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THE SURFACE STRUCTURE OF *PODOCOTYLOIDES CHLOROSCOMBRI* (DIGENEA : OPECOELIDAE) FROM THE MARINE FISH *TRACHURUS MEDITERRANEUS* FROM EGYPT

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ABSTRACT

In the present work, the surface topography of *Podocotyloides chloroscombri* Fischthal &Thomas, 1970 from the marine fish *Trachurus mediterraneus* is described by light and scanning electron microscopy. The study has shown the oral sucker to be fringed with 23 large oral processes, each provided with a pair of folds at its base. A number of spherical bodies are borne on the base of some of the oral processes and in between them. The dome-shaped ventral sucker has a short stalk. Its edge bears filamentous processes and its surface is transversely folded. The ventral surface is covered with dense tegumental scales,directed posteriorly. They have serrate free edges on some areas and each possesses two processes.The scales on the dorsal surface are provided,each with 8 processes. Scattered on the ventral surface are numerous pores of different shapes and sizes.These may function in transporting nutrients into the digenean tissues. *P. chloroscombri* is reported for the first time in Egypt and *T.mediterraneus* represents a new host .

INTRODUCTION

Scanning electron microscopy has become increasingly useful in describing surface topography of digenetic trematodes (Eduardo,1982; Fried& Fujino,1984; Ashour,1995).It may further provide a helpful tool for studying their taxonomy. Acting as an interface with the host, the digenean tegument, with its marked structural adaptations, serves major functions: nutritional, secretory, water- and ion - regulation and sensory (Halton,1982).

The aim of the present work is to describe the surface topography of *Podocotyloides chloroscombri*,infecting the marine fish *Trachurus mediterraneus*, which represents a new host, by light and scanning electron microscopy and to discuss the possible functions of its tegumental structures.

Podocotyloides chloroscombri, reported here for the first time from Egypt,was originally described by Fischthal &Thomas(1970) from the small intestine of *Chloroscambrus chrysurus* in Ghana.

MATERIAL AND METHODS

Several adult fishes of *Trachurus mediterraneus* were obtained from Alexandria fish market. They were examined for helminth parasites inhabiting the intestine as soon as possible. *Podocotyloides chloroscombri* worms were selected and washed several times in saline. For light microscopy, worms were

relaxed, flattened, then fixed in 70% alcohol or 5% formalin. Worms were stained, dehydrated in ascending series of ethanol and drawn to the scale using a Camera Lucida. For SEM, worms were transferred through a series of intermediate fluids (3:1,2:1 and1:1) of 100% ethanol and amylacetate and later to liquid CO2 in Polaron critical point dryer. The dried parasites were then coated with gold/palladium and examined with a JOEL scanning electron microscope in the Institute of Zoomorphology and parasitology,Heinrich Heine University,Dusseldorf,Germany.

RESULTS

The flattened body of *P. chloroscombri* is bifurcate anteriorly, elongate and with an acetabular stalk. The Oral sucker is terminal,rather protrusible and larger than the ventral sucker (Figs.1,2 & 3). SEM shows that the oral sucker is fringed with 23 finger-like oral processes,each provided with a pair of folds, probably sensory, at its base.A number of spherical bodies are borne on the base of some of the oral processes and in between them (Figs.4,5 & 6).The ventral sucker is dome-shaped and distinctly pedunculate. Its edge bears filamentous processes, and the outer surface is transversely folded (Fig.5). Dense tegumental scales cover the whole body and are directed posteriorly. They vary in shape and length in the different regions. The tegumental scales on the dorsal surface are digitiform, each with 8 processes (Figs.7,8). Dispersed between the bases of the scales all over the ventral surface are spherical bodies with numerous pores (Figs.9,10 & 11). Particularly in the neck region, on the ventral surface, the scales have serrate free edges (Fig.9). On the area behind the ventral sucker the scales are arranged in transverse rows, and each scale ends in 2 processes (Figs.10 & 11). Scattered on the ventral surface, there are several large squared pores with thick border, pierced with about 8 minute pores (Figs.12 & 13) .

DISCUSSION

Although many roles have been ascribed to the tegumental structures in the digeneans, their precise function is still not known. It is becoming increasingly evident that the diversity of structure of the tegumental processes may well indicate a diversity of functions.According to Chappell (1993) the digenean tegumental surface generally assumes a major nutritional function. As demonstrated in the present investigation,the tegument of *P. chloroscombri* is marked by a variety of morphological modifications including the development of scales, of different sizes and shapes, and pores. The latter may have a role in the transport of nutrients into the digenean tissues. Similar tegumental pores were also reported to occur in four strains of *Schistosoma japonicum* (Voge *et al.*, 1978). It has been suggested that mechano-rheo-tango and chemo-receptors could all serve useful functions for orientation, feeding and assessment of the host environment (Smales & Blankespoor,1984).In agreement with the latter view, the abundance of the different types of scales on the body surface of *P.*

chloroscombri suggests that these scales may serve a sensory function in orientation and feeding. This was also confirmed by Hoole&Mitchell (1981) who considered the sensory folds surrounding the ventral sucker of many digenean species to have a contact or stretch receptor function.

Irwin and Fried (1994) also reported, in *Zygocotyle lunata* (Paramphistomatidae), that the distinct concentration of tegumental papillae around the oral sucker may serve a sensory function selecting the material to be ingested by the worm. The present data further suggest that the different types of pores on the body and on the two suckers may play a sensory role in the selection of the proper attachment site and perhaps also help in mating between two worms.

EXPLANATION OF FIGURES

Fig.1:Camera Lucida drawing of flattened worm showing ventrolateral view, (S,Oral sucker; h,Pharynx; e,Oesophagus; g,Genital pore; a,Ventral sucker; i,Intestine; u,Uterus ; r,Receptaculum seminis ; o,Ovary ; at,Anterior testis ; pt,Posterior testis ; v,Vitellaria ; x,Excretory vesicle ; p,Excretory pore ; E,Egg).

Fig.2 : The end of genitalia (ue,Uterus end ; sv,Seminal vesicle; g,Genital pore).

Fig.3 : Photo of flattened worm showing, ventrolateral view.

Fig.4: Anterior extremity of dorso-lateral and ventral views, showing oral and ventral suckers and oral finger like processes (X 237).

Fig. 5 : Anterior extremity of ventral surface, showing transversely tegumental folds on the stalk of ventral sucker and sensory filamentous processes on its edge (X 615)

Fig. 6 : Oral sucker, showing oral processes, sensory folds and spherical bodies on and in between the oral processes (X 1240).

Fig. 7 : Enlarged part of dorsal surface, showing tegumental scales with its processes (X1210) .

Fig. 8 : A higher magnification of Fig. 7, showing (8) processes emerged from the scales (X 2400).

Fig. 9 : Enlarged part of ventral surface, showing tegumental scales on the neck region (X 2370).

Fig. 10 : The ventral surface,post neck region, showing tegumental scales with (2) processes (X 1160) .

Fig. 11 : Enlarged section of Fig. 10, showing tegumental scales and small pores in between the scales (X 2300) .

Fig. 12 : Enlarged part of ventral surface, showing large square pores with thick border (X 1060) .

Fig. 13 : Enlarged section of Fig. 12 , showing (8) minute pores on the border of the large square pores (X2110) .

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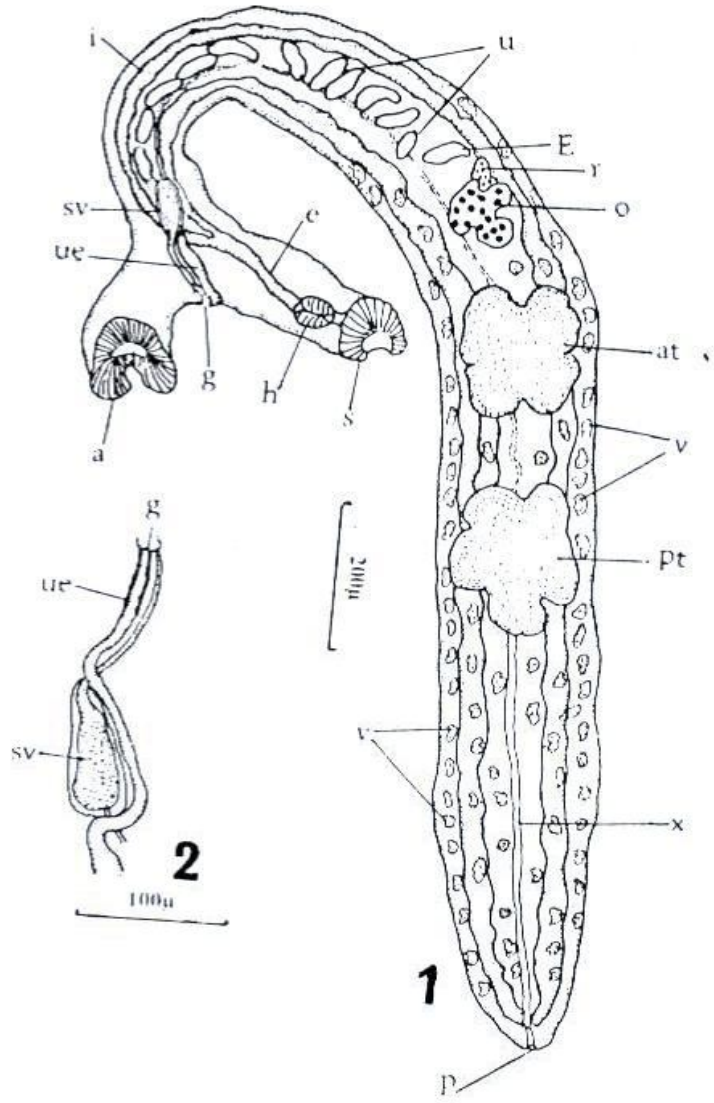

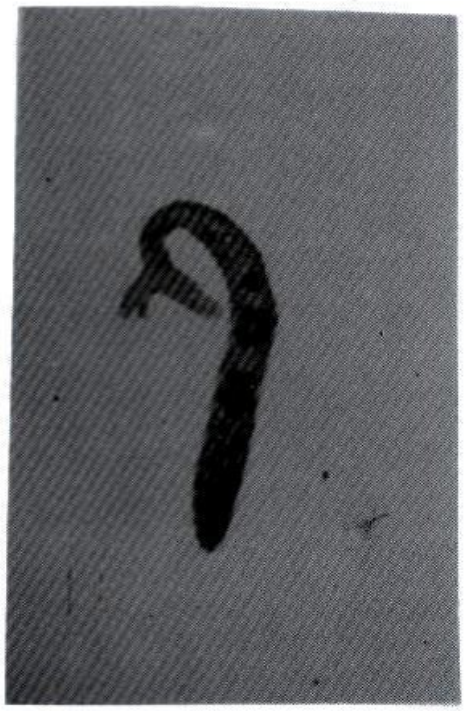

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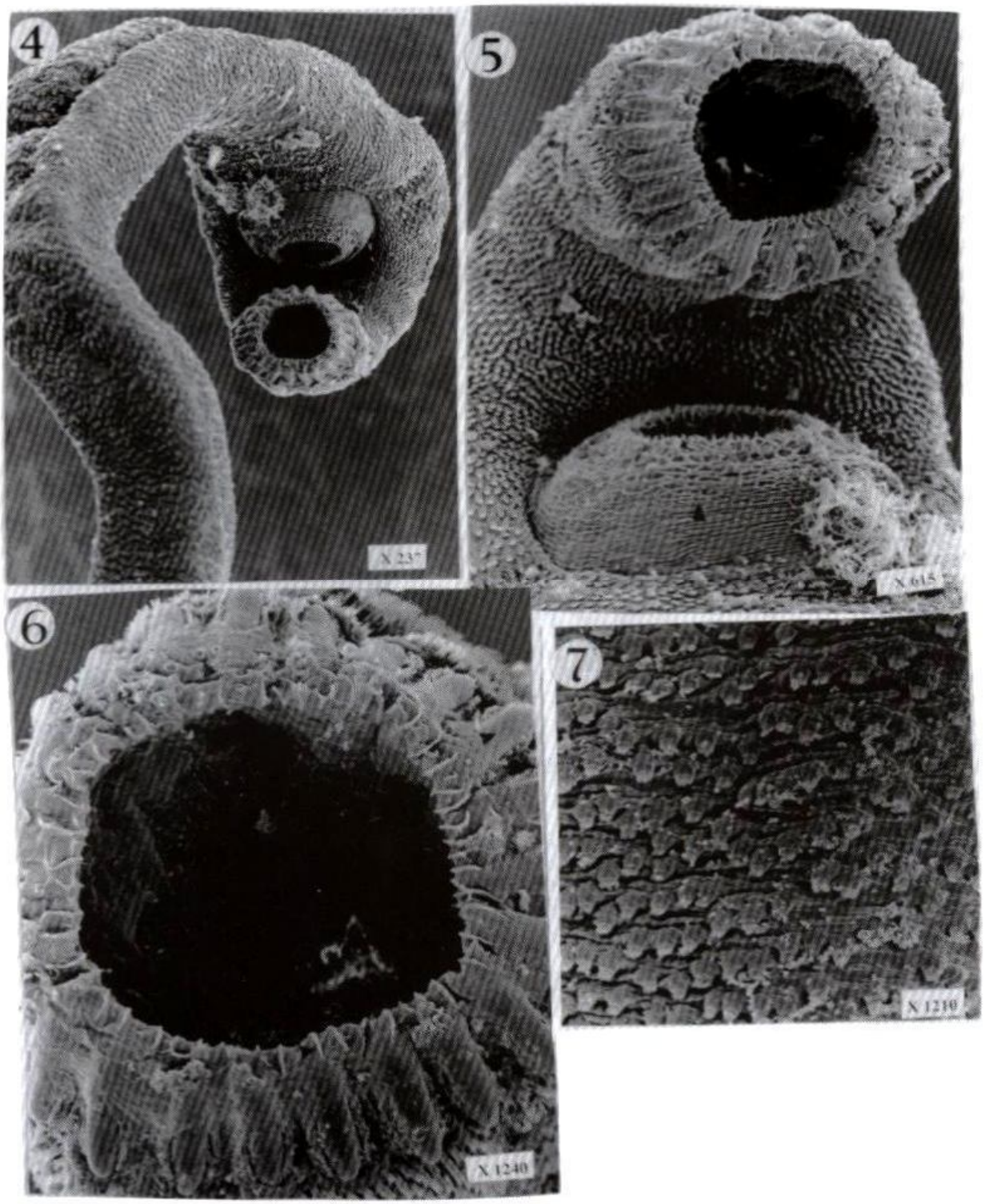
Podocotyloides chloroscombri **Fischthal & Thomas, 1970**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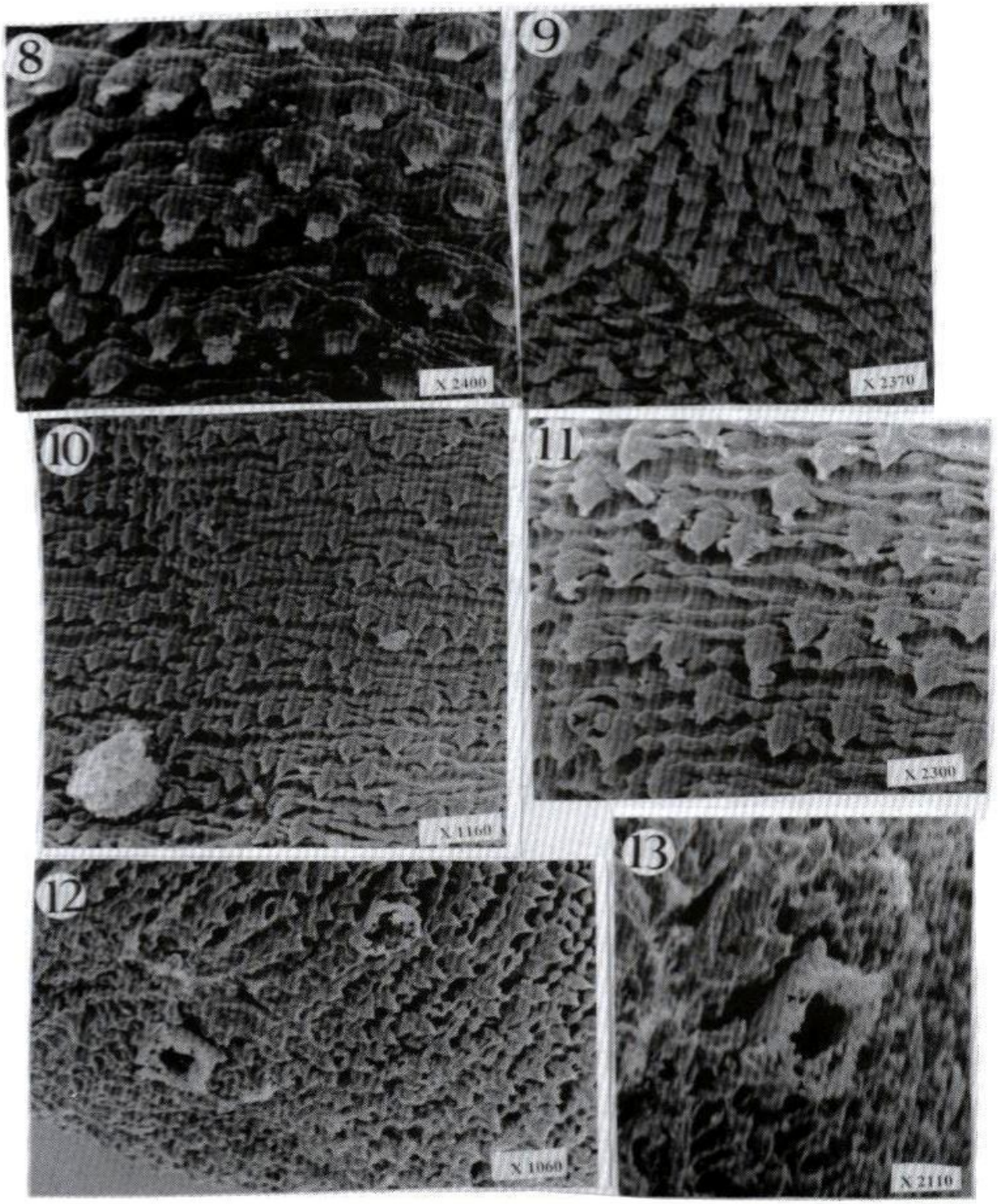
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دراسة التركيب السطحى لدودة بودوكوتيلويدز كلوروسكومبرى (أوبكوليدى - ثنائية العائل) من السمكة البحريه تراكيبورس ميد تيرينيس بمصر

ديهوم عبد الحميد منصور الباسل

قسم علم الحيوان- كلية العلوم جامعة القاهرة- فرع الفيوم

فى البحث الحالى تم وصف السطح الظاهرى لدودة *بودوكوتيلويدز كلوروسكومبرى* من السـمكة البحرية *تراكيورس ميد تيرينيس* بواسطة المجهر الضوئى والا لكترونى الماسح. وقد اظهـرت الدراسـه أن الممص الفمى محاط ب ٢٣ زائده فميه كبيره وكل منها مزود بزوج من الثنـيات عـند قاعدتـه. كمـا يحيط عدد من الأجسام الكرويه ببعض تلك الزوائد وفيما بينها. الممـص البطنى الذى يشبه القبه له ساق قصيرة ،حافته تحمل زوائد خيطية، على سطحه ثنيات جلديـه مستعرضـه. السطح البطنى مغطى بكثافه بحراشف جلديه تتجه للخلف ولها حافه حرة مسـننه فـى بعـض المناطق وتحمل زوجا من الزوائد. الحراشف على السطح الظهرى مزوده بـثمانى زوائد. ينتشرالعديد من الثقوب المختلفه الشكل والحجم على السطح البطنى ولهذة الثقوب دور فـى نقـل الغذاء الىانسجة الدودة. وتجدر الاشارة الى أن *بودوكوتيلويدز كلوروسكومبرى* يوصف لاول مرة من مصر كما ان سمكة *تراكيورس ميدترينيس* تمثل عائلا جديدا .

المجلة المصرية لعلم الحيوان

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يونيـه ٢٠٠٢

دورية علمية تصدر عن جمعية علم الحيوان بجمهورية مصر العربية