



# Comparative studies of chemoreceptor on male genitalia of two wasps species (Family:Pompilidae)

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ARTICLE INFO	ABSTRACT
<p><b>Article No.:</b> GJMS1206</p> <p><b>Type:</b> Research</p> <p><b>DOI:</b> 10.15580/GJBS.2013.4.GJMS1206</p> <hr/> <p><b>Submitted:</b> 06/12/2012</p> <p><b>Published:</b> 28/05/2013</p> <hr/> <p><b>*Corresponding Author</b></p> <p>Amal M. F. Al-Barty</p> <p><b>E-mail:</b> abzs9999@yahoo.com</p>	<p>There are variation in the fine structure between the male genitalia (subgenital plate and gonostyli of <i>Auplopus nigroaurntiacus</i> (magretti) and <i>Anoplius</i> sp (near to <i>viaticus</i> Linne) (Family : Pompilidae) . The gonostyli of <i>A. nigroaurntiacus</i> carried very long trichoid sensillae in terminal part , styloconis sensillae and porous trichoid sensillae in inner surface . while gonostyli of <i>A. arabicus</i> carried a large number trichoid sensillae (tsl &amp; 2).</p> <p>On other side , The subgenital plat of <i>A.nigroaurntiacus</i> carried different types of sensor hairs as . Basiconic sensillae (1 to 5) and trichoid sensilae (I to V) while the subgenital plate of <i>Anoplius</i> sp covered by a different types of porous trichoid sensillae (tsl to IV). This study help to identify and different between two closed wasps species.</p>
<p><b>Keywords:</b></p> <p>male genitalia, Pompilidae, subgenital plat, gonostyi, sensillae, <i>Anoplius</i> sp, <i>Auplopus nigroaurntiacus</i></p>	

## INTRODUCTION

Family pompilidae is the most distinct family in order Hymenoptera and its call ( spider hunting wasps ) or spider wasps. The individuals of pompilidae characterized by long legs and small to middle in size. This family is widespread in tropical & subtropical region . It is divided to three subfamily (Pepsinae , Pompilinae , ceropalinae ) , (Day, 1988; Gauld and Boulton 1988).

The family pompilidae have economic important as parasites which recently have used in biological control programs. There are little information about the spider hunting wasps. Adult Pompilidae are nectar-feeding insects and feed on a variety of plants. The female wasps search for a variety of spiders for their larva to feed on, including wolf spiders (Lycosidae), huntsman spiders (Sparassidae), and baboon spiders (Harpactirinae). As the larva feeds on its host, it saves the vital organs, such as the heart and central nervous system, for last nzo, 2005. By waiting until the final larva instar, it ensures that the spider will not decompose before the larva has fully developed. So, the aim target of our work to compare between new recode species *Anoplius sp* (near to *viaticus* Linne) and *Auplopus nigroaurantiacus* (Magretti) through investigation and identification sense organs which distinct on their male genitalia .

## MATERIAL AND METHODS

### I - Light microscopy study :

Mount of male genitalia of wasps was prepared following procedure similar to that described by Radovic and hurd (1980) Specimens of male genitalia were treated with clean solution (10 ml lactic acid + 2ml glycerin + 4 ml formaldehyde 40% conc.) for 48 hr, then washed in 70% ethanol and then placed on concave slide with one drop glycerin . The general structure of male genitalia were investigated under light microscope and drawn by using camera lucida , Also , the chemoreceptor distribution were examined .

### II - Scanning electron microscopy study :

Male genitalia of adult wasps were isolated their external genitalia , were placed as previously mentioned in clean solution and then placed in 70 % ethanol for 24 hrs., then transferred to 90% alcohol for 15 min , then the two specimens . Were gently removed . They were air dried mounted on specimen stubs and transferred to vacuum evaporation unit where they coated with 20 nm of carbon followed by 20 nm of 40 % palladium – gold while being rotated at about 15 rad , 5 – 10 ensure uniform coating as . Possible Boulton and Brabazon ( 1968 ) , The ultra – Structure . of chemoreceptor of the specimens were then examined in JXA-480 , Scanning electron microscope at beam voltage of 15 KV .

## Results and discussion

The structure of male genitalia of *Auplopus nigroaurantiacus* (Magretti) and *Anoplius sp.* including the same family/Pompilidae under two (subfamily:Pepsinae and Pompilinae) are described by (Al-Barty 2006 , and Gadallah and El-barty 2011) .

**I-The external male genitalia of *Auplopus nigroaurantiacus* ( Magretti ):** it consists of cuspis (CS) and gonostyli (Gs) (Fig 1).

**I.1.The gonostyli (Gs):** It carried different types of sensillae as Following :

1 – Trichoid sensillae type (I) (aporus sensilla) (tsI): It is straight hair distributed at the terminal margin of gonostyli and distinguished the male genitalia of species which considered the longest one (mean length 355.08  $\mu\text{m}$ ) (Fig 2) .

2 – Styloconic sensillae (stI & II): There are two types of styloconic sensillae distributed in inner surface of gonostyli (Fig 3 a,b) , the first one is minute peg (mean 3.8  $\mu\text{m}$ ) found inner surface of gonostyli , second one is longer (mean 8.5  $\mu\text{m}$ ) & found in fewer numbers compared with other. Both types characterized by elevated part of the integument of the arista encloses at its tip a slender hair like structure . This styloconic sensilla act as mechano and / or chemoreceptors as suggested by Zacharuk (1985) and Mitchell *et al.*,1999. These type of sensillae agree with finding at *Liosarcophaga babyari* (Abouzied, 2008) and *Phthorimaea operculella* proboscis (Moawad 1995).

3 – Porous trichoid sensilla (type II) , these type of sensillae found in inner surface of gonostyli (Fig 3a) , the bristle like hair is mean length (54.9  $\mu\text{m}$ ) .

**I.2. subgenital plat (SGP):** It is carried intensive hairs as described in (Fig 4 , 5a & 6) it is carried different types of chemoreceptor and mechanoreceptor sensillae as following :

1 – Basiconic sensillae (bs 1 , 2 , 3 , 4 and 5) : it has an enlarged stout base & carried crescent shaft (types 1,2,3,4) (their mean length 49.8  $\mu\text{m}$ ) or with straight shaft (type 5) (mean 34  $\mu\text{m}$ ) (Fig 5a & 6) .

They are found in between trichoid sensilla (ts) at the terminal margin of gonostyli . These types similar to basiconic sensilla on the maxillary palpi of *L.babyari* (Abou zied 2008) . these basiconic sensilla are known to play an olfactory roles as mention by Zachruk (1985) , Hunter and Adser balle , (1996) .

2 – Trichoid sensilla ( type I , II , III , IV & V ) : there are five types of trichoid sensilla at the terminal , middle and basal parts of gonostyli plate as (Figs 5a & b , 6 & 7) .

ts I & II is Nn case of tsI is straight bristle – like sensillae (mean length 30.8  $\mu\text{m}$ ) only distributed along the margin of the terminal part .

While stalk of is III , V , VI one broad in base and slight curved at the tip with helical decoration along the stalk of hair as ( Fig 5b ) .

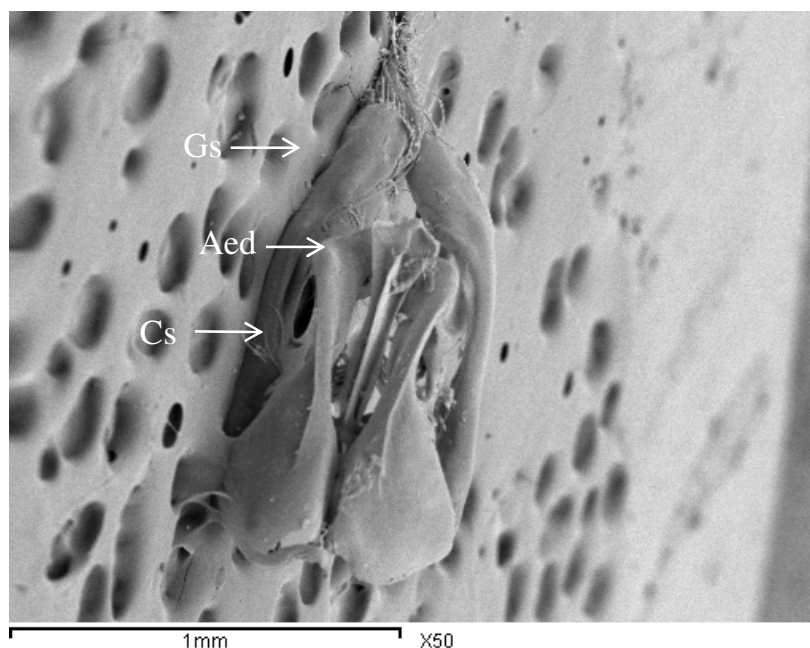
**II – External male genitalia of *Anoplius* sp :** Fig ( 8 ) described the structure of external male genitalia which consists of ( C S ) , gonostyli ( G s ) , aedeagus ( Aed.) and digitus ( Dg ) .

**II.1. The Gonostyli :** It carried number of Trichoid sensillae which aggregated at the apical part of gonostyli . Ts<sub>1</sub> is twisted bristle like structure mean ( 74.26  $\mu$ m ) while . ts<sub>2</sub> is slightly curved at tip ( mean 44.9  $\mu$ m ) ( Fig 9 ) .

**II.2. The sub-genital plate :** It covered by a different type of porous trichoid sensilla ( ts I , II , III & V ) as described before at another species genital in ( Fig 10 , 11 , 12 ) .

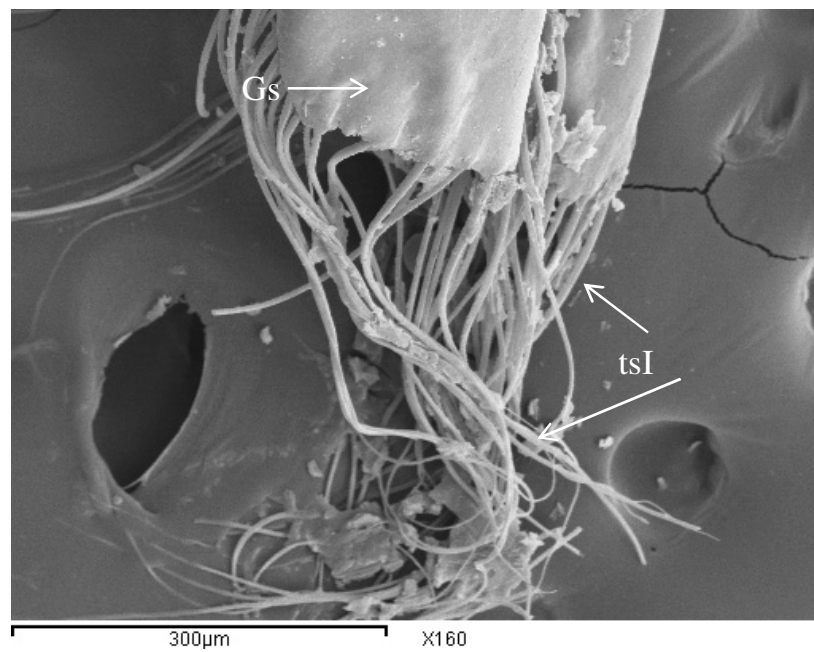
At the terminal part of the sub genital plate found approximately nine pore ( pheromone receptor ) distributed in between different type of trichoid sensilla ( Fig 14 ) .

From the previous mention results showing gonostyli & sub genital plate of two wasps species approximately similar to each other only in types of trichoid sensilla while different in it shape or length .

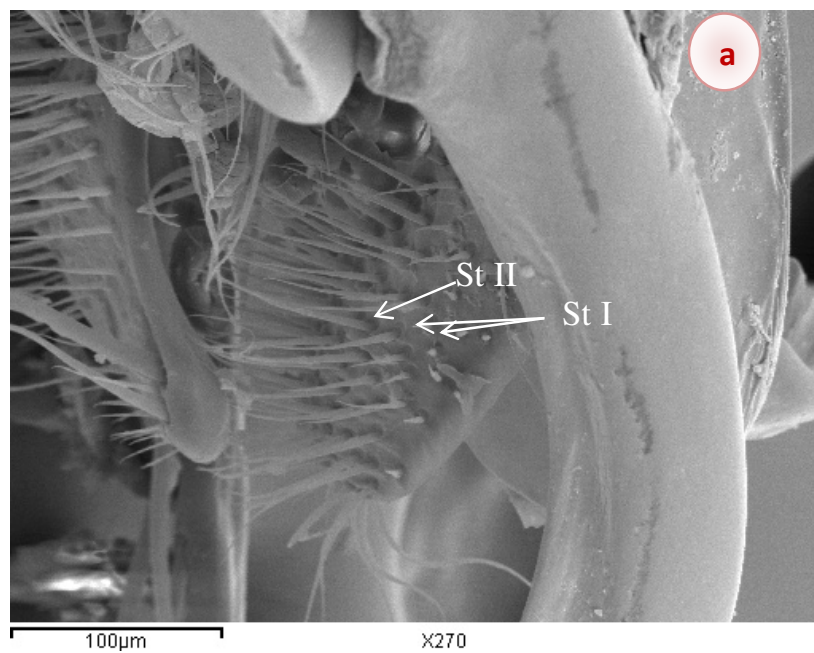


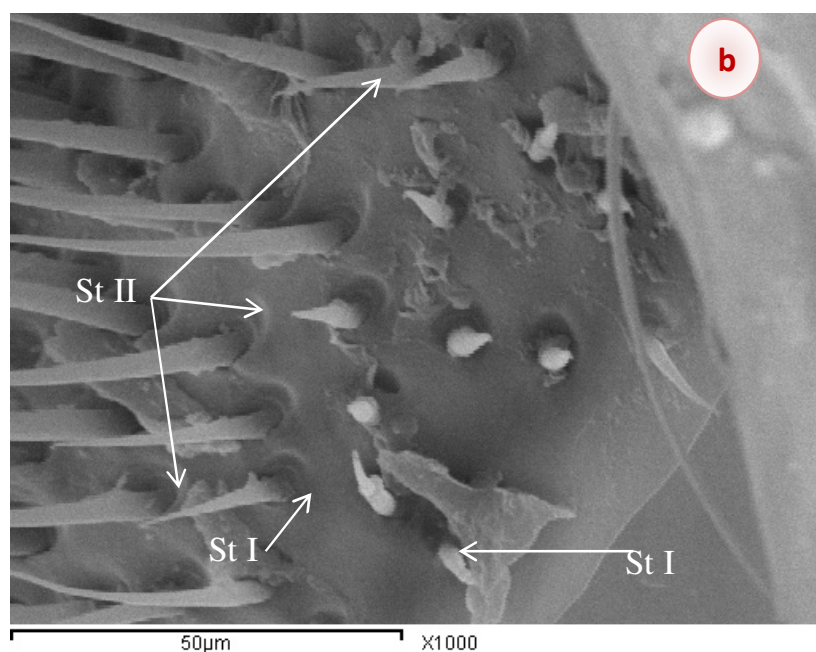
**Fig (1) : Described the structure of male genitalia of *Auplous nigraurantiacus* to illustrate**

Gs = gonostyli, Cs = Cuspis, Aed = Aedagus.

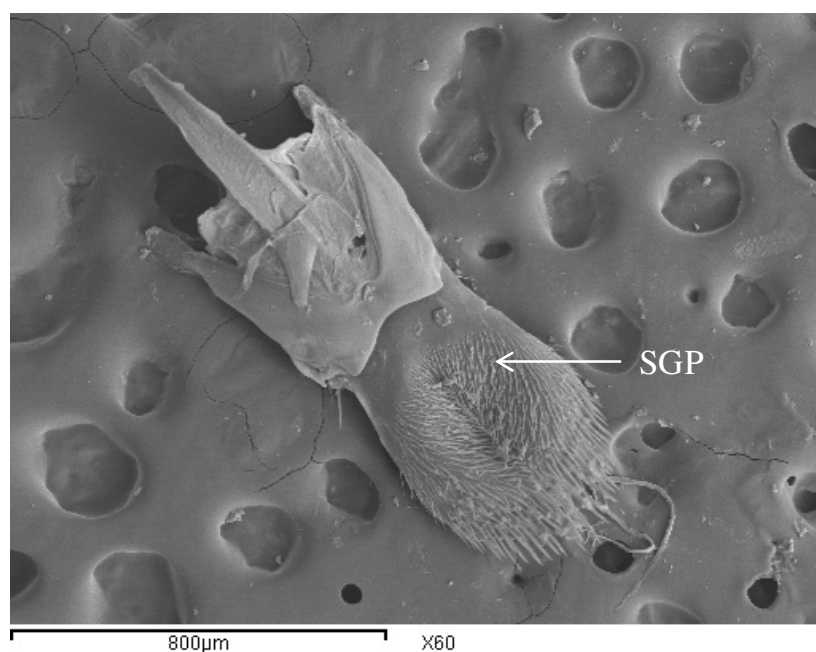


**Fig (2) : The terminal part of gonostyli (Gs) of *Auplous nigroaurantiacus*: show the longitudinal trichoid sensillae (tsI).**



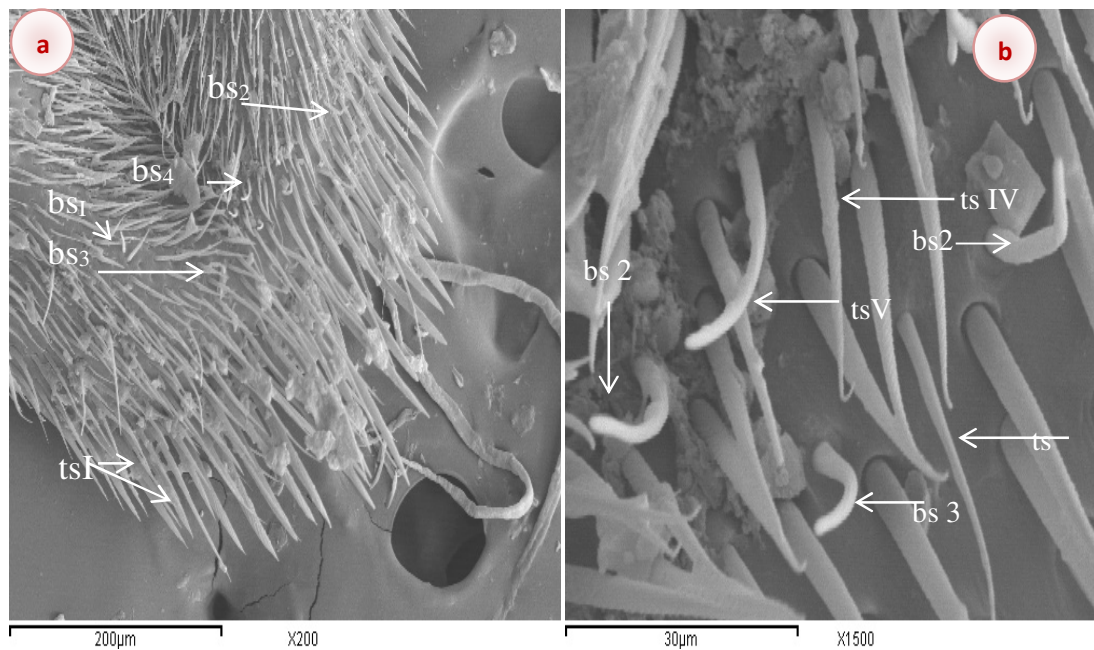


**Fig ( 3 ) : a, inner surface of gonostyli & b , magnified of apical part of gonostyli to show stI & II= styloconic type I and II ; tsII : trichoid sensillae type II**

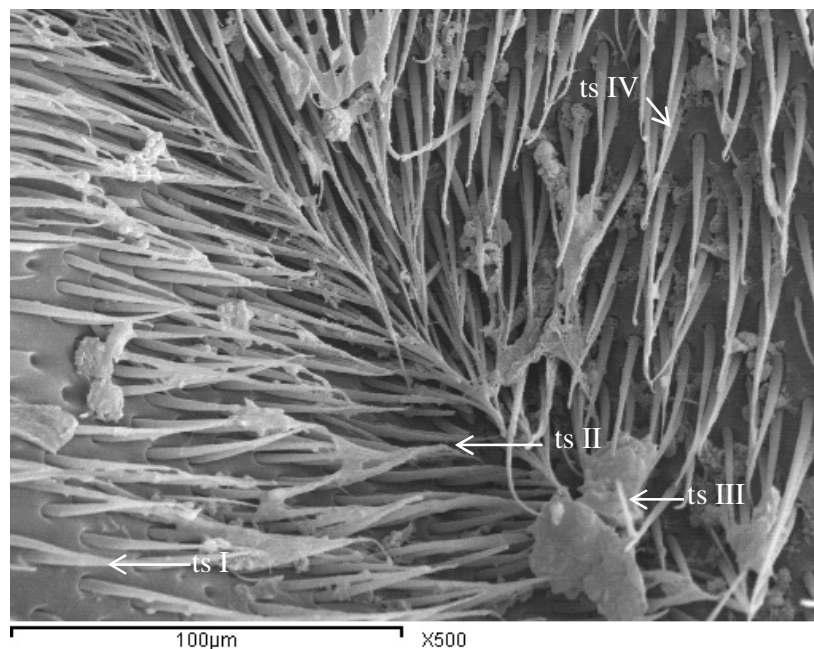


**Fig ( 4 ) : Subgenital plat of *Auplopus nigroaurantiocus* ( Magretti )**





**Fig ( 5 a ) : magnified the apical part of subgenital plat to show basiconic & trichoid (tsl)**  
**( 5 b ) : High magnification to show**  
**( b s 1 , 2 , 3 , 4 & 5 ) = basiconic sensillae type 1 , 2 , 3 , 4 & 5**  
**1sl , II , III , IV & V = trichoid sensillae type I to V**



**Fig ( 6 ) : Magnified the Middle part of subgenital plat to show trichoid sensillae (I , II , II & IV)**

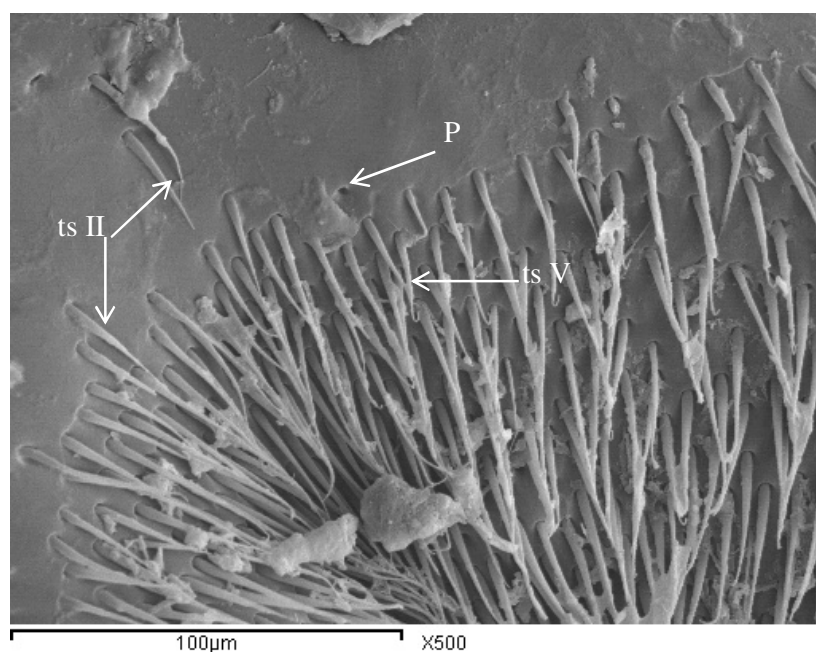


Fig ( 7 ) : Magnified the basal part of (SGP) to show pore (p) & trichoid sensillae (II & V)

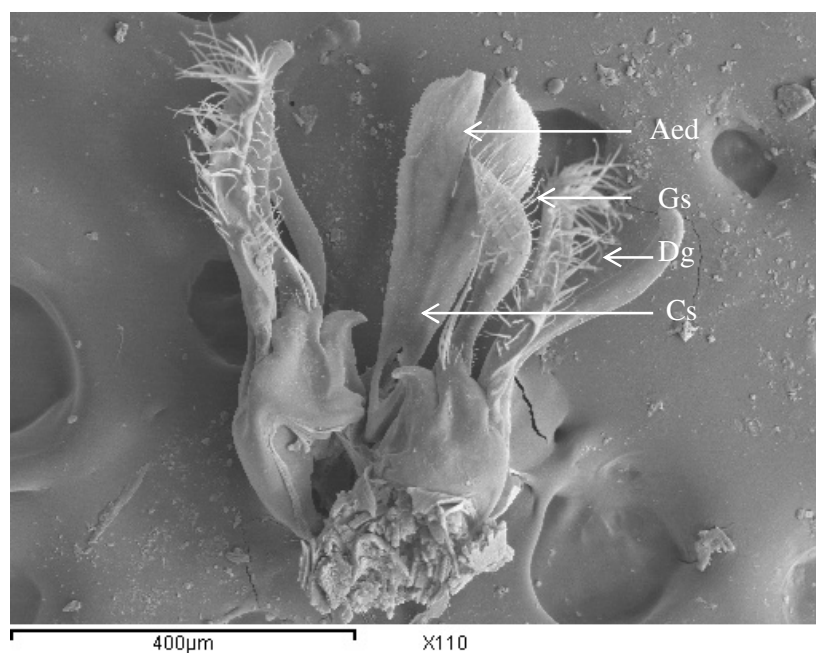
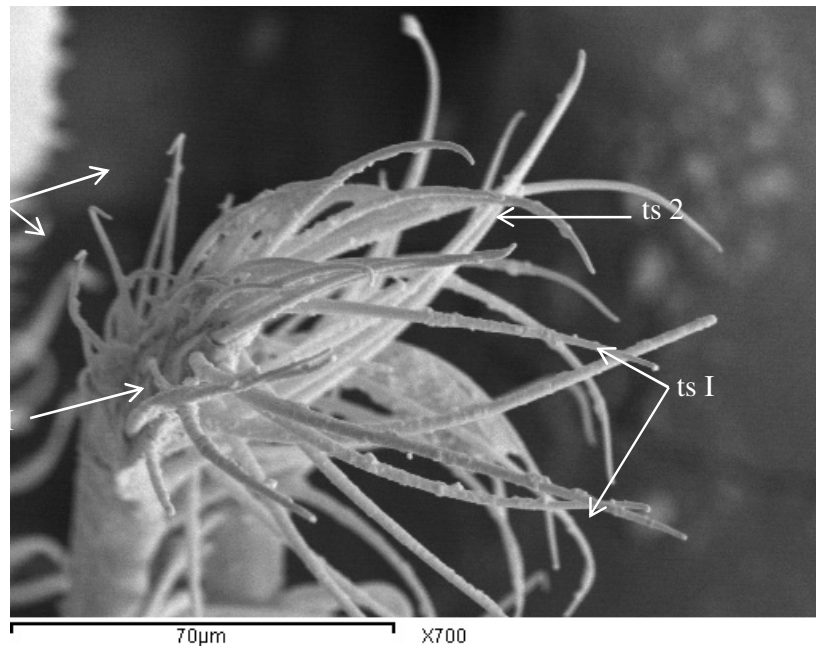
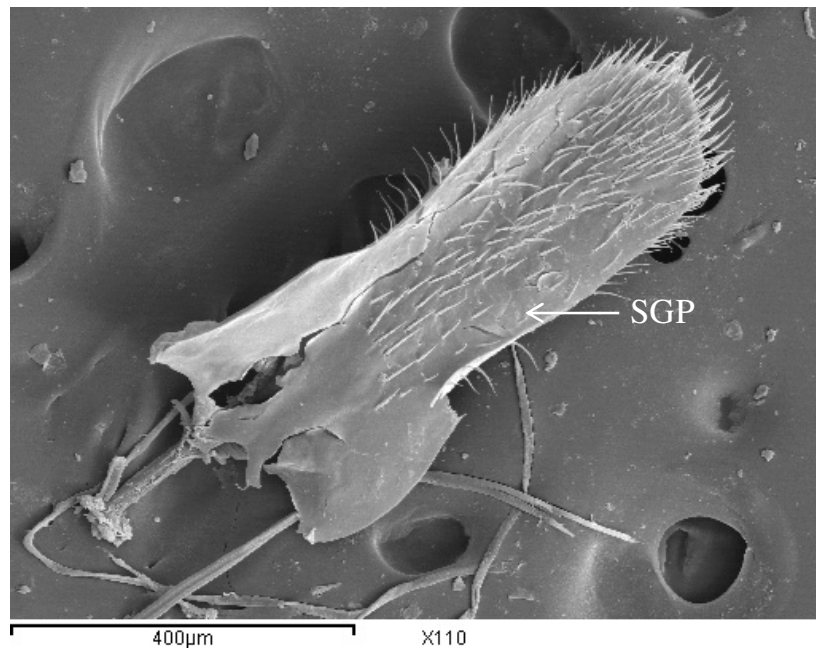


Fig ( 8 ) : External male genitalia of *Anoplius* sp.(Gadallah – AlBarty) to show  
Aed = Aedagus, Gs = Gonostyli, Dg = Digitus, Cs = Cusbis

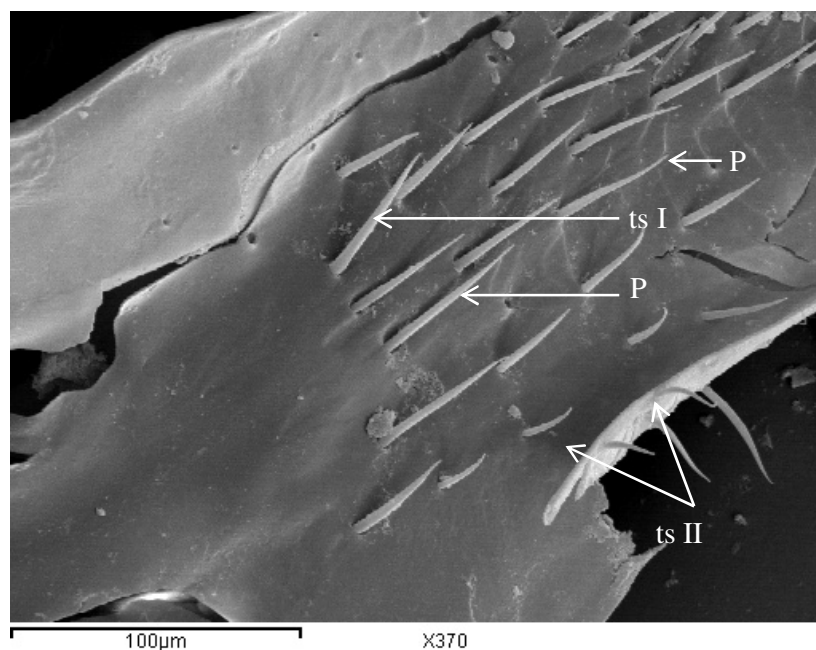


**Fig (9) : Magnified the apical or terminal part of gonostyli to show  $ts_1$  &  $ts_2$  = trichoid sensillae 1 & 2**

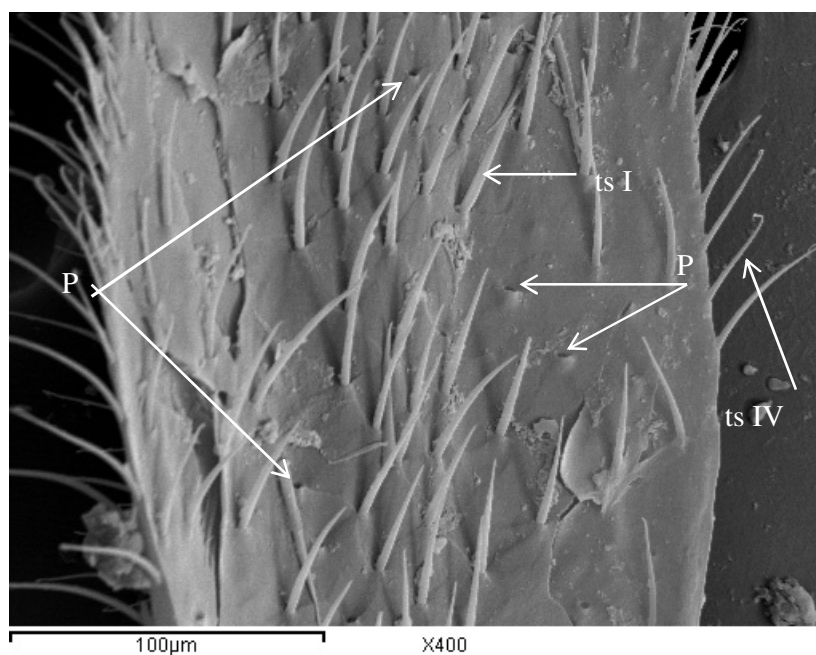


**Fig ( 10 ) : subgenital plate of *Anoplius* sp.**

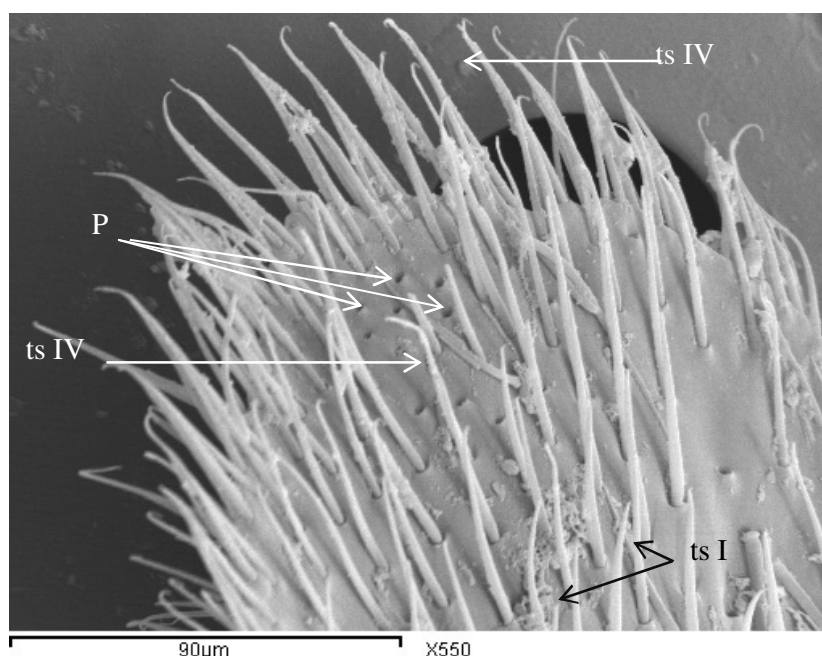




**Fig ( 11 ) : Magnified the basal part of subgenital plate to show  
P = pore, ts I & II = trichoid sensillae I & II**



**Fig ( 12 ) : The medial part of subgenital plate to show  
P = peg, ts I & V = trichoid sensillae I & V**



**Fig ( 13 ) : Apical part of subgenital plat to illustrate distribution of  
tsI, II & IV = trichoid sensillae type I, II & IV  
p = pore**

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