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Short Communication / *Kısa Bilimsel Çalışma*

First record of *Dictyocaulus capreolus* (Gibbons and Höglund 2002) in roe deer (*Capreolus capreolus*) from Turkey*

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Summary: Severe injury a roe deer *(Capreolus capreolus)* which was brought to the clinics of the Faculty of Veterinary Medicine of Ondokuz Mayıs University by Provincial Directorate of Environment and Forest was examined for parasitological at 2010. The roe deer was found infected with pulmonary nematodes and collected as totally 42 (14♂, 27♀ and 1 larva) parasites from the bronchi and bronchioles. All nematode identified as *Dictyocaulus capreolus* is the first report in Turkey.

Key words: Nematod, Dictyocaulus capreolus, roe deer, Samsun, Türkiye

Türkiye'de karacalarda (*Capreolus capreolus*) ilk *Dictyocaulus capreolus (*Gibbons ve Höglund 2002) olgusu*

Özet: İl Çevre ve Orman Müdürlüğü tarafından fakültemiz kliniklerine ağır yaralı olarak getirilip ölen bir dişi karaca, ölüm sonrası parazitolojik açıdan sistematik olarak muayene edilmiş ve akciğerde bronş ve bronşiollerden 42 (14 ♂, 27 ♀ ve 1 larva) nematod toplanmıştır. Tümü *Dictyocaulus capreolus* olarak tanımlanan parazitler Türkiye için ilk kayıttır.

Anahtar sözcükler: Nematod, Dictyocaulus capreolus, karaca, Samsun, Türkiye.

The roe deer (*Capreolus capreolus*) were found the greater part of Europe and Asia Minor. Their populations are increasing due to nature conservation methods in recent years and they occur especially in the woodlands of Black Sea in Turkey.

Dictyocaulus spp. may be important role in the respiratory tracts of domestic and wild animals (1). Except in endemic areas, occurrence of lungworm infection is not predictable (6). Wild ungulates often share pastures with domestic livestock and represent a potential reservoir for parasite species capable of cross-infection (2).

The *Dictyocaulus* genus contains seven species which are *D. africanus*, *D. arnfieldi, D. cameli, D.capreolus, D.eckerti, D. filaria* and *D.viviparus* (3,5-8). Generally roe deer harboured with *D. capreolus* and *D. eckerti* which were reported in different cervidae in some European countries (1,4,10,11).

The main lungworms of roe deer is *D. noerneri* (Railliet and Henry, 1907), but validity and name of this species is doubtful and systematic is still controversial due to the absence of a full description (3,7,9). This nematode redescribed by Durette-Desset et al. (5) but considered *incerta sedis* by several authors and re-suggested *D.eckerti* (1,7).

There have been many studies for the dictyocaluid nematodes of domestic animals and *D.arnfieldi, D. filaria* and *D.viviparus* were identified in Turkey. However there is no existence of *D. capreolus* in Turkey (12).

This article describes the morphology of the *D.capreolus* recovered from the lung of *C. capreolus*, including their measurements, studied by light microscopy.

Necropsy and the standard parasitological examination of died roe deer was performed in Samsun, Turkey in August 2010. Every nematode recovered from the lungs was cleaned with physiologic saline and fixed in hot 70% alcohol. Nematodes were prepared as temporary whole mounts cleared in lactophenol and examined and measured with a microscope (Eclipse 80i, Nikon Corp.) connected to a digital camera and a measurement specific software (Nikon Digital Sight1 DS-L1).

The anterior ends cut with a scalpel and fixed in 10% formalin and then all nematodes examined in terms

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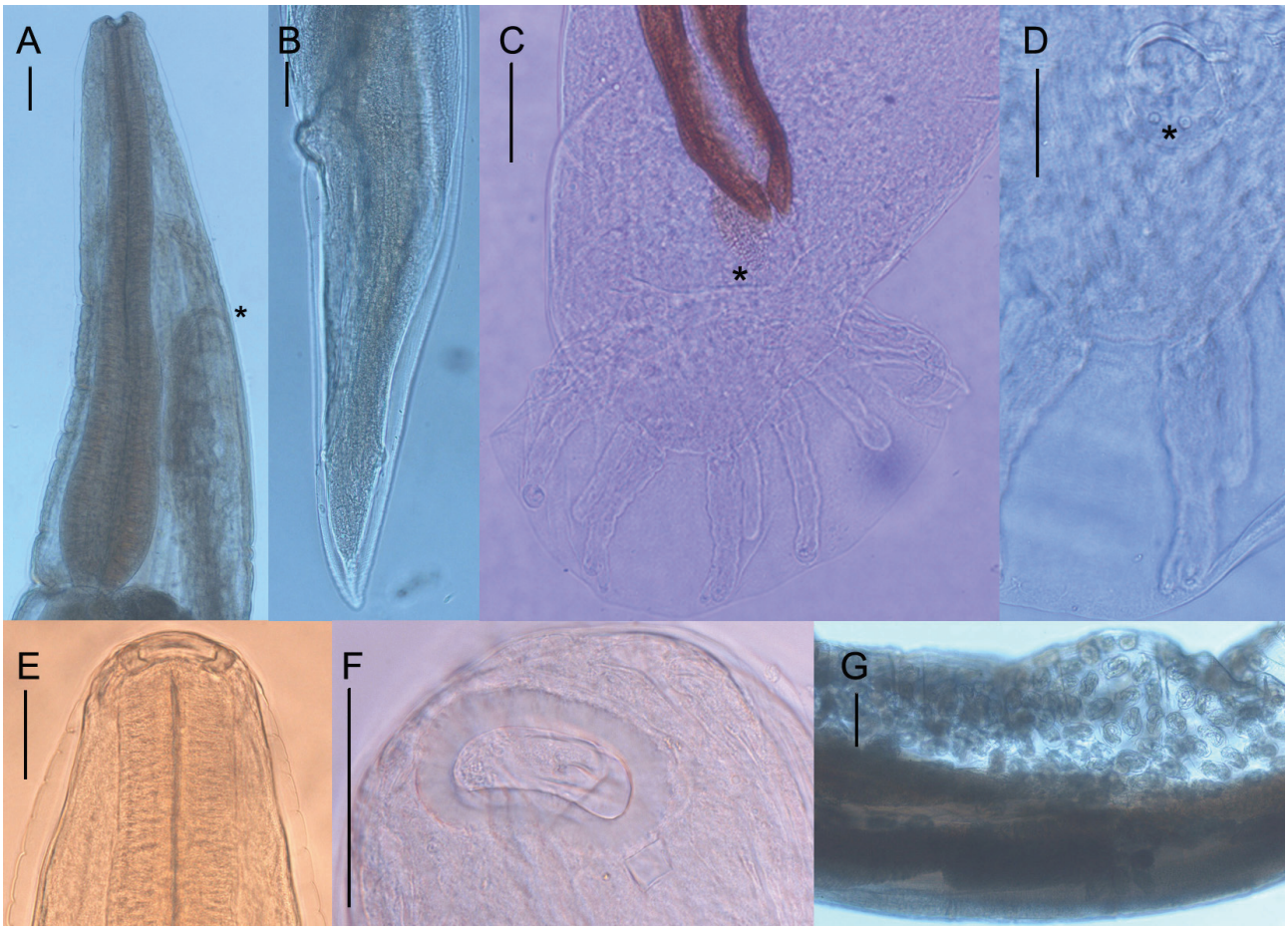

Figure 1. *D.capreolus*, **A.** Anterior end; **B**. Female, posterior end; **C**. Male, heart shaped bursa copulatrix, **D**. Genital cone and papillae 7, **E**. Buccal capsul; **F**, Optical section, kidney shaped buccal capsule; **G.** Embrionated eggs in uterus.(Bar 0.1 mm)
Şekil 1. *D.capreolus*, **A.** Ön uç; **B**.Dişi arka uç; **C**. Erkek, bursa kopulatriks ve kalp yapısı; **D**. Genital koni ve papilla 7, **E**.Ağız yapısı; **F**, Optik kesitte ağız kapsülü duvarı ve böbrek görünümü, **G.** Larvalı yumurtayla dolu uterus, (Çubuk 0.1 mm).

of morphological characters such as thickness and shape of the buccal capsule wall (BCW), ventral view of bursa and others according to literatures (3,5,7,8,11).

All nematodes and a larva were identified as *D.capreolus* that the first report from Turkey. Labelled specimens were preserved in 70% ethanol and deposited in the Helminth Coll. No. 2010-7, Department of Parasitology, Faculty of Veterinary Medicine, Samsun, Turkey.

Mature *D. capreolus* has oral opening elongated oval and dorso-ventrally flattened. Buccal capsule oval, flattened dorsoventrally, wall thick, kidney-shaped in optical section (Fig.1.A,E,F). Cuticle has with numerous longitudinal cuticular ridges, but it is difficult to see on the light microscope. Cervical papillae not observed.

Male body is 23.01-41.3 mm long, 0.18-0.22mm just anterior to bursa copulatrix. Oesophagus 1.11-1.25 (mean 1.16) mm long. Buccal capsule wall is 0.0088 (0.0077-0.0094)mm width. Anterior to excretory pore 0.43 (0.42-0.44)mm (Fig.1). Spicules 0.27 (0.24-0.31) mm long, porous texture and two sclerotized alae. Gubernaculum present and 0.065 (0.053-0.076)mm long, porous texture, irregularly oval in dorso-ventral view, uneven in width, variable in shape in lateral view (Fig.1C). Bursa bell-shaped, lobes not separated, partially heart-shaped in dorsoventral view. Dorsal ray is (ray 9, 10) divided to base, each branch with three small divisions at distal tip. Genital cone is simple, have a pair of short dorsal raylets (papillae 7) (Fig 1D).

Female body is 47.13 (28.29-52.81)mm long; 0.67 (0.56-0.80)mm wide in vulvar region. Oesophagus 1.18 (1.08-1.25)mm long. Buccal capsule wall is 0.0091 (0.0082-0.0097)mm width. Anterior to excretory pore 0.44 (0.35-0.49)mm. Vulva opens 22.90 (17.34-26.99)mm and anus 0.38 (0.35-0.43) mm from tail tip. Mature embryonates eggs in uterus 0.075 x 0.046 (0.066-0.082) x (0.042-0.050)mm. (Fig.1.G)

All *Dictyocaulus* species are very similar morphologically (8), it can be only distinguished by the mouth shape and thickness of their BCW. Based on the BCW shape, those with triangular shape were identified as *D. viviparus* while those with kidney or bean-shaped BCW were considered to be *D. eckerti* (3,5,7). However, they are of limited use for identifying the parasites to the

species level because their dimensions appeared to be affected by host species and worm total body length (3).

Dictyocaulus capreolus is to be closest to *D. eckerti* and *D. africanus* on the basis of mouth shape, all three species having an elongate mouth opening. The other species of the genus, all have a circular to oval mouth opening. *D. capreolus* can be distinguished from *D. eckerti* and *D. africanus* on the basis of the morphology of the bursa ventral view. The shape of the bursa is oval in *D. eckerti*, or heart-shaped in *D.caproeolus* (3,8). However intraspecific variations were seen in *Dictyocaulus* species (6). The other hand, with PCR-linked hybridization assay and other molecular techniques are also useful to distinguish between the *Dictyocaulus* species (3,4,6,9).

Our morphological findings and measurements were similar to literatures (5,7,8), however the slightly heart-shaped bursa was observed in this study. The reason for this may be due to position of the bursa and/or intraspecific variations. However additional studies are needed to asses the prevalence of this and other nematodes in wild and domestic animals in Turkey and the morphological identifications have supporting with molecular evidence.

References

1. **Carreno RA, Diez-Baños N, Hidalgo-Argüello MR, Nadler SA** (2009): *Characterization of Dictyocaulus species (Nematoda: Trichostrongyloidea) from three species of wild ruminants Northwestern Spain.* J Parasitol, **95,** 966-970.
2. **Divina BP, Höglund J** (2002): *Heterologous transmission with Dictyocaulus capreolus from roe deer (Capreolus capreolus) to cattle (Bos taurus).* J Helminthol, **76,** 125-130.
3. **Divina BP, Wilhelmsson E, Mattsson JG, Waller P, Höglund J** (2000)**:** *Identification of Dictyocaulus spp. in ruminants by morphological and molecular analyses.* Parasitol, **121**, 193-201.
4. **Divina BP, Wilhelmsson E, Mörner T, Mattsson JG, Höglund J** (2002): *Molecular identification and prevalence of Dictyocaulus spp. (Trichostrongylidea: Dictyocaulidae) in Swedish semi –domestic and free-living cervids.* J Wildl Dis, **38,** 769–775.
5. **Durette-Desset MC, Hugonnet L, Chabaud AG** (1988): *Redescription of Dictyocaulus noerneri Ralliet et Henry, 1907, parasite of Capreolus capreolus in Europe. Comparison with D. viviparus (Bloch, 1782), a parasite of cattle.* Ann Parasitol Hum Comp*,* **63,** 285-295.
6. **Epe C, Samson-Himmelstjerna GV, Schnieder T** (1997): *Differences in a ribosomal DNA sequence of lungworms species (Nematoda: Dictyocaulidae) from fallow deer, cattle, sheep and donkeys.* Res Vet Sci, **62**, 17-21.
7. **Gibbons LM, Höglund J** (2002): *Dictyocaulus capreolus n. sp. (Nematoda: Trichostrongyloidea) from roe deer, Capreolus capreolus and moose, Alces alces in Sweden.* J Helminth*,* **76,** 119–124.
8. **Gibbons LM, Khalil LF** (1988)**:** *A revision of the genus Dictyocaulus Railliet & Henry, 1907 (Nematoda: Trichostrongyloidea) with the description of D. africanus n. sp. from African artiodactylids.* J Afr Zool, **102,** 151-175.
9. **Höglund J, Morrison DA, Divina BP, Wilhelmsson E, Mattsson JG** (2003)**:** *Phylogeny of Dictyocaulus (lungworms) from eight species of ruminants based on analyses of ribosomal RNA data*. Parasitol, **127,** 179–187.
10. **Kuzmina TA, Kharchenko VA, Malega AM** (2010): *Helminth fauna of roe deer (Capreolus capreolus) in Ukraine: Biodiversity and parasite community. Vestnik Zool*, **44**, 595-599.
11. **Panadero R, Carrillo EB, López C, Diez-Baños N, Diez-Baños P, Morrondo MP** (2001): *Bronchopulmonary helminths of roe deer (Capreolus capreolus) in the northwest of Spain.* Vet Parasitol, **99,** 221–229.
12. **Umur Ş, Köroğlu E, Güçlü F, Tınar R** (2011). *Nematoda,* 270-281. **In:** R Tınar R (Ed), Veteriner Helmintoloji. Dora Yayınları, Bursa.

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