

**SCANNING ELECTRON MICROSCOPY OF *SUBULURA BRUMPTI*
FROM DOMESTIC CHICKEN *GALLUS GALLUS DOMESTICUS*
FROM TAIF, SAUDI ARABIA**

By

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Abstract

The nematode *Subulura brumpti* is described from the caecae of the domestic fowl collected from Taif, Saudi Arabia. The surface topography of the worms is described using scanning electron microscopy. This included the description of mouth opening, sensory papillae, cuticular surface, copulatory spicules and copulatory papillae.

Key words: Saudi Arabia, *Subulura brumpti*, domestic fowl, SEM.

Introduction

Nematodes belonging to the genus *Subulura* infect a wide range of hosts. This includes mainly birds belonging to different families in addition to other non-bird hosts such as reptiles and rodents (Vicente *et al*, 2000). Species of the genus *Subulura* were described mainly from bird caecum and occasionally from mammalian hosts (Diouf *et al*, 1998; Ubelaker *et al*, 2007).

The present work aimed to reveal the ultra-structural morphological topography of *subulura brumpti* worms recovered from domestic chicken from Taif City, Saudi Arabia

Materials and Methods

One hundred and five balady chicken collected from Taif city were slaughtered and examined for parasite infection. Large number of small white nematodes were recovered from the caecum. Worms were washed in saline to remove debris. Some worms were

cleared in lactophenol or glycerine and mounted on a glass slide for light microscope examination. Other worms were washed in phosphate buffer, fixed in glutaraldehyde, post fixed in 1% osmic acid, and CO₂ critical point dried then examined in JEOL scanning electron microscopy 6390, Taif University. For identification and classification standard keys were used (Yamaguti, 1961; Anderson *et al*, 1980; Gibbon, 1986).

Results

Out of 105 chicken examined 44 (41.9%) had *subulura* infection of which 20 (19%) chicken had single infection; *Subulura*, 23 (21.9%) had double infections consisting of *subulura* & cestodes and only one chicken (0.9%) had triple infection consisting of *subulura*, cestodes & *Ascaridia*.

Several nematode worms were recovered from the caecum of domestic chicken (balady) *Gallus gallus domes-*

ticus reared in an open area in Taif farms. The worms were identified as *Subulura brumpti* (Lopez Neyra, 1922) Cram, 1926. Worms possess a characteristic oesophageal bulb and pre-oesophageal dilation (Fig.1).

Female worms measure 10-12.5mm. long by 0.30-0.35mm diameter. Male worms are 10-11.8mm long by 0.31 mm diameter. Live worms are whitish in color and appear aggregated in large number within the caecum.

Scanning electron microscopy revealed the presence of a slightly swollen anterior extremity ending with a cuticular fold (Figs 2, 3 & 4). A characteristic hexagonal mouth opening lies on the most top of anterior cephalic plate of the worm (Figs. 2, 3 & 5). Four large submedian cephalic papillae and two lateral amphidial pores are found on the top of an oval to round cephalic plate (Figs. 3 & 5). Two well defined lateral alae extend along the whole length of the worm, which are slightly wide in cephalic area (Figs. 2, 3 & 6). The cuticular surface is well marked with double-lined transverse striations, a short faint longitudinal striations run between the circular ones (Fig.8).

Male worm possesses shorter body length (7-8.8mm.), two large equal spicules (1.3-1.7mm long), two pairs of precloacal and five pairs of postcloacal papillae (Figs. 9, 10, 14 & 15). A characteristic elongate precloacal sucker lies 0.7mm from posterior extremity, which appear rounded and opened (Figs.13 &14) or collapsed and closed depending on the state of fixation (Fig.11). The two copulatory spicules are long hollow and well chitinized,

each appear circular in cross section with two circular cavities inside and a ventral longitudinal ridge running on its outer surface ventrally (Fig.12). Inside the cloacal opening the gubernaculum appear triangular in shape with a rounded terminal extremity and it has a ventral smooth surface on which the spicules glide (Fig.15). Female possesses a crescent shaped anal opening and a pointed posterior extremity (Fig.16).

Discussion

Nematodes of the genus *S Subulura* are common parasites of caeca of domestic and wild birds. Vicent *et al.* (2000) reported that species of the genus *Subulura* Molin, 1860, are commonly parasitized birds and mammals. However, they described *S. lacertilian* from a reptilian host (Cuckler and Alicata, 1944).

Barus and Sonin (1980) re-described *S. skrjabini* from *Coturnix coturnix* in collections from the Kazakh SSR. They synonymized *S. coturnicis* and *S. baylisi* with *S. skrjabini* as all having 2 pairs of paracloacal papillae side by side and the first pair of precloacal papillae at the level of, or somewhat higher than, the margin of the precloacal sucker. Also, they studied *S. brumpti* from *C. coturnix* in the Tadzhik SSR and *Perdix daurica* from the Kazakh SSR and reported that this species possessing two pairs of paracloacal papillae in tandem. Kaufmann (1996) reported that *S. suctoria* were larger than *S. brumpti* as male length reached 11.8-13.8 mm. and female 20-33 mm.

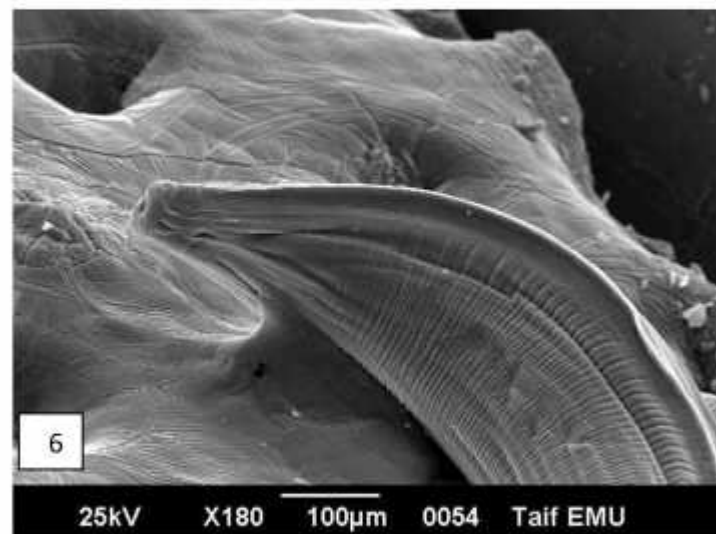
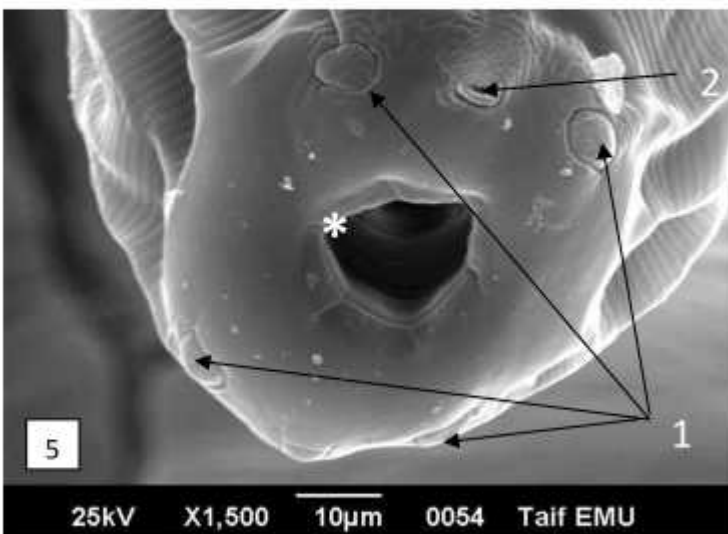
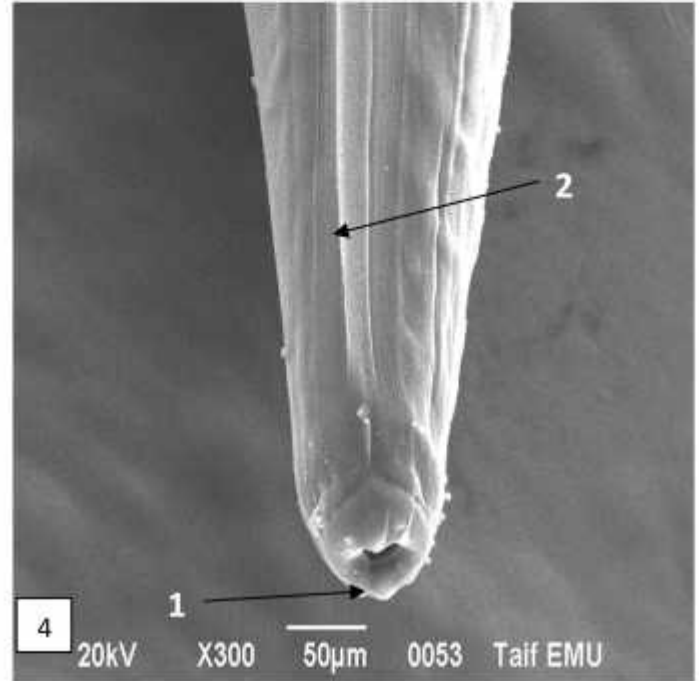
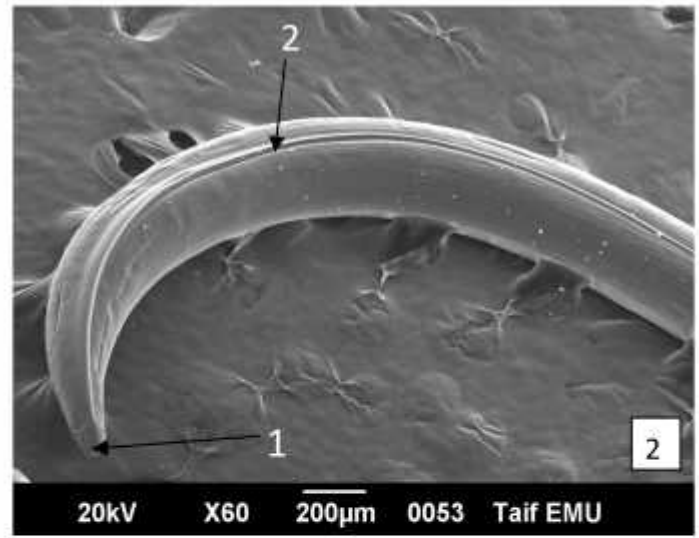
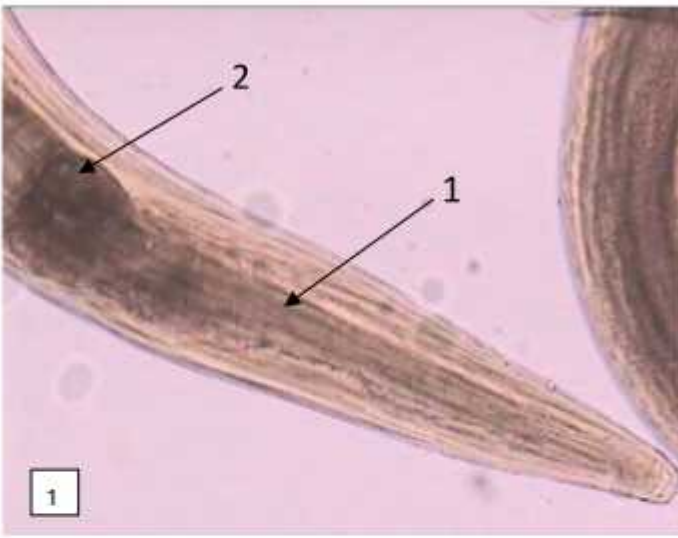
In Saudi Arabia, *S. suctorio* was described from Guinea fowl in Sarawat Mountain at Taif (Abou Zanada, 1993) Dehlawi (2007) reported three nematodes species from the intestine of Balady chicken *G. G. domesticus* from Jeddah; *S. brumpti*, *Ascaridia galli* and *Capillaria caudinflata*. It should be kept in mind that *S. brumpti* pathogenesis leads to loss in poultry and poultry products (Baker, 2008).

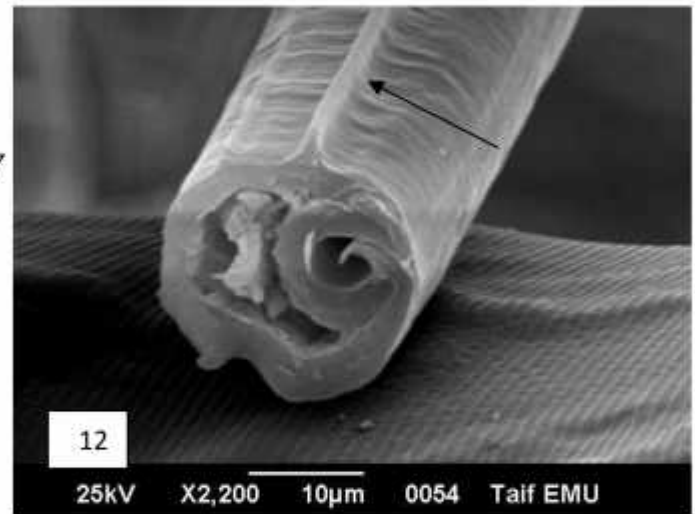
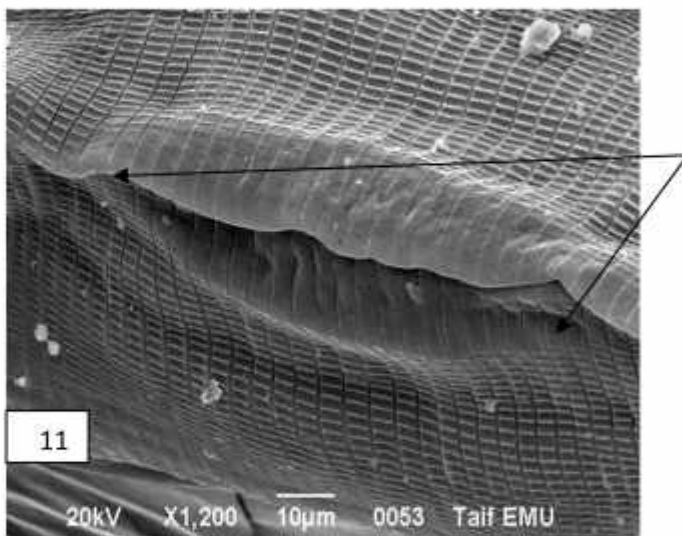
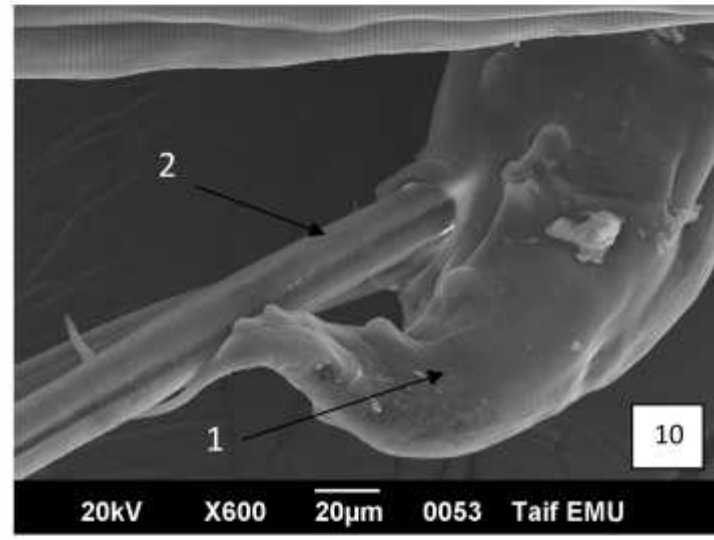
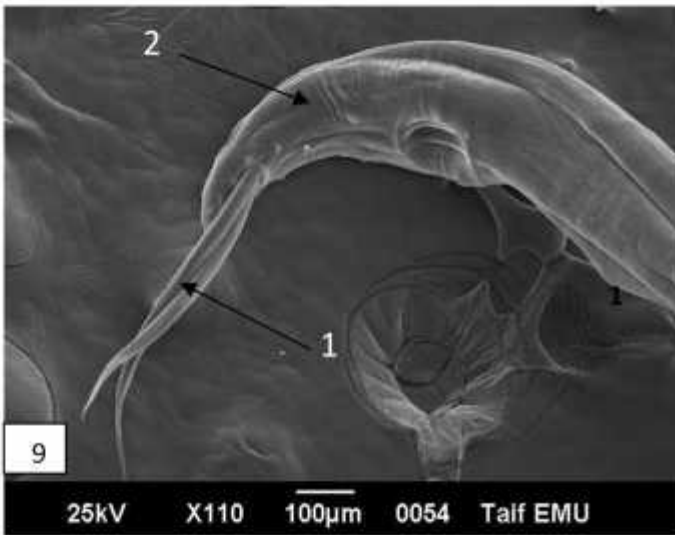
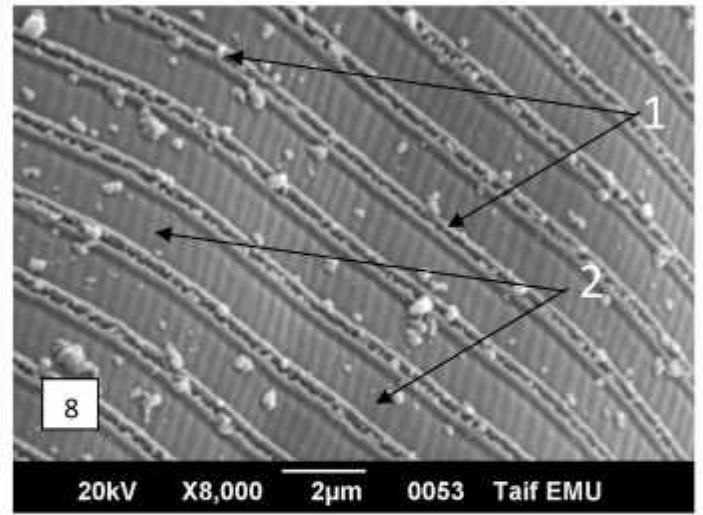
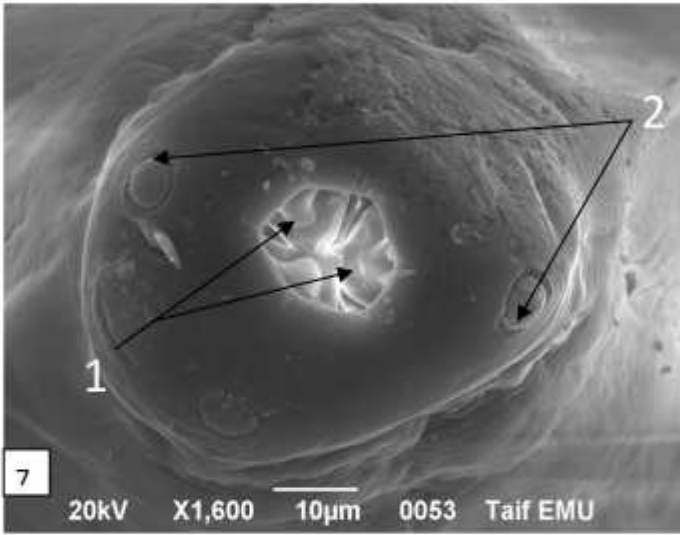
Conclusion

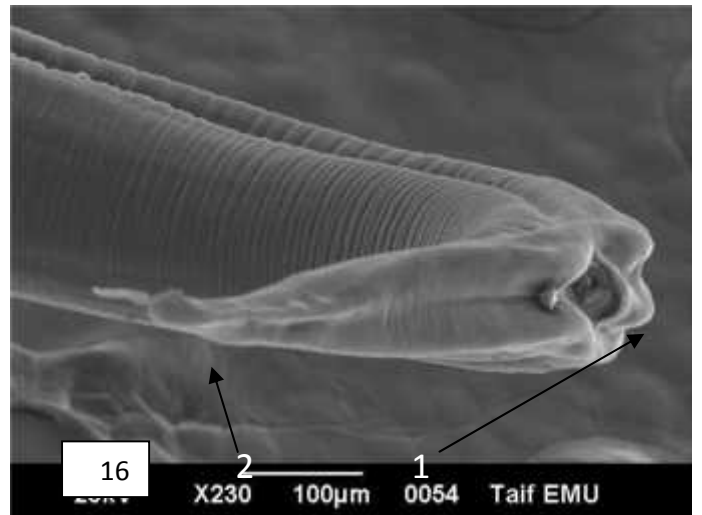
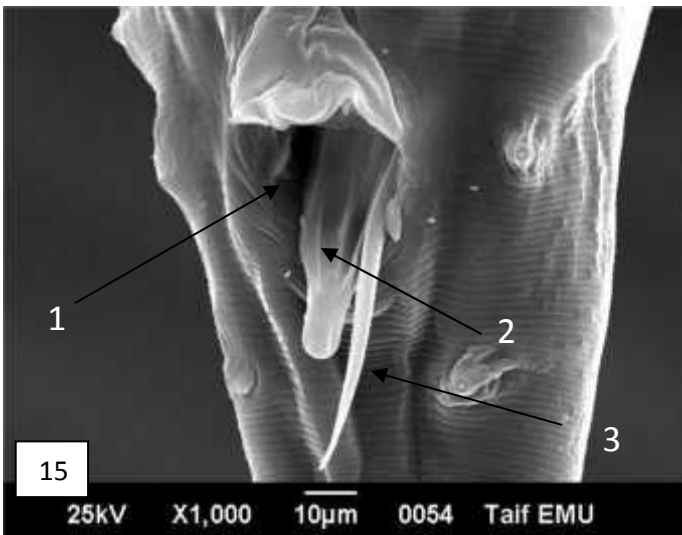
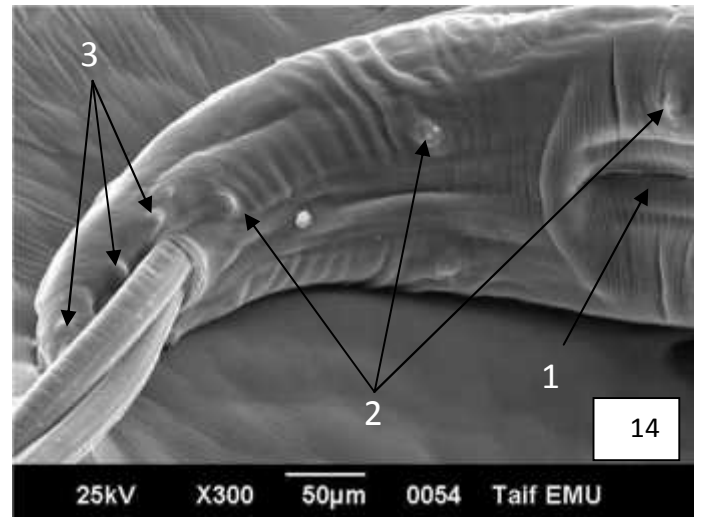
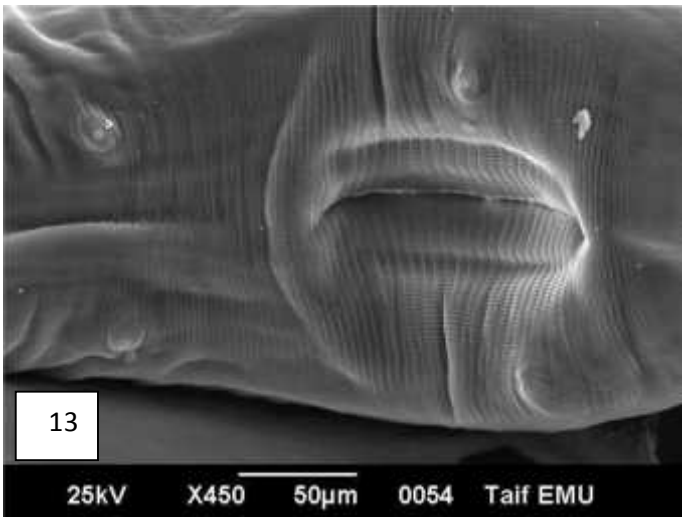
Chicken are farmed for meat, eggs and products. Parasites affect their economic value. This is the first description of *S. brumpti* from Saudi Arabia by SEM.

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Explanation of figures

- Fig. 1: Photomicrograph of anterior extremity of *Subulura brumpti* showing 1-oesophagus, 2-oseophageal bulb.
- Fig. 2: SEM of anterior extremity of *S. brumpti* showing mouth opening, 2- lateral line.
- Fig. 3: SEM of anterior extremity showing 1- mouth opening, 2-peri buccal collar, 3- lateral ala.
- Fig. 4: SEM of anterior extremity showing 1- mouth opening, 2- lateral alae
- Fig. 5: SEM showing hexagonal mouth opening with 6 bordering small lips (asterisk), 4 large cephalic papillae and 2- amphidial pore (arrows)
- Fig. 6: SEM of the anterior extremity showing wide lateral cephalic alae continued as lateral alae.
- Fig. 7: SEM of mouth opening showing 1-oseophageal sectors (teeth), 2- cephalic papillae.
- Fig. 8: SEM of body surface showing 1- double- lined transverse striations, 2- short longitudinal ridges.
- Fig. 9: Photomicrograph of male posterior extremity showing 1-spicules, 2- male tail.
- Fig.10: SEM of male of posterior extremity showing 1-male tail, 2- spicules.
- Fig. 11: SEM of posterior extremity of male collapsed preloacal sucker (arrows).
- Fig. 12: SEM of cross section in a spicule showing a hollow coiled chitinized tube with a longitudinal surface ridge (arrow).
- Fig.13: SEM of male showing opened ventral sucker
- Fig. 14: SEM of male showing 1- ventral sucker, 2-three preloacal papillae, 3- postloacal papillae.
- Fig.15: SEM of male showing 1- cloacal opening, 2- tgubernaculum and 3- one emerging spicule.
- Fig. 16: Female posterior extremity showing 1- anal opening and 2- a highly pointed terminal tail.