



***Namık Kemal Üniversitesi***  
***Tekirdağ Ziraat Fakültesi Dergisi***  
***Journal of Tekirdag Agricultural Faculty***

*An International Journal of all Subjects of Agriculture*

**Sahibi / Owner**

**Namık Kemal Üniversitesi Ziraat Fakültesi Adına**  
On Behalf of Namık Kemal University Agricultural Faculty

**Prof.Dr. Ahmet İSTANBULLUOĞLU**  
Dekan / Dean

**Editörler Kurulu / Editorial Board**

**Başkan / Editor in Chief**

**Prof.Dr. Türkan AKTAŞ**  
Ziraat Fakültesi Biyosistem Mühendisliği Bölümü  
Department Biosystem Engineering, Agricultural Faculty  
taktas@nku.edu.tr

**Üyeler / Members**

<b>Prof.Dr. M. İhsan SOYSAL</b>	Zootekni / Animal Science
<b>Prof.Dr. Servet VARIŞ</b>	Bahçe Bitkileri / Horticulture
<b>Prof.Dr. Temel GENÇTAN</b>	Tarla Bitkileri / Field Crops
<b>Prof.Dr. Sezen ARAT</b>	Tarımsal Biyoteknoloji / Agricultural Biotechnology
<b>Prof.Dr. Aydın ADİLOĞLU</b>	Toprak Bilimi ve Bitki Besleme / Soil Science and Plant Nutrition
<b>Prof.Dr. Fatih KONUKCU</b>	Biyosistem Mühendisliği / Biosystem Engineering
<b>Doç.Dr. İlker H. ÇELEN</b>	Biyosistem Mühendisliği / Biosystem Engineering
<b>Doç.Dr. Ömer AZABAĞAOĞLU</b>	Tarım Ekonomisi / Agricultural Economics
<b>Doç.Dr. Ümit GEÇGEL</b>	Gıda Mühendisliği / Food Engineering
<b>Yrd.Doç.Dr. Harun HURMA</b>	Tarım Ekonomisi / Agricultural Economics
<b>Yrd.Doç.Dr. Özgür SAĞLAM</b>	Bitki Koruma / Plant Protection
<b>Araş.Gör. Eray ÖNLER</b>	Biyosistem Mühendisliği / Biosystem Engineering

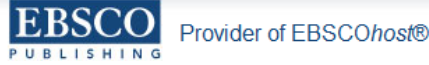
**İndeksler / Indexing and abstracting**



CABI tarafından full-text olarak indekslenmektedir / Included in CABI



DOAJ tarafından full-text olarak indekslenmektedir / Included in DOAJ



EBSCO tarafından full-text olarak indekslenmektedir / Included in EBSCO



FAO AGRIS Veri Tabanında İndekslenmektedir / Indexed by FAO AGRIS Database



INDEX COPERNICUS tarafından full-text olarak indekslenmektedir / Included in INDEX COPERNICUS



TUBİTAK-ULAKBİM Tarım, Veteriner ve Biyoloji Bilimleri Veri Tabanı (TVBBVT) Tarafından taranmaktadır / Indexed by TUBİTAK-ULAKBİM Agriculture, Veterinary and Biological Sciences Database

**Yazışma Adresi / Corresponding Address**

Tekirdağ Ziraat Fakültesi Dergisi NKÜ Ziraat Fakültesi 59030 TEKİRDAĞ

E-mail: ziraatdergi@nku.edu.tr  
Web adresi: http://jotaf.nku.edu.tr  
Tel: +90 282 250 20 00

ISSN: 1302-7050

## **Danışmanlar Kurulu / Advisory Board**

### **Bahçe Bitkileri / Horticulture**

- Prof. Dr. Ayşe GÜL** Ege Üniv., Ziraat Fak., İzmir  
**Prof. Dr. İsmail GÜVENÇ** Kilis 7 Aralık Üniv., Ziraat Fak., Kilis  
**Prof. Dr. Zeki KARA** Selçuk Üniv., Ziraat Fak., Konya  
**Prof. Dr. Jim HANCOCK** Michigan State University, USA

### **Bitki Koruma / Plant Protection**

- Prof. Dr. Cem ÖZKAN** Ankara Üniv., Ziraat Fak., Ankara  
**Prof. Dr. Yeşim AYSAN** Çukurova Üniv., Ziraat Fak., Adana  
**Prof. Dr. Ivanka LECHAVA** Agricultural University, Plovdiv-Bulgaria  
**Dr. Emil POCSAI** Plant Protection Soil Conser. Service, Velenca-Hungary

### **Biyosistem Mühendisliği / Biosystem Engineering**

- Prof. Bryan M. JENKINS** U.C. Davis, USA  
**Prof. Hristo I. BELOEV** University of Ruse, Bulgaria  
**Prof. Dr. Simon BLACKMORE** The Royal Vet.&Agr. Univ. Denmark  
**Prof. Dr. Hamdi BİLGİN** Ege Üniv.Ziraat Fak. İzmir  
**Prof. Dr. Ali İhsan ACAR** Ankara Üniv. Ziraat Fak. Ankara  
**Prof. Dr. Ömer ANAPALI** Atatürk Üniv., Ziraat Fak. Erzurum  
**Prof. Dr. Christos BABAJIMOPOULOS** Aristotle Univ. Greece  
**Dr. Arie NADLER** Ministry Agr. ARO, Israel

### **Gıda Mühendisliği / Food Engineering**

- Prof.Dr.Evgenia BEZIRTOGLOU** Democritus University of Thrace/Greece  
**Assoc.Prof.Dr.Nermina SPAHO** University of Sarajevo/Bosnia and Herzegovina  
**Prof. Dr. Kadir HALKMAN** Ankara Üniv., Mühendislik Fak., Ankara  
**Prof. Dr. Atilla YETİŞEMİYEN** Ankara Üniv., Ziraat Fak., Ankara

### **Tarımsal Biyoteknoloji / Agricultural Biotechnology**

- Prof. Dr.İskender TIRYAKI** Çanakkale Üniv., Ziraat Fak., Çanakkale  
**Prof. Dr. Khalid Mahmood KHAWAR** Ankara Üniv., Ziraat Fak., Ankara  
**Prof.Dr. Mehmet KURAN** Ondokuz Mayıs Üniv., Ziraat Fak., Samsun  
**Doç.Dr.Tuğrul GİRAY** University of Puerto Rico, USA  
**Doç.Dr.Kemal KARABAĞ** Akdeniz Üniv., Ziraat Fak., Antalya  
**Doç. Dr. İsmail AKYOL** Kahramanmaraş Sütçü İmam Üniv., Ziraat Fak., Kahramanmaraş

### **Tarla Bitkileri / Field Crops**

- Prof. Dr. Esvet AÇIKGÖZ** Uludağ Üniv., Ziraat Fak., Bursa  
**Prof. Dr. Özer KOLSARICI** Ankara Üniv., Ziraat Fak., Adana  
**Dr. Nurettin TAHSİN** Agriculture University, Plovdiv-Bulgaria  
**Prof. Dr. Murat ÖZGEN** Ankara Üniv., Ziraat Fak., Ankara  
**Doç. Dr. Christina YANCHEVA** Agriculture University, Plovdiv-Bulgaria

### **Tarım Ekonomisi / Agricultural Economics**

- Prof. Dr. Faruk EMEKSİZ** Çukurova Üniv., Ziraat Fak., Adana  
**Prof. Dr. Hasan VURAL** Uludağ Üniv., Ziraat Fak., Bursa  
**Prof. Dr. Gamze SANER** Ege Üniv., Ziraat Fak., İzmir  
**Prof. Dr. Alberto POMPO** El Colegio de la Frontera Norte, Meksika  
**Prof. Dr. Şule IŞIN** Ege Üniv., Ziraat Fak., İzmir

### **Toprak Bilimi ve Bitki Besleme Bölümü / Soil Sciences And Plant Nutrition**

- Prof. Dr. M. Rüştü KARAMAN** Yüksek İhtisas Üniv., Ankara  
**Prof. Dr. Metin TURAN** Yeditepe Üniv., Müh. ve Mimarlık Fak. İstanbul  
**Prof. Dr. Aydın GÜNEŞ** Ankara Üniv., Ziraat Fak., Ankara  
**Prof. Dr. Hayriye İBRİKÇİ** Çukurova Üniv., Ziraat Fak., Adana  
**Doç. Dr. Josef GORRES** The University of Vermont, USA  
**Doç. Dr. Pasquale STEDUTO** FAO Water Division Italy

### **Zootekni / Animal Science**

- Prof. Dr. Andreas GEORGOIDUS** Aristotle Univ., Greece  
**Prof. Dr. Ignacy MISZTAL** Breeding and Genetics Universit of Georgia, USA  
**Prof. Dr. Kristaq KUME** Center for Agricultural Technology Transfer, Albania  
**Dr. Brian KINGHORN** The Ins. of Genetics and Bioinf. Univ. of New England, Australia  
**Prof. Dr. Ivan STANKOV** Trakia University, Depart. of Animal Science, Bulgaria  
**Prof. Dr. Muhlis KOCA** Atatürk Üniv., Ziraat Fak., Erzurum  
**Prof. Dr. Gürsel DELLAL** Ankara Üniv., Ziraat Fak., Ankara  
**Prof. Dr. Naci TÜZEMEN** Kastamonu Üniv., Mühendislik Mimarlık Fak., Kastamonu  
**Prof. Dr. Zlatko JANJEČIĆ** University of Zagreb, Agriculture Faculty, Hırvatistan  
**Prof. Dr. Horia GROSU** Univ. of Agricultural Sciences and Vet. Medicine Bucharest,Romanya

İÇİNDEKİLER / CONTENTS

<b>F. Kurtulmuş, S. Öztüfekçi, S. Şehirli</b> <b>Armut Meyvesinde Diplocarpon Mespili Lezyonlarının Görüntü İşlemeyle Analizi</b> Analyzing Diplocarpon Mespili Lesions On Pear Using Image Processing .....	1-11
<b>H. M. Velioglu, G. Çelikyurt</b> <b>Farklı Tarım Artığı Ürünlerden Fungal Ve Bakteriyel A-Amilaz Enzimi Üretiminin Optimizasyonu</b> Optimization Of Fungal And Bacterial A-Amylase Production From Different Agricultural By-Products.....	12-24
<b>G. Çınar, F. Işın, G. Armağan</b> <b>Türkiye’de Tarımsal Ürün İhracatı Yapan Firmaların Risk Tercihi Açısından İncelenmesi</b> Analysis Of The Firms That Exported Agricultural Product In Terms Of Risk Preference In Turkey .....	25-33
<b>B. Firdin</b> <b>Pamuk Yaprak Kurdu Spodoptera Littoralis (Boisduval) (Lepidoptera: Noctuidae) Larvalarının Gelişim Evrelerinde Protein, Glikojen Ve Su Oranındaki Değişim</b> Changes In The Rate Of Protein, Glycogen And Water Of Cotton Leafworm Spodoptera Littoralis (Boisduval) (Lepidoptera: Noctuidae) During The Larval Development Stages .....	34-39
<b>M. İ. Soysal, T. Bilgen, A.Perucatti, L. Iannuzzi</b> <b>GTG Banded Karyotype Of Anatolian River Buffalo (Bubalus Bubalis, 2n=50)</b> Anadolu Mandası (Bubalus bubalis, 2n=50) GTG Bantlı Karyotipi.....	40-43
<b>N. Öner, İ. Başer, F. Öner, Ö. Sarıbaş</b> <b>Buğdayda Yaprak Analiziyle Eksikliği Belirlenen Elementlerin Yapraktan Gübrelemeyle Verim Ve Kalite Üzerine Etkileri</b> Effects On Yield And Quality Of Foliar Application Of Wheat With The Determination Of Deficient Nutrients Leaf Analyses .....	44-51
<b>T. Cengiz</b> <b>Konut Satın Alımında Kentsel Açık-Yeşil Alanlar Ve Sosyal Donatı Elemanlarının İncelenmesi: Çanakkale Kent Merkezi Örneği</b> Influence Of Urban Green Spaces And Social Reinforcement Elements In Home Purchasing: The Case Of Çanakkale City, Turkey.....	52-60
<b>M. Gür, C. Şen</b> <b>Trakya Bölgesinde Doğal Bir Merada Tespit Edilen Baklagiller Ve Buğdaygiller Familyalarına Ait Bitkilerin Bazı Özellikleri</b> Some Properties Of The Vegetation On Grazing, Protected And Abandoned Natural Rangelands .....	61-69
<b>S. Erdoğan Bayram, Ö. L. Elmacı, B. Miran</b> <b>An Evaluation On Strawberry Production In Terms Of Plant Nutrition And Farmer Applications: Evidences From Gediz River Basin, Turkey</b> Bitki Besleme Ve Çiftçi Uygulamaları Açısından Çilek Üretimi Üzerine Bir Değerlendirme: Gediz Havzası Örneği, Türkiye .....	70-79
<b>B. Kaptan</b> <b>Prevalence Of Listeria Spp And L. Monocytogenes İn Home Made Pottery Cheese</b> Ev Yapımı Küp Peynirinde Listeria Spp Ve L. Monocytogenes Yaygınlığı.....	80-87
<b>N. Pouyafard, E. Akkuzu, Ü. Kaya</b> <b>Kıyı Ege Koşullarında Yetiştirilen Ayvalık Zeytin Fidanlarında Su Stresine Bağlı Bazı Fizyolojik Ve Morfolojik Değişimlerin Belirlenmesi</b> Determination Of Some Physiologic And Morphologic Changes Of Young Olive (Cv Ayvalık) Trees Under Different Water Stress İn Coastal Part Of Aegean Region .....	88-98
<b>İ. H. Çelen</b> <b>Hava Emişli Yelpeze Hüzmeli Püskürme Memelerinde Püskürtme Dağılımının İlerleme Hızına Bağlı Olarak Değişimi</b> The Change Of The Spray Distribution On Air Inlet Fan Spray Nozzles Depending On Different Forward Speeds .....	99-106
<b>M. E. Gündoğmuş, T. Uyar</b> <b>Kestane Bahçelerinde Gelir Yöntemine Göre Değerleme: Aydın İli Nazilli İlçesi Örneği</b> Land Valuation Of Chestnut Orchards By Income Capitalization Method: A Case Study İn Nazilli District Of Aydın Province.....	107-117

## GTG Banded Karyotype of Anatolian River Buffalo (*Bubalus bubalis*, 2n=50)

M. İ. Soysal<sup>1,\*</sup> T. Bilgen<sup>2</sup> A.Perucatti<sup>3</sup> L. Iannuzzi<sup>3</sup>

<sup>1\*</sup> Namik Kemal University, Faculty of Agriculture, Department of Animal Science, 59100 Tekirdag, Türkiye.

<sup>2</sup> Research and Application Centre for Scientific and Technological Investigations (NABILTEM) of Namik Kemal University, Tekirdag, Türkiye

<sup>3</sup> Institute for Animal Production Systems in Mediterranean Environments (ISPAAM), National Research Council (CNR) of Italy, Napoli, Italia

Corresponding author: E-mail: misoysal@nku.edu.tr

The water buffalo (*Bubalus bubalis*) is one of the most important farm animals of Turkey. There are two types of the water buffalo: river and swamp. While the chromosome number of the river type is 2n=50, that of swamp type is 2n=48. It was reported that the Anatolian water buffalo has 2n=50 chromosomes as being river type but the GTG banded karyotype has not been reported so far. We here report for the first time a GTG banded karyotype of the Anatolian water buffalo.

**Keywords:** Anatolian water buffalo, karyotype, GTG banding.

### Anadolu Mandası (*Bubalus bubalis*, 2n=50) GTG Bantlı Karyotipi

Anadolu Mandası (*Bubalus bubalis*) Türkiye yetiştirilen önemli çiftlik hayvan genetik kaynaklarından biridir. Mandalarda Nehir ve bataklık mandaları olmak üzere iki alt grup bulunur. Nehir Mandalarının kromozom sayısı 2n=50 iken Bataklık Mandalarının 2n=48 dir. Anadolu mandalarının kromozom sayısı nehir mandası olarak 2n=50 olarak rapor edilmiş olmakla beraber henüz GTG bantlı karyotip çalışması yapılmamıştır. Bu çalışmada Anadolu Mandalarının GTG bantlı karyotipi ilk olarak gösterilmiştir.

**Anahtar Kelimeler:** Anadolu mandası, , karyotip, GTG bandı

#### Introduction

Anatolian water buffalo breeds play an important role for the Turkey's native animal genetic resources; nevertheless, so far no comprehensive cytogenetic investigation has been performed on this important economic breed (Soysal et al., 2015). The domesticated water buffaloes are believed to have been derived from the Indian wild Buffalo (*Bubalus arnee*). Riverine and swamp buffaloes were domesticated almost together around 2000 B.C., the former in the Indus valley and the latter in the Yangtze valley. Domestic buffalo reached Southern East Europe by 12th century, later taken to the America, Australia and Africa in 20th century. Buffalo is important for local economies in many parts of the world, for production of milk and meat and drought animals. Differences in climate, local geography, cropping systems and size of farms characterize the management in different countries. Riverine

breed development has largely centered in Indo-Pakistan subcontinent. According to FAO (2013) data there are about 200 million domesticated Buffalo raised in the 42 countries of which 193.8 million (97%) are in Asia of the five world continents. Total Turkish buffalo population according to the Turkish Statistic institute ([www.turkstat.gov.tr](http://www.turkstat.gov.tr)) is 121.826 in 2014 (Singh and Singh, 2015).

Water buffalo (*Bubalus bubalis*) includes two subspecies known as river and swamp buffaloes, which differ in chromosome number and morphology. The riverine buffalo has 50 chromosomes while swamp Buffalo has 48 chromosomes due to tandem fusion translocation between riverine buffalo chromosomes 4 and 9 (Di Berardino and Iannuzzi, 1981). However, the two subspecies are inter-fertile and produce progeny with 49 chromosomes.

Anatolian river buffalo is not yet suitable for intensive commercial dairy farming without a rapid its genetic improvement, based on information produced from genomic studies (Ali et al., 2010). Confirmation of normal chromosomal morphology is the first step towards implementing strategies to improve genetic merit for production and reproductive traits. Cytogenetic diversity within different livestock species is critical to delineate evolutionary genetic relationship and to provide basis to localize economically important genes on different chromosome in the absence of genetic maps (Iannuzzi et al., 2003).

### Materials and Methods

Peripheral blood samples were collected into sodium heparin containing tubes from healthy female and male Anatolian water buffaloes from in a farm in the city of Tekirdag, Turkey. Briefly, 0.5ml of whole blood was cultured in 10 ml of RPMI 1640 (Biological industries, Israel) medium containing fetal bovine serum (15%), L-glutamine (Biological industries, Israel), penicillin streptomycin antibiotics mixture (Biological industries, Israel) and Concanavalin A (Sigma Aldrich, Germany) as mitogen at 15 µg/ml final concentration. The cultures were incubated in 15 ml sterile tubes at 37°C for 72 hours in a dry incubator. At the end of incubation, 50µl of colcemid solution (10 µg/ml) (Biological industries, Israel) were added into each culture tube and the cultures were continued to incubation for an additional 30 minutes. The cells were harvested by starting hypotonic (0.075 M KCl) treatment. Following centrifugation at 1000 g for 8 min, the supernatants were removed and hypotonic solution (0.075 M KCl) was added up to 10 ml by vortexing using a Pasteur pipette. Cells were mixed using a Pasteur pipette, and then they were stored at 37° C for 10 min. To stop the hypotonic treatment, 1 ml of fixative solution (methanol/acetic acid 3:1) was added and centrifuged at 1000g for 8 min. The supernatants were removed. Following three additional fixation steps by fixative solution (methanol/acetic acid 3:1), metaphase spreads were prepared by

dropping the cell suspension on to cold and wet slides. The chromosomes were banded using trypsin (Sigma Aldrich, Germany) and Giemsa dye (Merck, Germany) followed by aging of the chromosomes for three days at 37°C. One metaphase for female and one for male Anatolian water buffalo were chosen for preparation of the karyotypes. Karyotypes were arranged according to the standard karyotype (Iannuzzi., 1994).

### Results and Discussion

GTG banded metaphase spreads from female (left) and male (right) cells of Anatolian river buffalo with relative karyotypes are shown in Fig. 1.

Chromosomes represent an important biological material in the genetic improvement of livestock by means of evolutionary, clinical, molecular, environmental cytogenetics (Iannuzzi, 2015). There is comparatively little information on Anatolian water buffalo breed raised in Turkey, because previous studies did not identified individual chromosomes as of GTG banded karyotype. The precise identification of banding patterns using different staining techniques constitutes a first step to explore the chromosomes so to reveal chromosome abnormalities such as translocations, autosomal and sex chromosome aneuploidies (Ali et al., 2010).

Clinical and cytogenetic studies on water buffalo have been reported in Italy and India (Iannuzzi et al., 2005; Di Meo et al., 2008). The study of karyotype is an important step which should routinely be performed to all males and females addressed with reproduction problems. In addition, young females with male traits (large head and horns, prominent withers, tight pelvis) should be promptly investigated (karyotype, rectal palpation) to save time and money (Iannuzzi., 2015).

Indeed, chromosomal abnormalities may reduce the genetic improvement program in water buffalo (Iannuzzi, 2015).

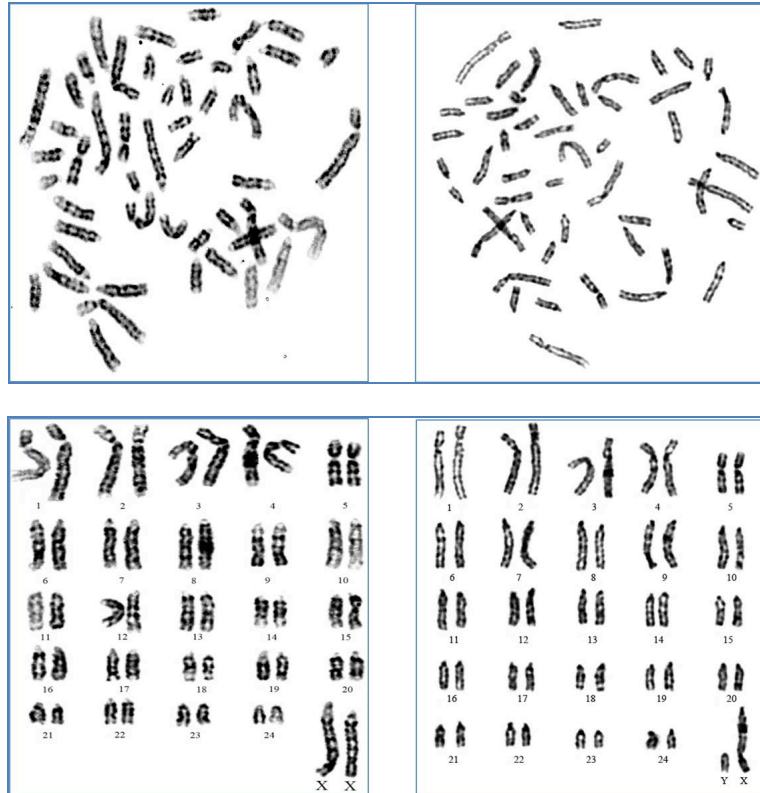


Figure 1. GTG banded metaphase spreads and karyotypes from female (left) and male (right) Anatolian river buffaloes

Since some numerical autosomal abnormalities could be visible, they can be eliminated by the breeders. On the other hand, sex chromosomal abnormalities, almost all related to sterility (or low fertility) especially in females, are generally not visible in the carriers. Structural chromosome abnormalities as deviation from shape and gene order are very important for the high percentage of carriers in cattle (i.e. centric fusion) which have normal body condition but reduced reproductive value (low fertility). A study done in Italy reported that all river Buffalo bulls examined so far showed normal karyotype by RBG banding with the only exception of one famous bull (Magnifico) which was found to be a carrier of complex chromosome abnormalities (Albarella et al., 2013). X trisomy ( $2n=51,XXX$ ) and X monosomy ( $2n=49,X$ ) revealed by FISH with X-chromosome specific probe in freemartin cases were also reported (Di Meo et al., 2008).

In conclusion, it is widely accepted that the sex chromosomal abnormalities are strictly related to the fertility, especially in the females. In this

study, we report the GTG banded karyotypes of the Anatolian water buffalo which can be used as point of reference for future studies in Turkish buffaloes with infertility and/or with developmental abnormalities.

## References

- Albarella S., Ciotola F., Coletta A., Genualdov., Iannuzzi L., Peretti V. (2013) A new translocation  $t(1p;18)$  in an Italian Mediterranean river buffalo (*Bubalus bubalis*,  $2n = 50$ ) bull: cytogenetic, fertility and inheritance studies. *Cytogenet. Genome Res.* 139(1): 17-21.
- Ali A., MÖ.Naves, M.E.Babar, M.Aziz, M.Akhtar (2010) First report on standart G-Banded karyotype of Nilşiravi Buffalo (*BubalisBubalis*). *Pakistan J.Zoology* Vol 42(2) pp 177-180.2010.
- Di Bernardino D. and L. Iannuzzi (1981) Chromosome banding homologies in swamp and murrh buffalo. *J. Hered.* 72: 183-188.
- Di Meo, G.P., Perucatti A., Di Palo R., Ciotola F., Peretti, V., Neglica G., Campenile G., Zicarelli L. Iannuzzi L. (2008) Sex chromosome

- abnormalities and sterility in River Buffalo Cytogenetic. *Genome Res.*120: 127-131.
- FAO (2013). FAO-Food and Agriculture Organization of The United Nations. <http://faostat3.fao.org/faostat-gateway/go/to/download/Q/QA/E>, (20.06.2013).
- Iannuzzi L. (1994) Standard karyotype of the river buffalo (*Bubalus bubalis* L., 2n=50). Report of the committee for the standardization of banded karyotypes of the river buffalo (L Iannuzzi, coordinator). *Cytogenet. Cell Genet.* 67:02-113.
- Iannuzzi L., G.P. Di Meo, A. Perucatti, L. Schibler, D. Incarnato, D. Gallagher, A. Eggen, L. Ferretti, E.P. Cribiu, J. Womack. (2003)The river buffalo (*Bubalus bubalis*, 2n=50) cytogenetic map: assignment of 64 loci by fluorescence *in situ* hybridisation and R-banding. *Cytogenet. Genome Res.* 102:65-75
- Iannuzzi L., Di Meo G.P., Perucatti A., Ciotola F., Incarnato D., Di Palo R., Peretti V., Campanile G., Zicarelli L. (2005)Freemartinism in river buffalo: clinical and cytogenetic observations. *Cytogenet. Genome Res.* 108:335-358.
- Iannuzzi L. (2015) The Contribution of cytogenetics in the Genetic improvement of the water buffalo an update Abstract Book of Asian Buffalo Congress 21-25 April 2015, İstanbul Türkiye.
- Singh I., Singh K.P (2015) İndia's rich diverse buffalo germ plasm for global buffalo development .Book of abstract asian Buffalo Congres 21-26 April 2015 İstanbul/Türkiye
- Soysal M.I., Tekerli M., Daskiran I., Ayar A., Sozen O., Kaplan Y. (2015). Anatolian water buffalo husbandry in Türkiye. Book of abstract Asian Buffalo Congress 21-26 April 2015 İstanbul/Türkiye