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Orijinal araştırma (Original article)

Cytotaxonomical studies on six species of spiders (Arachnida: Araneae) from Turkey[1]

Türkiye'den altı örümcek türü üzerinde sitotaksonomik çalışmalar (Arachnida: Araneae)

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Summary

In this study, six species of spiders in three families were reported cytotaxonomical properties. Chromosome accounts for both males and females (2n) on families: Gnaphosidae *Zelotes petrensis* (C. L. Koch, 1839) ♂ 11 X, *Zelotes aeneus* (Simon, 1878) ♂ 9 XX, *Nomisia conigera* (Spassky, 1941) ♂ 10 XX; Theridiidae *Theridion pictum* (Walckenaer, 1802) ♀ 11 X, *T. pictum* ♂ 14 X, *Steotoda triangulosa* (Walckenaer, 1802) ♂ 12 XX; Lycosidae *Trachosa ruricula* (De Geer, 1778) ♂ 9 XX. All karyologic results shown in this work the first time except to *Staetoda triangulosa.*All of the speciess, we studied of total lenght of chromosomes, is less than 2 µm. Therefore, the measurements of chromosomes were not made.

Key words: Cytotaxonomy, spider, Gnaphosidae, Theridiidae, Lycosidae

Özet

Bu çalışmada, örümceklerde üç familyadan altı örümceğin sitotaksonomik özellikleri bildirilmiştir. Familyalara göre hem erkek hemde dişilerin kromozom sayılar şöyledir: Gnaphosidae *Zelotes petrensis* (C. L. Koch, 1839) ♂ 11 X, *Zelotes aeneus* (Simon, 1878) ♂ 9 XX, *Nomisia conigera* (Spassky, 1941) ♂ 10 XX; Theridiidae *Theridion pictum* (Walckenaer, 1802) ♀ 11 X, *T. pictum* ♂ 14 X, *Steotoda triangulosa* (Walckenaer, 1802) ♂ 12 XX; Lycosidae *Trachosa ruricula* (De Geer, 1778) ♂ 9 XX. *Staetoda triangulosa* hariç diğer türlerde karyolojik sonuçlar bu çalışma ile ilk kez gösterilmiştir. Çalışalan türlerin hepisinde kromozomların uzunlukları 2 µm daha kısa olduğundan bu kromozomların ölçüleri verilememiştir.

Anahtar sözcükler: Sitotoaksonomi, örümcek, Gnaphosidae, Theridiidae, Lycosidae

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Introduction

Cytotaxonomical properties and karyotypes may be useful for located category in their taxonomic position. Several researchers have described karyotypes of spiders so far (Sokolov, 1960, 1962; Maddison, 1982; Tugmon et al., 1990; Tsurusaki et al., 1993; Gorlova et al., 1995, 1997; Kral et al., 2008).

Account of the world spider fauna is of 42055 species (Platnick, 2011 – version 11.5). On the other hand, in Turkey, spider fauna is merely 755 species (Bayram et al. 2010 –Version 10.1). Concequently, very little number speciess have been studied on cytotaxonomical feature so far (Gorlova *et al*., 1997, Gill and Gustavo 2002). In this study, the six spider species are reported for the first time, belonging to the families of Gnaphosidae, Theridiidae and Lycosidae.

Material and Methods

Materials were collected between May 2009 and October 2010 from the localities: *Trochosa ruricula* (♂) was collected in Kahramanmaraş province, Türkoğlu district, Kuzudağı village, Tavşanlı plateau ($37^{O}17`N$, $36^{O}41`E$), 1177m. on 27.10.2010: *Zelotes aeneus* (♂) was collected in Kahramanmaraş province, Çakıroğluoğlu district, Beşik düldülü hill (37^{O} 18`N, $36^{O}39`E$), 1740 m. on 27.10.2010: *Theridium pictum* (♀) was collected in Gaziantep province, Nurdağı district, under wind-rosa ($37^{O}18`N$, $36^{O}39`E$), 1095 m. on 12.11.2010: *Theridium pictum* (♂) and *Steatoda triangulosa* (♂) were collected in Kahramanmaraş province, Andırın plateau, Başdoğan village ($37^{O}29`N$, $36^{O}20`E$), 652 m. on 15.11.2010: *Nomisia conigera* (♂) was collected in Gaziantep province, Sof plateau ($37^{O}10`N$, $37^{O}$ 08`E), 1095 m. on 01.05.2010.

All of adult specimens were dissected under stereo-microscope (Olympus SZX 12) and their gonads were extracted. Gonads were dillated twenty minute in potassium chlorur (KCL) solution. After, gonads were heid about thirty-five minutes in Carnoy fixative. Pieces of tissue were dissociated inadrop of microscope slides. They were diffused by using wire brush in asetic acit from 25-30 minutes. We use wire brush instead needle. The chromosome preparations were dyed with Giemsa. Percentage with some change of which to raise the bar % 50. They have taken to potography (Nikon P5 100). Chromosome preparations were made by using the method with some modifications of Traut (1976), Cokendolpher and Brown (1985).

Results and Discussion

Mitotik metaphase chromosomes of six spiders species stained with Giemsa were showed. All samples were observed in metaphase. Chromosome numbers of species: *Zelotes petrensis* (♂) 11 X, *Zelotes aeneus (*♂) 9 XX, *Nomisia conigera* (♂) 10 XX, *Theridion pictum* (♀) 11 X, *T. pictum* (♂) 14 X, *Steotoda triangulosa* (♂) 12 XX, *Trachosa ruricula* (♂) 9 XX (Figures 1, 2). All specimen counted chromosomes which they adult and diploid chromosomes number (Table 1).

Table 1. Provides data on the karyotypes of six species

Araneae	Chromosome accounts	n	Sex chromosome
Gnaphosidae			
Zelotes petrensis (♂)	23	11	X
Zelotes aeneus (♂)	20	9	XX
Nomisia conigera (♂)	22	10	XX
Theridiidae			
Theridion pictum (♀)	23	11	X
Theridion pictum (♂)	29	14	X
Steotoda triangulosa (♂)	26	12	XX
Lycosidae			
Trachosa ruricula (♂)	20	9	XX

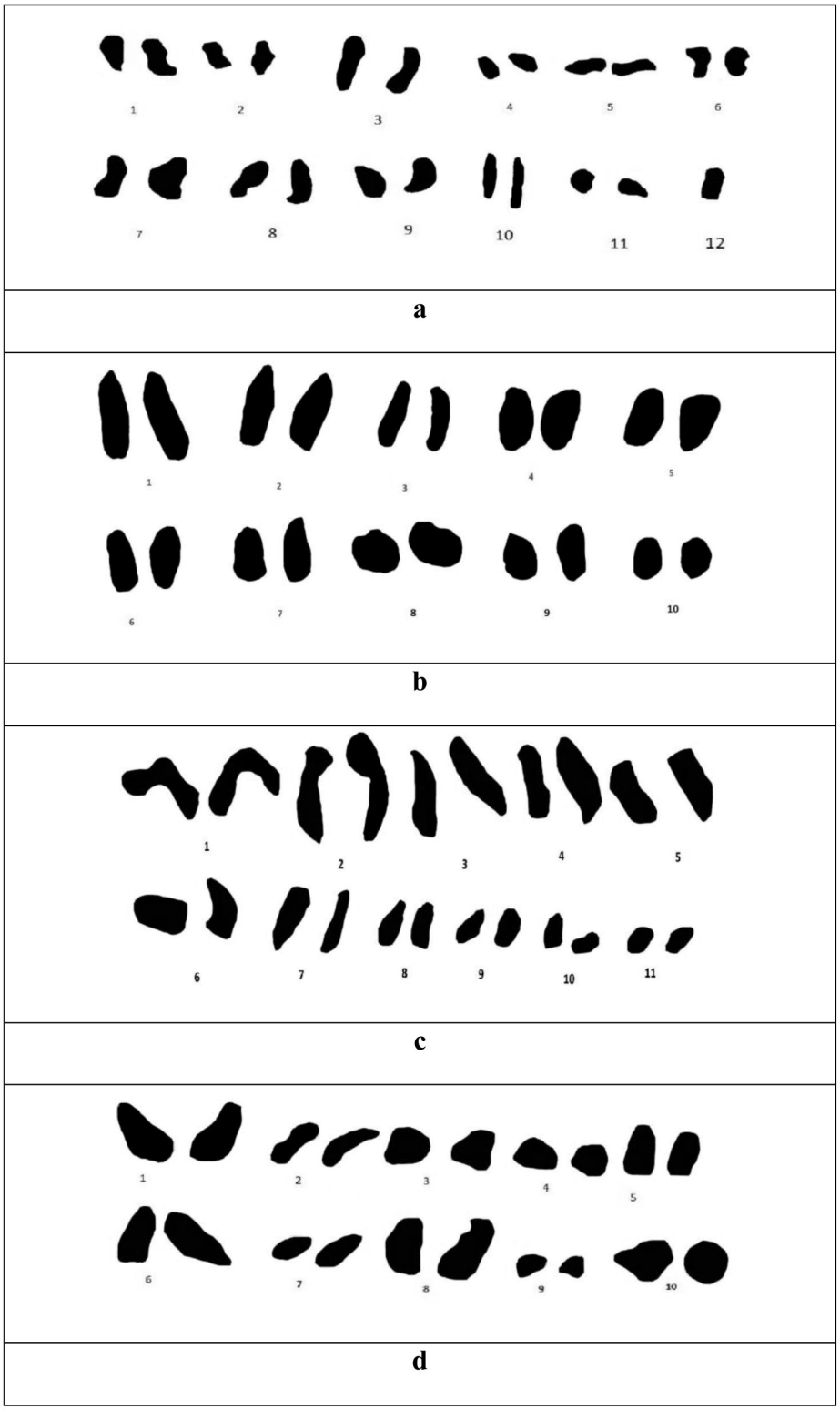

Figure 1. Karyotypes of the male *Zelotes petrensis* (a), male *Zelotes aeneus* (b), male *Nomisia conigera* (c), male *Trachosa ruricula* (d). All male was taken spermatogonial metaphase.

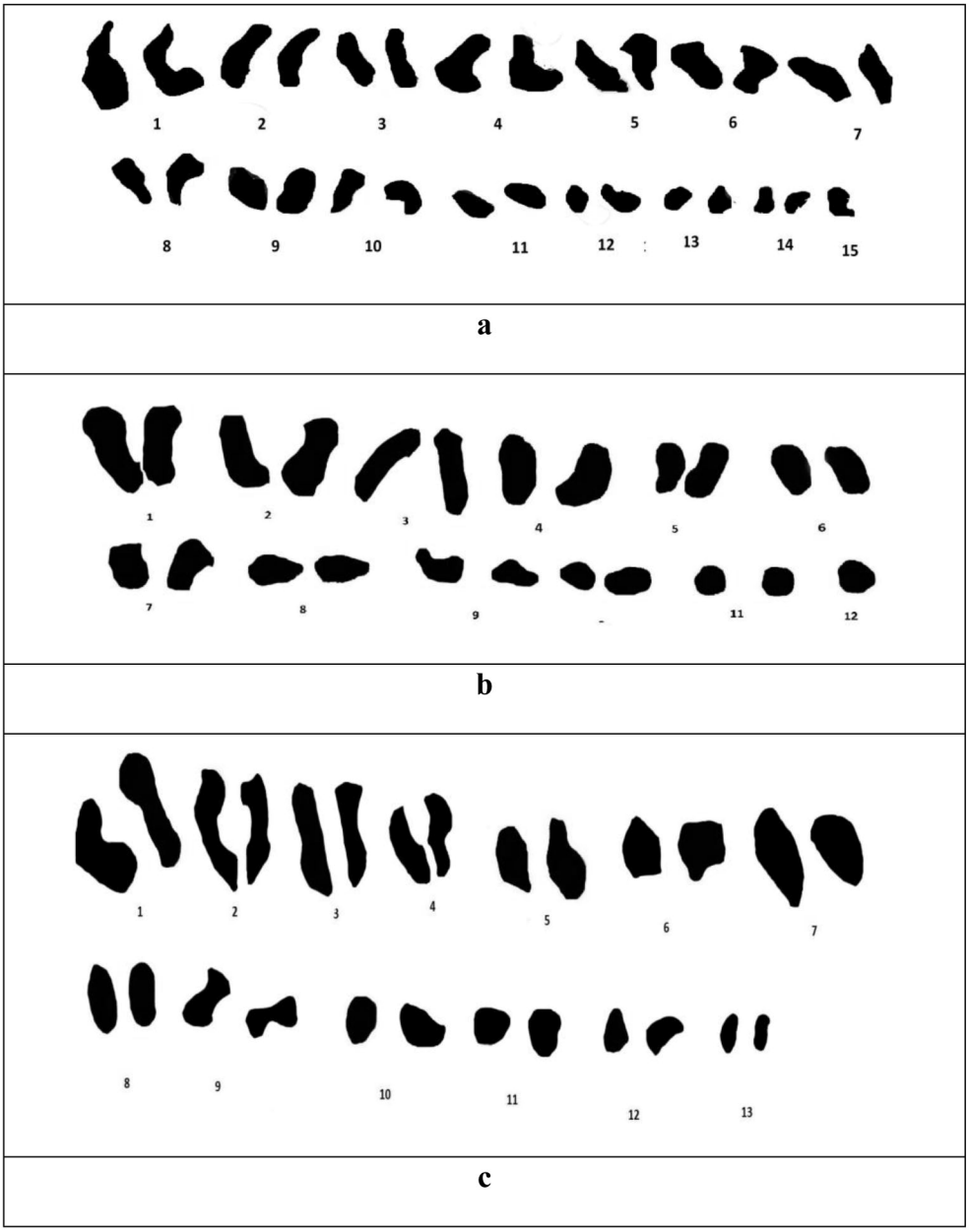

Figure 2. Karyotypes of the male *Theridion pictum* (a), female *Theridion pictum* (b), male *Steotoda triangulosa* (c). All male was taken spermatogonial metaphase and female oogonial metaphase.

Distributions of *Zelotes aeneus* is Europe (Platnick, 2011). It is found in dry area. Distributions of *Zelotes petrensis* is from Europe to Central Asia (Platnick, 2011). It is found in desert areas, dry brake and stony place, under stone and leaf on forest area. Distributions of *Nomisia conigera* is from Turkey to Central Asia (Platnick, 2011). It is found in brake and stony place. Distributions of *Trachosa ruricula* is from Bermuda which is Holarctic species (Platnick, 2011). But it is found out ever so much locations. It is found in arid land on moisty place. Distributions of *Theridion pictum* is Holarctic species (Platnick, 2011). It is found in near to damps and brake area. Distributions of *Steotoda triangulosa* is cosmopolitan species (Platnick, 2011). It is found in amongs stones and vegatations area sometimes in buildings.

This study, both female and male tried to *Theridion pictum* in family Theridiidae. Females (♀) 2n = 23 while the men (♂) 2n = 29 have been determined here. In both sex, a single sex chromosome (X) was

determined. Spiders between the sexes have different chromosome numbers (Tsurusaki et al., 1993; Gill & Gustavo, 2002).

Tugmon et al. (1990) have done their research on *Staetoda triangulosa* family of Theridiidae state that it's chromosome number have 22 and 24 (+XX). In parallel to this in our study adult male *Steotoda triangulosa* (Walckenaer, 1802) diploid chromosomes number is 12 XX (2n = 26). But, it has a subspecies according to Platnick, 2011. Distributions of *Steotoda triangulosa concolor* (Caporiacco, 1933) is Libya. So, this subspecies should have studied in the next. All species except to *Staetoda triangulosa* were studied for the first time from Turkey.

This study tried to karyotypes of *Nomisia conigera*. The near future it proved to be a synonym of *N. anatolica* Seyyar, Ayyildiz & Topçu, 2009.

Chromosome painting in the method have done some changes for the advanced picture. Especially in the preparation used wire brush instead of needle and while dyed preparation % 50 raised percentage of Giemsa. All of the species weren't made ideograms because all arm of chromosomes have less than 2 µm (Gil & Gustavo, 2002).

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