperative members, 33.42 in farms and 231.54 in private company, respectively.

If the farmer wants to be member of CBAM, the main rule is it has be mininum 5 dairy cattle (accept cooperative members). Pedigree facilities are amount of constitute of CBAM activities. The other important facilities are those; Sperma sales, artificial insemination, Alta-Mate service, Total Brill Feed Formulation Programme, test of mastitis, to provide cheap input for members, heifer sales, formation of milk markets and enformation. Ninety one percent of the cattle in Manisa are now within the scope of pedigree and prepedigree system (Table 4).

The survey results of CBAM: Some General Information in Manisa; Manisa province has 1.309.600 ha. Surface area with 523.522 ha. cultivable agricultural land. About 31.15% of this land has irrigation facility. Manisa Province has a very important part in Turkey with wide range of animal and vegetal products, besides being a industrial capacity.

When the numbers of livestock are examined in Manisa province, total number of cattle is 186.71. The ratio of culture breeds and crossbred cattle are 85%. The number of sheep and goat is near 627.438. According to the 2007 data, annual milk production is 379.242 tones, meat production is 9.356 tonnes in Manisa province.

Some general information on farms: The average farm managers' age was 46.73 years and households was 4.45 people. All members of CBAM were literate and the average schooling rate was 6.8 years. About 21.2% of farms performing animal husbandry among 1-5 years and the ratio of farms carrying on animal husbandry over

Table 3: The pedigree and pre-pedigree national count of cattle (2008) in Turkey

Project name	Head										General total
	Cow number	Heifer	Yearling female	Calf female	Total female cattle	Bull number	Bullock	Yearling male	Calf male	Total male cattle	
Pedigree	827,564	367,595	125,997	107,890	1,429,046	33,721	151,705	114,078	107,043	406,547	1,828,486
Pre-pedigree*	3,051,228	646,381	143,546	73,492	3,914,647	124,054	331,687	144,849	75,174	675,764	4,218,213

Anonymous (2009a). *: This Project was application by MARA

Table 4: The Pedigree and pre-pedigree count of cattle in Manisa

Project name (2640 member of pedigree farm)	Head										General total
	Cow number	Heifer	Yearling female	Calf female	Total female cattle	Bull number	Bullock	Yearling male	Calf male	Total male cattle	
Pedigree	22,481	12,073	4,691	3,413	42658	1,482	4,734	3,857	3,457	13,530	56,188
Pre-Pedigree*	99,190	1,010	2,325	1,052	103,497	6,344	1,309	2,310	983	10,946	114,443

Anonymous, 2009b. *: This Project was application by MARA

Table 5: Descriptive statistics for the sample of 66 cattle farms

Parameters	Small-scale (1-10 head)	Mid-scale (11-30 head)	Large-scale (31- + head)	Overall
Number of cattle per farm (head)	7,20	22,02	66,40	35,50
Milk production per farm (ton)	21,70	59,20	193,00	101,35
Gross production Value (\$)	10987	28932	105874	53998
Variable cost per farm (\$)	7216	17207	68088	34209
Variable cost per cattle (\$)	1002	779	1024	964
Gross profit per farm (\$)	3771	11725	37786	19789
Gross profit per cattle(\$)	524	531	568	557

20 years is 27.2%. Farmers stated that 66% of them have diary farms, only 3% of them have stock farming. In the examined farms, average farm size is 9.76 ha. In these farms, about 65% of them producing livestock farming as well as crop products. The rest of these farmers has different incomes from other professions such as tradesman, civil servant etc.

Cow number and milk yield: When we examined the number of cattle, the average cattle number is 7.2 in 1-10 cattle size farm. In 11-30 cattle size farm, the average cattle number is 22.02 and in 31+ cattle size farm the average cattle number is 35.5. In these farms annual increase of cattle is 1.8 head⁻¹ in average. The most important factors in this situation are increasing costs and gradually decreasing milk prices. The reason is that the fodder production in these farms is proportionally higher in this group (Table 5).

Gross production value: Gross production value per farm was \$53998 and increased in parallel with farm size ranging from \$10987 for the small scale to \$105874 for the large-scale dairy cattle farms. The milk value consisted of 70.7% of total gross production value.

Variable cost: Variable costs per farm were \$34209 and increased in parallel with farm size ranging from \$7216,

\$17207 and \$68088, respectively. The feed costs made up 80.54% of total variable costs. Variable costs per cattle were \$964 and there are parallel small and large farm \$1002 and \$1024. Variable costs per cattle were \$779 in medium scale farm. Bunun nedeni, Isletmede üretilen yemin oransal olarak bu grupta daha fazla olması olarak belirtilebilir.

Gross profit: Gross profit per cow \$557 for overall farms and increased in parallel with farm size ranging from \$524 for the small scale to \$568 for large scale to cattle farms.

In evaluations done according to Likert scale: The means of Likert type scales provide interesting results. The mean of life standart and increase income are after the member of CBAM is 2.82. Turning to account application of CBAM is 3.14 and benefit to enformation is 3.27. CBAM and the other Agricultural organizations (of Agriculture Association, Agricultural Cooperatives, e Irrigation Association) valuations results are 2.95, 2.24, 2.68 and 2.21, respectively (Table 6).

About 55% of examined farms have attended plenary meeting. The farmers are asked in how often do you visit CBAM, 61% of them visits 1-4 weeks, 6% of them never visits this place. Most of the farmers who do not attend plenary meeting and visit union are cooperative members, utilizes CBAM activities indirectly.

Table 6: Evaluation of CBAM and the other organizations by farmers

Cattle farmers	Mean±SD
Standarts of living and increased income	2.82±1.58
Turning to account application	3.14±1.66
Benefit to enformation	3.27±1.63
Evaluation of CBAM	2.95±1.64
Evaluation of agriculture association	2.24±1.36
Evaluation of agricultural cooperatives	2.68±1.44
Evaluation of irrigation association	2.21±1.48

*Based on 5-Point Likert Scales: 1): Strongly disagree, 2): Disagree, 3): Uncertain, 4): Agree and 5): Strongly agree

Pedigree and other Pre-pedigree projects implemented by the government and CBAT are very important in terms of cattle breeders in rural areas. Especially livestock farming is very important due to the nutrition of the population and employment. It is necessary to increase the productivity in livestock farming during EU full membership negotiations. For this reason, it is needed to support and extend pedigree studies through out the country.

In the survey study the farmers highlighted that the activities of CBAM is generally good but price and support policies are not sufficient. The major problem of the farmers is gradually increasing in costs on the other hand the product prices (milk and meat) moreover, the milk prices is recently <25-35% from previous years.

According to the farmers' opinion, for solving all problems they have, to get more power for CBAM, not only for pedigree studies but also have influence on milk prices and to process the raw milk. It is obvious that could not happen in short term. Several numbers of cooperatives have been organized for technical and economical reasons in diary cattle sector in Turkey. Some of them are KOY-KOOP for village development and other agricultural purposes, Cattle Breeders' Association of Turkey (CBAT), Animal Breeders Cooperative Central Union (HAYKOOP) and Milk Producers' Union (SUB). The mentioned organizations are occasionally rubbing against each other unnecessarily, technical and economical divergence. For this reason, the number of these organisations should be reduced in number. In diary cattle sector, two organizations are sufficient.

DSYB should intensify on breeding programmes as it's established for Economical activities should be leaved to cooperatives (Kaymakçi, 2009). However, cooperatives' basic problems such as management, inspection and financial problems haven't been solved and this situation leads farmers to expect some services from CBAM. Moreover, there have been 1465 farmers in which their cooperatives are connected with CBAM. As we evaluate the scores of the farmer' that they gave to their own organisations, it is clear that they are not very pleased from these organisations.

CONCLUSION

As a conclusion, CBAT, which the main goal is to provide service to its' members and the other cooperatives should combine in an upper framework and function together for their members. Legal arrangement is needed to form this mentioned structure. But this structure should be perfectly formed in order not to cause authorization disorder. In my opinion, the organization model, which CBAT and Animal cooperatives combine under the same roof will be beneficiary.

REFERENCES

- Anna, I., S. Olsson, C. Gamborg and P. Sandoe, 2006. Taking ethics into account in farm animal breeding: What can the breeding companies achieve? *J. Agric. Environ. Ethics*, 19: 37-46. DOI: 10.007/s 10806-005-4494-6.
- Anonymous, 2006a. Screening with Turkey. Non exhaustive list of issues and questions to facilitate preparations for bilateral meetings. http://www.abgs.gov.tr/tarama/tarama_files/11/sorular_cevaplar_file_s/cevaplar/OTP_Dogrudan_Odemeler_IACS.pdf. (05.08.2009).
- Anonymous, 2006b. Agriculture and Rural Development, Screening Report Turkey. <http://ec.europa.eu/enlargement/pdf/turkey/screening-report11tr>. (05.08.2009).
- Anonymous, 2004a. Turkey country report on farm animal genetic resources. <http://ftp.fao.org/docrep/fao/010/a1250e/annexes/CountryReports/Turkey.pdf>.
- Anonymous, 2004b. MARA, Agricultura Counsey Report, Ankara. www.tarimsurasi.tarim.gov.tr.
- Anonymous, 2007. The Journal of Cattle Breeders' Association of Turkey, Year 9, No. 36-13, Cattle Breeders Association of Turkey, Ankara.
- Anonymous, 2009a. Cattle Breeders' Association of Turkey. <http://www.dsymb.org.tr/default.asp> (06.08.2009).
- Anonymous, 2009b. The document of Cattle Breeders Association of Manisa.
- Anonymous, 2009c. Ministry Agriculture and Rural Affairs (MARA). <http://rega.basbakanlik.gov.tr/eskiler/2009/04/20090414-35.htm>.
- Arat, S., 2006. *In vitro* conservation and priliminary molecular identification of some Turkish domestic animal genetic resources (Turkhaygen-i), tubitak mam gmbe (gebi) Genetic Engineering and Biotechnology Institute, Gebze, Kocaeli, Turkey.
- Azabagaoglu, M.O., 2004. Determination of Dairy farmers existing structure in Turkey and analysis of emerging issues in production. *Agric. Econ. CZECH*, 50 (6): 255-259.

- Bayemi, P.H. and E.C. Webb, 2009. An integrated method for improving the dairy production sector in developing countries: The case of Cameroon. *Trop. Anim. Health Prod.*, pp: 41: 525-534. DOI: 10.1007/s11250-008-9217-3.
- Bichard, M., 2002. Genetic improvement in dairy cattle-an outsider's perspective. *Livest. Prod. Sci.*, 75: 1-10. DOI: 10.1016/S0301-6226(01)00332-3.
- Ekmen, E., 2003. Farmers Organization in Turkey, MARA (unpublished report), Ankara, Turkey.
- Ferreira, N., C.J. Cattoni, S.C. Caceres and J. Frutos, 2007. An economic opportunity survey of small dairy farms in Paraguay. *Trop. Anim. Health Prod.*, 39: 603-610. DOI: 10.007/s11250-007-9065-6.
- Ghaffar, A., M. Qasim Khan and Nemat Ulah, 2007. Integrated approach for improving small scale market orientad dairy systems in Pakistan: Participatory rural appraisal and economic opportunity survey. *Trop. Anim. HealthProd.*, 39: 593-601. DOI: 10.007/s11250-007-9064-7.
- Güngör, S., 2005. The Role of Cattle Breeders Association on Bovine Breeding in Turkey. [http://www.adsyb.org.tr/webfolders/topics/66549314.pdf?id=V836N8V6M89E5TQA3VVJ\(23.06.2009\)](http://www.adsyb.org.tr/webfolders/topics/66549314.pdf?id=V836N8V6M89E5TQA3VVJ(23.06.2009)).
- Inan, H. and B. Basaran, 2004. Evaluation of agricultural cooperatives and other producer organizations in Turkey within the entrance process to the EU, The 6. Turkey Agricultural Economy Congres, Sep. 16-18, Tokat/Turkey, Birikim Publish House Ltd. Company, Ankara, pp: 395-402. ISBN: 975-7328-39-1.
- Kaymakçi, 2009. The Analysis on Dairy Cattle Farming in Turkey, *J. CBAM*, Year 5, Number 12, pp: 34-36.
- Koçturk, O.M., 2009. Income of dairy cattle in rural area in Western part of Turkey. *J. Anim. Vet. Adv.*, 8 (9): 1685-1688.
- Musalía, L.M., S.M.M. Wangia, R.S. Shivario, P. Okutu and V. Vugutsa, 2007. Dairy production practices among small holder dairy farmers in Butera/Mumias and Kakamega Districts in Western Kenya. *Trop. Anim. HealthProd.*, 39: 199-205. DOI: 10.1007/s11250-9011-7.
- Mwacharo, J.M. and A.G. Drucker, 2005. Production objectives and management strategies of livestock keepers in South-East Kenya: Implications for a breeding programme. *Trop. Anim. Health Prod.*, 37: 635-652. DOI: 10.007/s11250-005-4253-8.
- Newbold, P., 1995. *Statistics for Business and Economics*. Perentice-Hall, Internetonal, New Jersey, pp: 867.
- Rekhis, J., F. Saaidane, M. Laamouri, K. Ben Hamida, W. Mabrouk and N. Slimane, 2007. Participatory rural appraisal in smallholder dairy systems in Tunisia. *Trop. Anim. HealthProd.*, 39: 619-626. DOI: 10.1007/s11250-007-9067-4.
- Rhone, J.A., S. Koonawootrittriron and M.A. Elzo, 2008. Record keeping, genetic selection, educational experience and farm management effects on average milk yield per cow, milk fat percentage, bacterial score and bulk tank somatic cell count of dairy farms in the Central Region of Thailand. *Trop. Anim. Health Prod.*, 40: 672-636. DOI: 10.1007/s11250-008-9141-6.
- Sahin, K., 2009. A comparison of scale on profitability of dairy cattle farms in Eastern part of Turkey. *J. Anim. Vet. Adv.*, 8 (2): 328-331.
- Tosun, D., N. Demirbas, G. Everen and F. Cukur, 2007. The role and importance of milk collection centers in milk supply chain in Turkey: The Case of Izmir Province. The I Mediterranean Conference of Agro-Food Social Scientists. 103. EAAE Seminar Adding Value to the Agro-Food Supply Chain in the Future Euromediterranean Space. Barcelona. Spain.
- TURKSTAT, 2008. Turkish Statistical Istitute, Animal Production Statistics. <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=4053>.
- Uzmay, A., 2009. Effects on farm size and raw milk quality on farm gate milk prices in dairy cattle farms within the province of Izmir, Turkey. *Path Anal. Approach*, 8 (9): 1878-1885.
- Yıldırım, I., M. Terin and K. Çiftçi, 2008. The Influence of scale on the profitability of culture-cross breed dairy cattle farms in western part of Turkey. *J. Anim. Vet. Adv.*, 7 (9): 1073-1077.
- Wismans, W.M.G., 1999. Identification and registration of animals in the European Union. *Comput. Electronics in Agric.*, 24: 99-108. DOI: 10.1016/S0168-1699(99)00040-X.