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Source: Florida Entomologist, 94(4) : 795-799

Published By: Florida Entomological Society

URL: https://doi.org/10.1653/024.094.0410
A CYTOGENETIC STUDY OF VADONIA UNIPUNCTATA
(COLEOPTERA: CERAMBYCIDAE) AND ITS DISTRIBUTION IN TURKEY

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ABSTRACT

The paper gives the results of the first cytogenetic study of Vadonia unipunctata (F. 1787) on the basis of the mitotic metaphase plate, karyogram, and the male genitalia. The distribution of this species in Turkey is also presented.

Key Words: cytogenetic, karyology, Vadonia unipunctata

RESUMEN

Este informe provee los resultados del primer estudio citogénetico de Vadonia unipunctata (F. 1787) basado sobre el plato de la metafase mitótica, cariograma y los genitales de los machos. Se presenta l distribucion de esta especie en Turquía.

Cytogenetic studies may be helpful in classifying a taxon when external taxonomic traits are not adequate to do so unambiguously. Comparative karyology can have advantages in taxonomic studies of animals because chromosomal characters are essentially morphological characters (Gokhman & Kuznetsova 2006). Cytogenetic studies on the Cerambycidae, in particular, have been realized poorly worldwide until now (Ehara 1956; Teppner 1966, 1968; Kudoh et al. 1972; Smith & Virkki 1978; Vidal 1984; Vaio et al. 1985; Lachowska et al. 1996; Holecova et al. 2002; Rozek et al. 2004; Dutrillaux et al. 2007). The diploid number of chromosomes in long-horned beetle species range between 10 and 36. The sex-chromosome system of long-horned beetles is the parachute type (Xyp). The most frequent diploid chromosome number in the Cerambycidae is 2n = 20 (18AA + Xyp) (Smith & Virkki 1978).

Until now no cytogenetic investigations had been conducted on the genus Vadonia Mulsant 1863 (Coleoptera: Cerambycidae: Lepturinae: Lepturini) including the species, Vadonia unipunctata (Fabricius 1787). In this species, we determined the diploid number of chromosomes in the Cerambycidae is 2n = 20 (18AA + Xyp) (Smith & Virkki 1978).

The members of Vadonia closely resemble each other in their external morphology; and identification of these species on the basis of external morphology, therefore, is either very difficult or impossible. Generally the identification of Vadonia species is necessarily based solely on characteristics of the male genitalia. Therefore the discovery of new taxonomic characters of Vadonia species by means of cytogenetic investigations may prove to be useful for both the identification of species and also the proper classification of the genus.

MATERIALS AND METHODS

The specimens were collected from Ankara province of Turkey in 2009 and 2010 and were deposited in Gazi University, Ankara, Turkey. The chromosomes were obtained according to the method of Rozek (1994) with some alterations as follows. The specimens were placed in a killing jar charged with ethyl acetate. Abdomens of the specimens were cut open and the abdominal contents, especially testicular tissue of the male, and mid-gut tissue in both males and females, were transferred into petri dishes with distilled water for 10-15 min. Next the tissues of a single specimen were transferred into a cryotube with 0.05% colchicine solution, held for 45-60 min at room temperature, and then fixed in 3:1 fresh ethanol-acetic acid solution for at least 1 h. Small pieces from the treated tissues were taken and each piece was mounted on a clear slide. Other tissue pieces were placed in a drop of 45% acetic acid and dissected with a dissection pin and a scalpel. Then, each tissue piece was mounted on a slide, covered either with a cover slip or another glass slide and pressed firmly. These preparations were
immersed in liquid nitrogen. The slide and cover slip or the 2 pressed together slides were separated and left to dry. Next the dry preparations were stained with 4% Giemsa Phosphate Buffer (pH = 6.8) for 10 min, and washed with distilled water. After drying, the preparations were examined under a stereo compound microscope (Leica DMLB). The observed chromosomes were photographed with 10X-100X zoom lenses.

RESULTS AND DISCUSSION

Subfamily Lepturinae Latreille, 1802
Tribe Lepturini Latreille, 1802
Genus Vadonia Mulsant, 1863
Type species: Leptura unipunctata F. 1787


The following 7 species are endemic to Turkey: V. bolognai Sama 1982, V. ciliicensis K. Daniel & J. Daniel 1891, V. danielorum Holzschuh 1984, V. frater Holzschuh 1981, V. instignata (Pic 1889), V. ispirensis Holzschuh 1993 and V. soror Holzschuh 1981. V. monostigma Ganglbauer 1881 was listed only for Turkey in Löbl & Smetana (2010), but it is distributed in both Turkey and Greece; therefore it is not endemic to Turkey. The 3 species, V. insidiosa Holzschuh 1984, V. mainoldii Pezarini & Sabbadini 2004 and V. parnassensis (Pic 1925), are endemic to Greece. On the other hand, V. eckweileri Holzschuh 1989, V. hirsuta K. Daniel & J. Daniel 1891 and V. saucia (Mulsant et Godart 1855) are endemic to Pakistan, Romania and Crimea, respectively.

Vadonia unipunctata (F. 1787)

Original combination: Leptura unipunctata F. 1787

This species is the type species of Vadonia Mulsant 1863. According to Löbl & Smetana (2010), V. unipunctata has 6 subspecies. The species is represented only by the nominate subspecies in Turkey. It is widely distributed in Turkey. With respect to the remaining known subspecies, V. unipunctata dalmatina (Müller 1907) occurs only in Croatia, V. unipunctata makedonica Holzschuh 1989 occurs only in Greece, V. unipunctata occidentalis (Daniel & Daniel 1891) occurs in Spain, France and Italy, V. unipunctata ohridensis Holzschuh 1989 occurs in Greece and Macedonia, and V. unipunctata syricola Holzschuh 1993 occurs in Syria and Lebanon.
each species can be ascertained and this number has some value with respect to taxonomy.

In the present work, cytogenetic investigations were carried out on adult *V. unipunctata* specimens because identification of larvae and pupae to the species level is very difficult. The diploid number of chromosomes of *V. unipunctata* was determined as 2n = 20 in the mitotic metaphase in testicular tissues (Fig. 2).


Fig. 1. Habitus of *Vadonia unipunctata* (dorsal view).

Figs. 2A and 2B. 2A, Mitotic metaphase plate from testicular tissue of *Vadonia unipunctata*. 2B, Karyogram of *Vadonia unipunctata* (2n = 20).
Park] (Özdikmen & Demirel 2005); Konya prov. [Seydisehir to Antalya road, Derebucak-Tekebeli pass env., Bozkir-Kozagac and Baybogan villages env.] (Turgut & Özdikmen 2010); Malatya prov. [Darende] (Fuchs & Breuning 1971); Nevsehir prov. [Ürgüp-Göreme] (Fuchs & Breuning 1971; Adlbauer 1988); Nigde prov. [Çamardi, Çiftehan] (Bodemeyer 1900; Adlbauer 1988); Osmaniye prov. [Central, Entry of Yarpuz, Yarpuz road-Karatas place, Yesil village-Hasanbeyli] (Özdikmen & Demirel 2005; Özdikmen 2007; Özdikmen et al. 2010); Sivas prov. [Central] (Tozlu et al. 2002); Tokat prov. [Central] (Tozlu et al. 2002); Usak prov. [Banaz] (Adlbauer, 1988) (Fig. 3).

Range. Europe (Spain, France, Italy, Croatia, Bosnia-Herzegovina, Serbia, Macedonia, Greece, Bulgaria, European Turkey, Romania, Hungary, Austria, Czechia, Slovakia, Poland, Slovenia, Ukraine, Moldavia, European Russia, European Kazakhstan), Caucasus (Azerbaijan, Armenia, Georgia), Turkey, Syria, Lebanon.

Chorotype. Turano-European or Turano-Euro-Mediterranean; Since, according to Sama (2002), the records from North Africa are erroneous.

Genitalia. Aedeagal apex pointed distinctly like a claw. Its sclerotization is rather strong. Lobes of parameres are rather long and thick with sparse and clear long hairs, their inner margins are nearly parallel. The inner gab is “U” shaped basally (Fig. 4).

ACKNOWLEDGMENTS

This work was supported by a project of Gazi University (05/2008-44). The data were derived from the Ph.D. Thesis of A. Y. Okutaner.

REFERENCES CITED


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