

MORPHOLOGICAL STUDY OF *Cerambyx cerdo* LINNAEUS, 1758 (COLEOPTERA : CERAMBYCIDAE) FROM DUHOK PROVINCE, KURDISTAN REGION-IRAQ.

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(Received: August 22, 2022; Accepted for Publication: September 25, 2022)

ABSTRACT

The present study is a morphological description of *Cerambyx cerdo* L. 1758 which was collected from different localities of Duhok province, Kurdistan region-Iraq. The species is morphologically has been described and illustrated in detail. The most important diagnostic and taxonomic characters were studied. The locality, general distribution, collecting date and host plant of this species has been recorded.

KEYWORDS: Morphology, *Cerambyxcerdo*, Coleoptera, Cerambycidae, Duhok province.

INTRODUCTION

The genus *Cerambyx* L. 1758 is the most important genus of the family Cerambycidae and order Coleoptera, the number of species belonging to this genus is 26 species and 3 sub-species, 13 species distributed in the Palaearctic region (Özdikmen and Turgut, 2009; De Zan et al., 2017). The great Capricorn beetle *C.cerdo* is a type species of the family Cerambycidae and for the first time was discovered and described by Carolus Linnaeus (Latreille, 1802). The Great Capricorn beetle plays a key role in decomposition of wood and ecosystem functioning of natural and semi-natural oak forests (Buse et al. 2008). This beetle is a saproxylic (wood-eating) beetle, the larvae lives in dead-wood of old oak trees (*Quercus* spp.) and other deciduous species such as chestnuts, birch, willow, ash, elm, walnut, hazel, carob, beech, hornbeam, while in areas of its distribution, host trees are limited, white oaks-only (*Quercus robur* and *Q. petraea*) and found in low-altitude forests, it's most common in semi-natural woods and veteran trees in orchards, farming, and landscape, the species prefers old, rotting oaks over 100 years old and 40cm in diameter (De Zan et al., 2017). In addition, the *C. Cerdo* and *C. dux* are widely distributed in north of Iraq, and caused damage to oak trees, which the larvae borer into stem of tree and make rounded tunnels, and this led to death of tree (Saad and Amin 1983). In Iraq, the *C. cerdo* was recorded for the first time by (Al-

Ali 1977) on the oak and elm tree in Duhok and Sulaymaniyah province. Ismail (1983) in his study mentioned this species in Iraq, then Shalli and Fat-hullah (1986) also listed this species in Sulaymaniyah province. Özdikmen and Ali (2012) listed *C. Cerdo* in Iraq. Because this species is a type species of the family Cerambycidae, the aim of this study is a morphological study and all the body parts of adult were described and illustrated in detail to depend on it for the study of the other family species.

MATERIAL AND METHODS

1. Sample collection: The samples have been collected from different localities of Duhok province, Kurdistan region-Iraq, from June to September 2021 and 2022. The specimens were collected from forest and orchard trees by the light and bait trap. The species was identified according to available keys and original description of the species such as (Saliba 1974; Özdikmen and Turgut 2009; De Zan et al., 2017), and the confirmation of the species was confirmed by Pierpaolo Rapuzzi (Civiale del Friuli UD, Italy). All specimens have been preserved and labelled in a special box of insects and then deposited in the museum of college of Agricultural Engineering Sciences, University of Duhok.

2. Morphological study and dissection: The adult has been examined by using a dissection microscope, while the minute body part was

studied by the preparation of permanent microscopic slides. The dissecting of species was studied by many researchers such as (Torson et al., 2020; López 2022). The samples have been relaxed by soaking them in a beaker size 100ml, containing hot water for 15-25 minutes, the duration depended on the size of specimen then the head, thorax and abdomen were separated from each other and digested in KOH 10% solution for 20-25 minutes, and then washed in distilled water for 5-10 minutes. Thereafter placed in glass Petri-dish containing water and dissected by 2 fine pins to get the target parts. The target parts were soaked in ethyl alcohol for dehydration in concentrations 50%, 75% and 100% respectively for 2 minutes, then transferred into Xylol for 2 minutes, and after that placed in Canada balsam on slid and covered with cover slid to prepare for illustrating and examination.

3. Illustration and measurement: The body parts were illustrated by using camera Lucida which connected to the dissecting microscope. The picture of adult was taken by using digital camera Canon 16.6 megapixel. All the measurements have been taken by using an ocular micrometre after calibrated with micrometre slide.

RESULTS

Diagnosis of genus *Cerambyx* Linnaeus, 1758.

The body elongated and robust. The head is more or less salient towards mouthpart. Antennae are variable in length and very long. The maxillary palpus has an apical palpomere triangular or sub-triangular. The prothorax is a rugulose-bearing tooth on both lateral margins, with wrinkled from surface of pronotum. The elytra are long completely covered abdomen, narrowed apically with or without spine. Procoxal cavities externally widely opened or narrowly opened or narrowly closed. claws are long and robust simple type (Villiers 1978; Vives 2000; Özdikmen and Turgut 2009)

Description of *Cerambyx cerdo* Linnaeus, 1758.

1. Adult body: Male(Fig.1) elongate-ovate shaped, dorsally slightly convex, black in color, except elytra red-brown toward the apex. Body length 26-54 mm, width 6-13 mm.

2.The head: In dorsal view (Fig. 2A) prognathous type, sub-spherical shaped. Vertex transverse and slightly convex at the base and depressed toward the frontal foveola. Frons

narrow and distinctly concaved with a strong groove in the middle. Antennal socket small, semi-oval, located at the middle of eye lobes. The clypeus strongly compressed and broad, subdivided into membranous ante-clypeus, separated from the labrum by a clypeolabral suture. Head dorsally covered by short yellow setae with irregular punctures and wrinkles. Head in the ventral view (Fig. 2B), with occipital foramen is a broad cavity and sub-spherical shaped, separated from occiput and post occiput by post occipital suture. Post gena broad and curved, covered occipital foramen from each side, separated from compound eye by ocular suture covered by short yellow setae. Gula broad and smooth located under occipital foramen, separated from post gena and occipital foramen by gular suture. Antennae (Fig. 2C) very long, filiform type, length 78-108mm, passing apical elytra by 3-4 antennomere, consist of 11 antennomeres. Scape long and cylindrical shaped, basally inserted into the antennal socket, 4 times longer than the 2nd antennomere. Pedicel smallest antennomere, cap-shaped. Antennomeres 3-11 are called flagellum. The 3rd - 5th antennomeres thin basally and swollen thickened apically. The 6th - 7th tubular shaped. The 8th - 11th antennomeres long and flattened, 1.4 times longer than the 3rd - 7th antennomeres. The last antennomere very thin and longest antennomere. Mouth parts with labrum (Fig. 3A) clearly visible, moderately sclerotized, elongate semi-oval, basal margin straight, apical margin distinctly concave at the middle and densely covered by long yellow setae. Mandibles (Fig. 3B) strongly developed, robust, subtriangular shaped, sub-carinate dorsally, length 2.2-3.4mm, outer margin arcuate, inner margin called incisor region with two teeth, apical tooth developed and long with sharpened apex, the second tooth weakly developed shortly with obtuse apex. Dorsal condyle distinctly visible and rounded. Abductor muscle distinct and longer than adductor muscle. Maxillae (Fig. 3C) moderately sclerotized, length 2.9-3.8mm. Cardo long and robust cup-shaped, 2.1 times longer than stipes. Stipes small and triangular shaped. Palpifer stout and sub-triangular shaped shorter than stipes. Maxillary palps with four palpomeres, 1st palpomere small and cylindrical shaped, 2nd and 3rd palpomeres cup-shaped, apical palpomere sub-triangular shaped and longest palpomere. Galea large irregular shaped, basal margin distinctly concave, apical margin covered by long yellow

setae. Laciniaclearly visible, tubular-shaped, apex covered by long yellow setae. Labium (Fig. 3D) strongly sclerotized. Submentum larger than mentum, transverse and sub-rectangular shaped, lateral margin moderately arcuate. Mentum sub-trapezoidal shaped, anterior margin slightly concave and distinctly articulated with submentum, covered by long yellow setae. Ligula transverse and membranous densely covered by short yellow setae. Palpiger tubular-shaped, longer than 1st palpomere. Labial palp with three palpomeres, 1st and 2nd palpomeres cup-shaped, 1st palpomere shorter than 2nd palpomere, 3rd palpomere elongate-ovate shaped, and longest palpomere. Palpi sparsely covered by short yellow setae.

3. Thorax: Prothorax in dorsal view sub-trapezoidal shaped, shorter than the elytral base. Pronotum (Fig. 4A) moderately convex wider than long, anterior margin moderately arcuate with short rounded angles, lateral margins sinuous with distinct acute spine at the middle, posterior margin concaved with long rounded angles. Pronotal surface strongly wrinkled with spars of short yellow setae. Prothorax in ventral view (Fig. 4B) distinctly transverse at the middle and narrow at the apex, densely covered by short yellow setae and small to moderate irregular wrinkles. Prosternal sub-trapezoidal shaped, posterior margin deeply concave at the middle, separated from hypomeron by prosternal suture. Prosternal process strongly developed with raised rounded apex. Procoxal cavity semi-oval shaped, closed type, laterally extended and projected, located at the base of prosternum. Hypomeron long and irregular shaped, located at the sides of prosternum.

Mesothorax in the dorsal view (Fig. 4C) moderately sclerotized, dark brown and smaller than the metathorax. Mesonotum composed of mesoscutum, and scutellum. Mesoscutum sub-trapezoid shaped, anterior margin distinctly convex at the middle, laterally covered by short yellow setae, contain an oval plate located at the apical quarter called stridulatory plate. Scutellum sub-triangular shaped with rounded apex, densely covered by short yellow setae. Mesothorax in ventral view (Fig. 5B) mesosternum short and wide, sub-rectangular shaped, anterior margin moderately concaved. Mesocoxal cavity distinctly contiguous, circular shaped, located at the posterior part of mesosternum. Mesepisternum sub-triangular shaped, slightly concave at the sides. Mesepimeron elongate irregular shaped, located

between mesepisternum and metepisternum, basal part projected and inserted to the mesocoxal cavity. Mesothorax ventrally covered by short yellow setae and small to moderate rounded punctures.

Metathorax in dorsal view (Fig. 5A) slightly sclerotized, light brown in colour, wider than long, and larger than mesothorax. Metanotum composed of the scutum, prescutum, scutellum, and scutellar groove. Scutum elongate-ovate shaped, covered from each side by anterior notal and posterior notal wing process. Prescutum small elliptical-shaped and located on the anterior part of the scutellar groove. Scutellum small nearly heart-shaped and located under the scutum from each side, basely covered by post scutellum sclerite. Scutellar groove long and conical-shaped, located between presecutum and scutellum. Axillary cord membranous and sub-triangular shaped covered posterior notal wing process from each side. Metathorax in ventral view (Fig. 5B) metasternum quadrate-shaped, metasternal suture developed and deeply originated, located from middle of mesocoxal cavity and extended to the middle of sternellum. Metacoxal cavity elongate oval-shaped located at the posterior margin of sternellum. Metepisternum long and thin covered metasternum from each side. Metepimeron small and elongated located between metasternum and sternellum. Sternellum clavate-shaped located under metepimeron. Metathorax ventrally densely covered by short yellow setae and small to medium size punctures.

4. Wings: Elytra (Fig. 6B) elongate-semi ovate shaped, gradually narrowed from base to the apex, slightly convex at the base, length 4.5 times longer than wide. Elytral apices completely covered abdomen, unconnected with a distinct sutural spine. Basal margin of elytra with median process small sub-triangular and connected elytra to the mesothorax. Elytral base distinctly wider than pronotal base. Elytral surface with three thin striae, irregularly distributed, 1st stria short and shallow, originated from outer margin of basal quarter and extended to the middle of elytra, 2nd stria long and deep, originated from basal margin and extended to the near apex of elytra, 3rd stria deep and shorter than 2nd stria, originated from basal margin and extended to the apical quarter of elytra and joined with 2nd stria. Elytral intervals sparsely with short yellow setae and completely covered by small to moderate irregular wrinkles more coarsely at the base. Hind wing (Fig. 6A)

transverse sub-triangular shaped 3.1 times longer than wide, costal margin slightly convex at the apical quarter, apical margin obtuse, posterior margin sub-straight from apical quarter to the basal quarter then arcuate toward the base. Longitudinal veins clearly visible, brown in colour. Costa vein (C) thin and long originated from the base of the wing and joined with sub-costa at the middle of the wing. Sub-costa (Sc) originated from the base of the wing and extended to the middle of the wing and connected with Costa and Radius. Radius vein (R) basely connected with Sub-costa and Midian veins, reaching to the apical quarter of the wing and joined with anterior margin of radial cell. Radial recurrent vein (Rr) originated from basal third of the (R) and reaching to near radial cell. Posterior radial branches (Rp1, 2, 3) distantly visible, (Rp1) longer than (Rp2), originated from the base of radio-medial sclerotization (rms) and reaching to the apex of the wing. (Rp2) short and connected with the apex of wing. (Rp3) longer than (Rp1), originated from radial sclerotization (rsc) and reaching to the posterior margin of wing. Radial cell (rc) triangular shaped joined with (R) and (rms). Radial sclerotization (rsc) sub-triangular shaped posterior margin distinctly concaved. Radio-media cross vein (r-m) strongly developed and arcuate, located between (rsc) and median vein. Median vein (M) divided into four posterior midian branches (Mp1, 2, 3, 4). (Mp1 and 2) fused together, basely connected with (R) and cubitus vein (Cu) and apically connected with Midian spur (Ms) and (rm). (Ms) short with acute apex joined to the posterior margin of the wing. (Mp3+Mp4) originated from basal quarter of wing, basely straight and jointed to the middle of wing then separated and reaching to the posterior margin of wing. Cubitus vein (Cu) connected from base and apex with anal vein to originate and an elongate cell called anal cell (ac). The first and second anterior cubital veins (Cua1+2) fused and extended from base of (ac) and reached the posterior margin of wing. Anal vein (A) short and connected basely with (Cu), divided into (Aa3+ 4) and (Ap3+4) anterior and posterior anal branches, (Aa3+ 4) fused and reached the posterior margin of wing, (Ap3+4) short and not reaching to the posterior margin of wing.

5. Legs: Fore-legs (Fig. 7A) small compared with mid and hind legs, densely covered by short yellow setae more dense and long setae on tarsus. Coxa rounded shape. Trochanter small and triangular shaped. Femur cylindrical-shaped

slightly longer than tibia, inner margin slightly concaved near the apex. Tibia sub-tubular shaped basely narrowed and apically widened, 1.3 times longer than tarsus, apical angle interiorly bears a pair of long dark-brown, pointed spur. Tarsus (Fig. 7D) with 5-5-5 type formulation and consists of 5 tarsomeres (pentamerous), 1st tarsomere cup-shaped and longest tarsomere, 2nd tarsomere sub-triangular shaped longer and wider than 3rd tarsomere, 3rd tarsomere heart-shaped bilobed, 4th tarsomere small rounded- shape inserted between lobes of 3rd tarsomere, 5th tarsomere sub-cylindrical shaped basely narrowed, as long as 2nd and 3rd tarsomere. Claws unconnected simple type, slightly curved with acute apex. Mid-legs (Fig. 7B) similar to the fore legs, except the coxa and trochanter of midlegs stout and larger than fore coxa and trochanter. Hind-legs (Fig. 7C) similar to fore legs, except metacoxa elongate-oval shaped, meta trochanter larger than fore trochanter, and metatibia narrower than fore tibia.

6. Abdomen: Sub-triangular shaped, moderately convex at ventral. In dorsal view (Fig. 8A) composed of 8 abdominal tergites, moderately sclerotized, pale-yellow, covered from each side by long and membranous ribbon called Pleuron. The 1st abdominal tergite elongate posterior margin distinctly concave at the middle. The 2nd-6th tergites sub-rectangular shaped, lateral margin moderately rounded, the 2nd tergite largest and widest tergite and then gradually narrowed from 3rd tergite toward 6th tergite, the 7th tergite semi-oval shaped, apical part slightly concaved with dense of moderate yellow setae. The 8th tergite semi-oval shaped, anterior margin concaved at middle, posterior margin slightly concaved at the middle, apical half densely covered by long yellow setae. In ventral view (Fig. 8B) five abdominal sternites are visible, strongly sclerotized, dark brown, representing abdominal sternites 3-7, each sternite separated with other sternite by a membranous plate, the surface of sternite covered by short to moderate yellow setae and small rounded punctures. The 3rd sternite transvers and larger than other sternites, sub-rectangular shaped, posterior margin with long abdominal sternite projection. The 4th and 5th sternites rectangular shape, the 4th sternite wider than 5th sternite. The 6th sternite narrow and elongate, anterior margin strongly concaved. The 7th sternite small sub-rectangular shape, anterior margin slightly concaved. The 8th sternite (Fig. 9A) membranous located under the

7th sternite, composite of two plates pale yellow hook shaped, distinctly connected at the base with dense of long yellow setae. Speculum relictum (Fig. 9B) strongly sclerotized dark-brown Y-shaped, long with divergent arms. Speculum gastral (Fig. 9C) strongly sclerotized, dark-brown, long Y-shaped with truncate apex.

7. Male genitalia: Aedeagus in dorsal view (Fig. 9E) strongly sclerotized, brown in colour, length 7.1-7.7 mm, sub-cylindrical shaped, narrowed toward the apex with acute apex. Median struts elongate, thin and curved, gradually divergent from base to apex with rounded apex. Tegmen (Fig. 9D) with moderate parameres, slightly connected at the base, sub-triangular shaped, apex obtuse with long yellow seta. Tegminal struts broad from base to middle then curved and gradually narrowed toward apex with rounded apex. Tegminal ring spear-shaped posterior margin strongly depressed.

Material examined: more than 200 specimens collected from Duhok province: (Akre-Kanituz, Hashtka, Shkafta, 20-6-2022, Zawita- Bablo, Meski 20-8-2021 and 13-6-2022, Amedi-Bagera, BaroshkaSadani, Spendar, Ashawa, Sarsenk, Dahe, Dargali, Chamsayda, Kani Mase, 22-6-2022, Shexan-Atrish, Banyi, Benarenky, Mersedia 10-6-2022, Zaxo-Uzmana, Armishte, Zenava, Majalmakht, Zrhawa, Betasi 25-5 to 25-6 2022).

General distribution: Alberta, Argentina, Australia, Bahrain, Belarus, Belgium, Costa Rica, Greece, Czech Republic, French, Hungary, Iceland, India, Iran, Iraq, Italy, Jordan, Laos, Luxembourg, Moldova, Monaco, Morocco, Netherlands, Poland, Romania, Sierra Leone, Solomon Islands, Swaziland, Syria, Turkey, Ukraine.



8mm

Fig. (1):- *Cerambyx cerdo*in (Male)

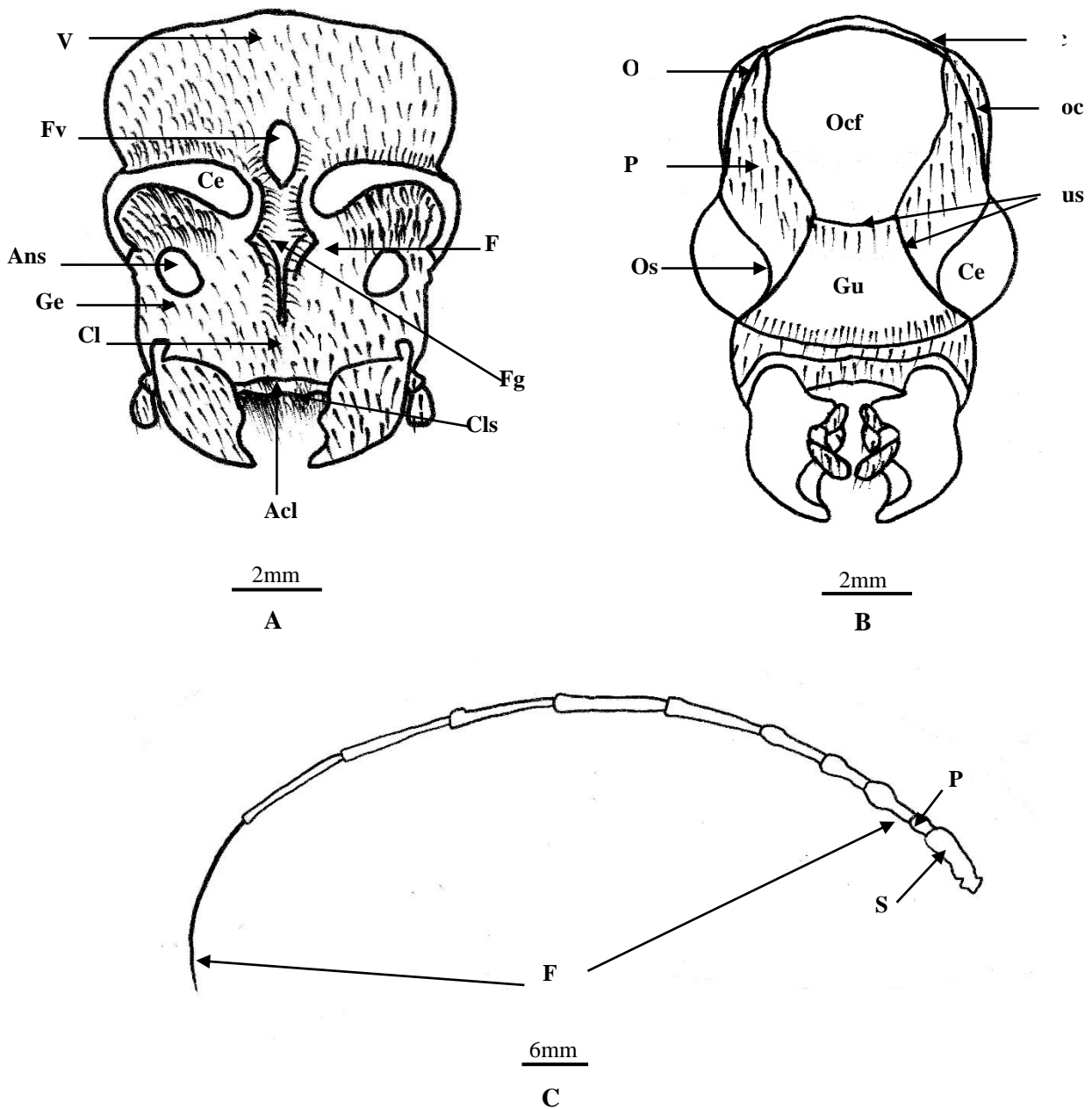


Fig. (2):- A- Head dorsal view B- Head ventral view C- Antennae

Acl: Anteclypeus; Ans: Antennal socket; Ce: Compound eye; Cl: Clypeus; Cls: Clypolabial suture; F: Flagellum; F: Frons; Fg: Frontal groove; Fv: Frontal foveola; Ge: Gena; Gu: Gula; Gus: Gular suture; Oc; Occiput; Ocf: Occipital foramen; Ocs: Occipital suture; Os: Ocular suture; P: Pedicel; Pge: Postgena; Poc: Postocciput; S: Scape; V: Vertex.

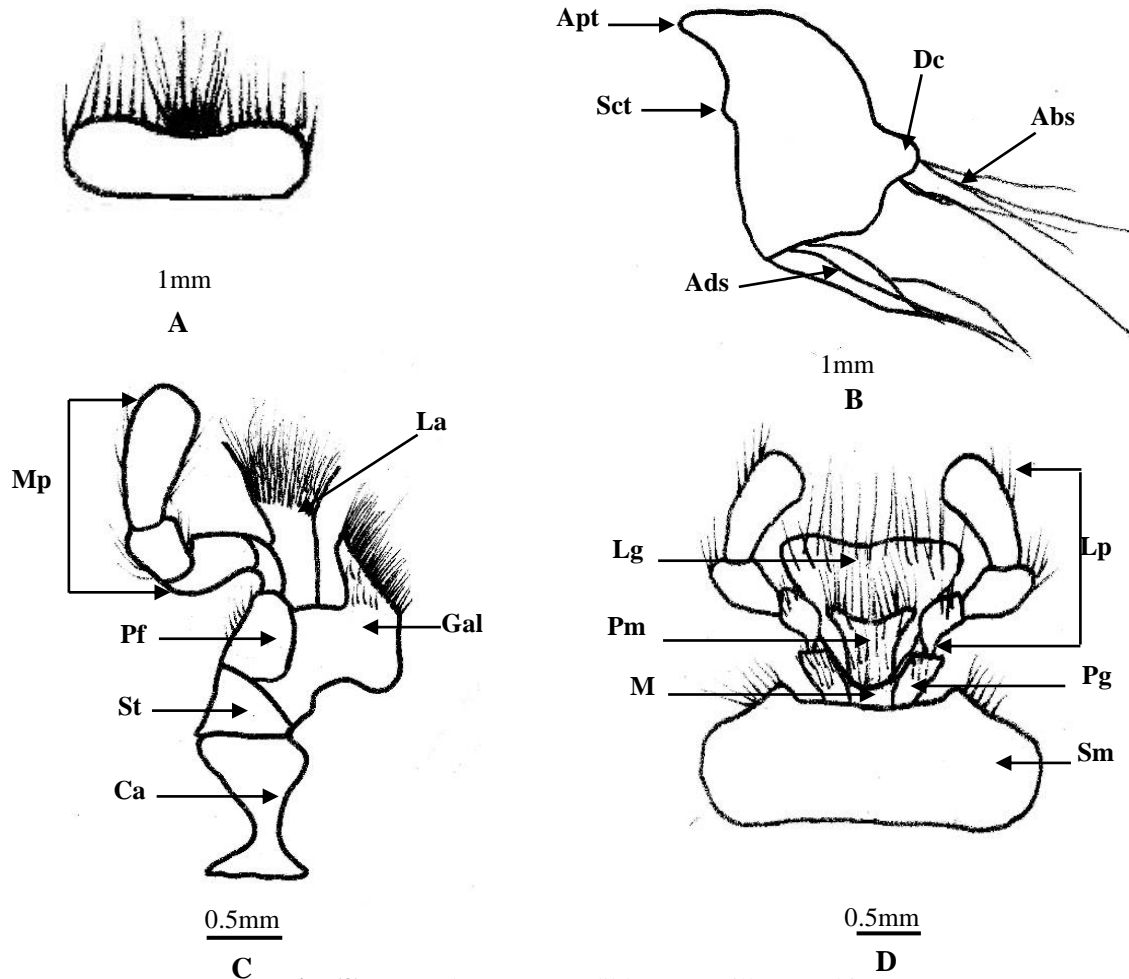


Fig. (3):- A- Labrum B- Mandible C- Maxilla D- Labium
Abs: Abductor muscle; **Ads:** adductor muscle; **Apt:** Apical tooth; **Ca:** Cardo; **Dc:** Dorsal condyle; **Gal:** Gاليا; **La:** Lacinia; **Lg:** Ligula; **Lp:** Labial palps; **Pf:** Palpifer; **Pg:** Palpiger; **Pm:** Prementum; **Sct:** Second tooth; **Sm:** Submentum; **St:** Stipes; **M:** Mentum; **Mp:** Maxillary palps.

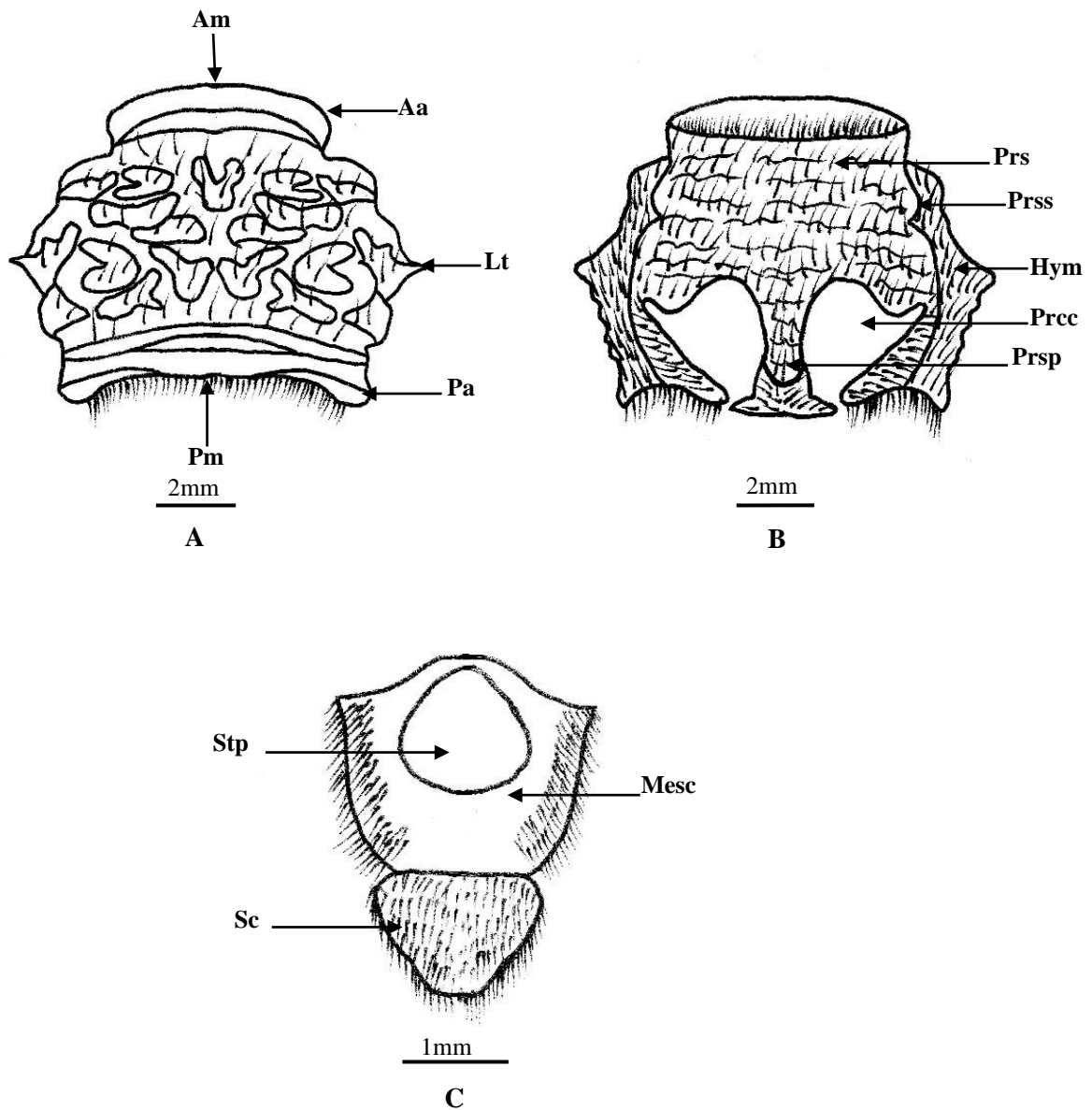


Fig. (4):- A- Prothorax in dorsal view B- Prothorax in ventral view C- Mesothorax in dorsal view

Aa: Anterior angle; **Am:** Anterior margin; **Hym:** Hypomeron; **Lt:** Lateral tooth; **Mesc:** Mesoscutum; **Pa:** Posterior angle; **Prcc:** Procoxal cavity; **Pm:** Posterior margin; **Prs:** Prosternum; **Prsp:** Prosternal process; **Prss:** Prosternal suture; **Sc:** Scutellum; **Stp:** Stradulatory plate.

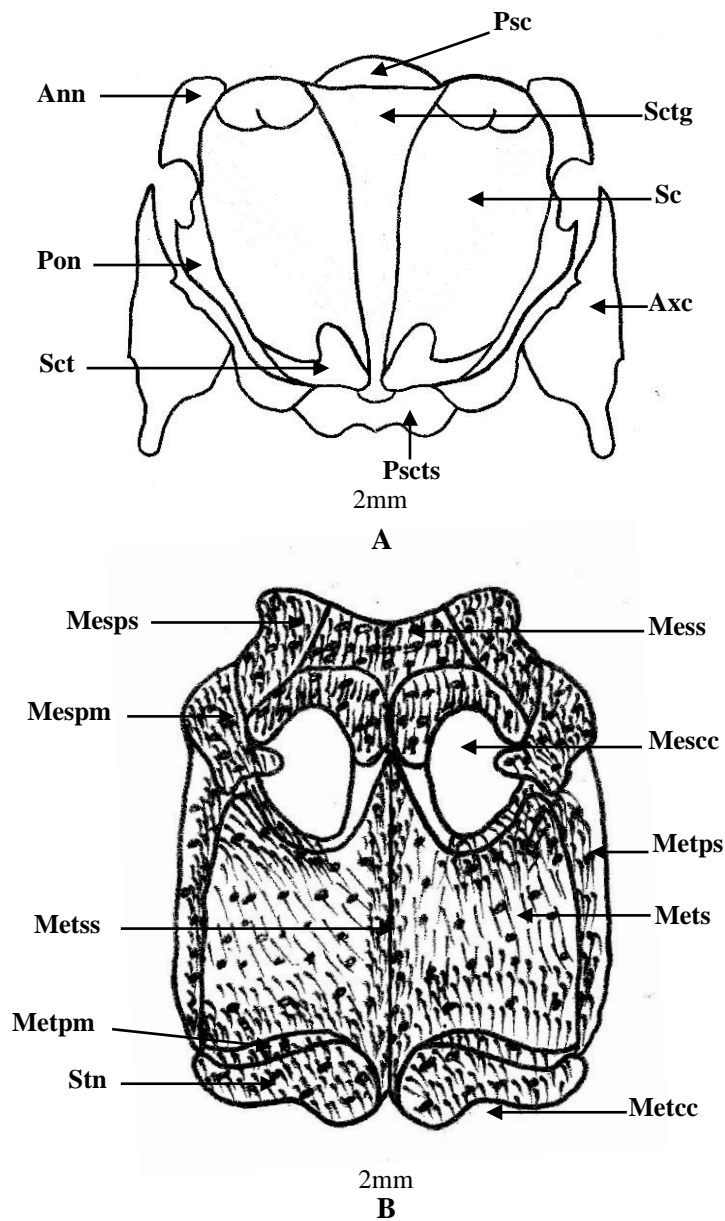
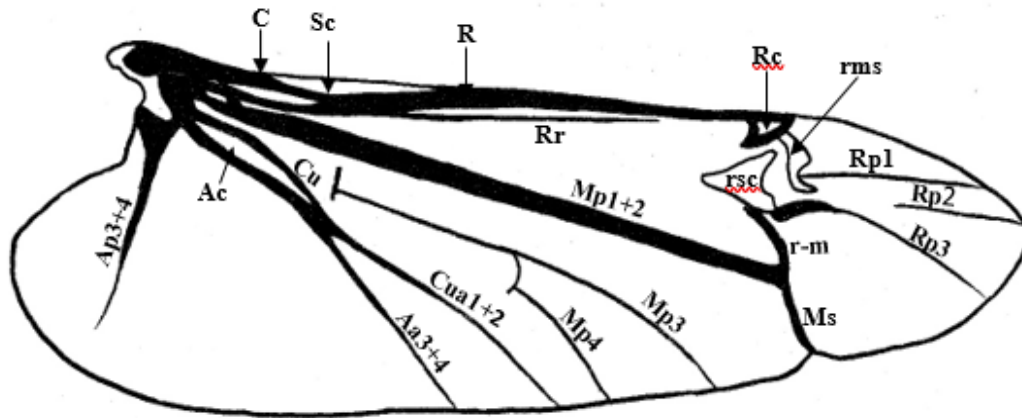


Fig. (5):- A- Metathorax in dorsal view B- Meso-metathorax in ventral view

Ann: Anterior notal; Axc: Axillary cord; Mescc: Mesocoxal Cavities; Mess: Mesosternum; Mesps: Mesepisternum; Metcc: Metacoxal cavities; Metps: Metepimeron; Mets: Metasternum; Stn: Sternellum; Metpm: Metepimeron; Metss: Metasternal suture; Mesp: Mesepimeron; Pon: Posterior notal; Psc: Prescutum; Pscts: Post scutellum sclerite; Sc: Scutum; Sct: Scutellum; Sctg: Scutellar groove.



3mm
A B

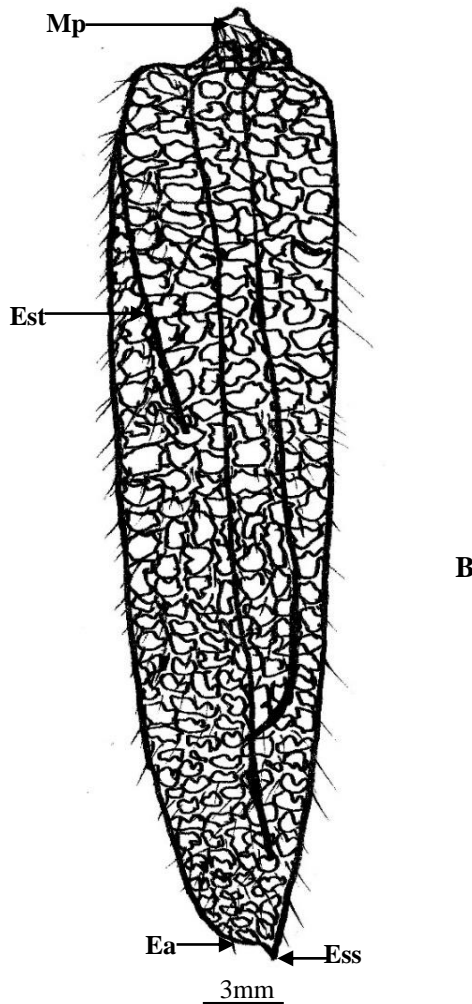
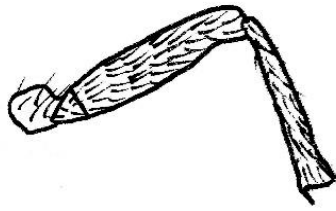


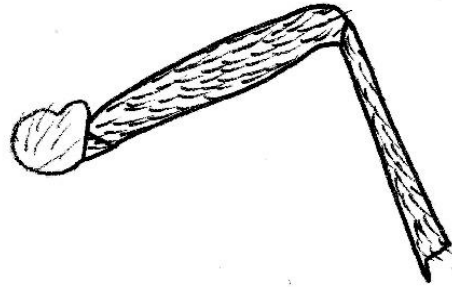
Fig. (6):- A- Hing wing B- Elytra

Aa3,4: Anterior anal branches; **ac:** Anal cell; **Ap3,4:** Posterior anal branches; **C:** Costa; **Cu:** Cubits; **Cua1,2:** anterior Cubital branches; **Ea:** Elytral apex; **Ess:** Elytral apices; **Est:** Elytral stria; **Mp:** Median process; **Mp1,2,3,4:** Posterior median branches; **Ms:** Median spur; **R:** Radial; **Rc:** Radial cell; **rms:** radio-medial sclerotization; **r-m:** Radio-media cross vein; **Rp1,2,3:** Posterior radial branche; **Rr** Radial recurrent; **rscl:** Radial sclerotization; **Sc:** Sub-costa.



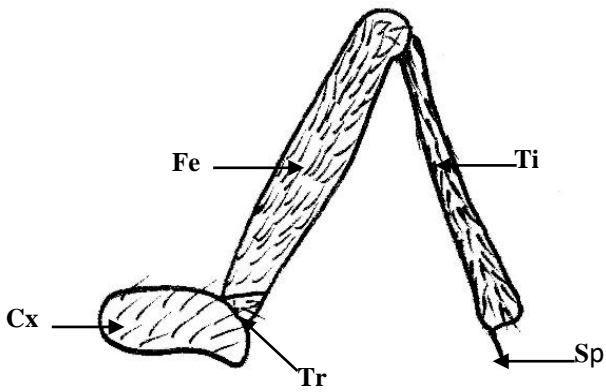
3mm

A



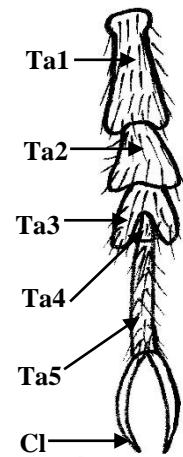
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B



3mm

C



Hind leg D- Tarsus with Claws

2mm

Fig. (7):- A-
Fore leg B-
Mid leg C-

Cl: Claws; **Cx:** Coxa; **Fe:** Femur; **T1-5:** First to fifth tarsomeres; **Ti:** Tibia; **Tr:** Trochanter; **Sp:** Spur.

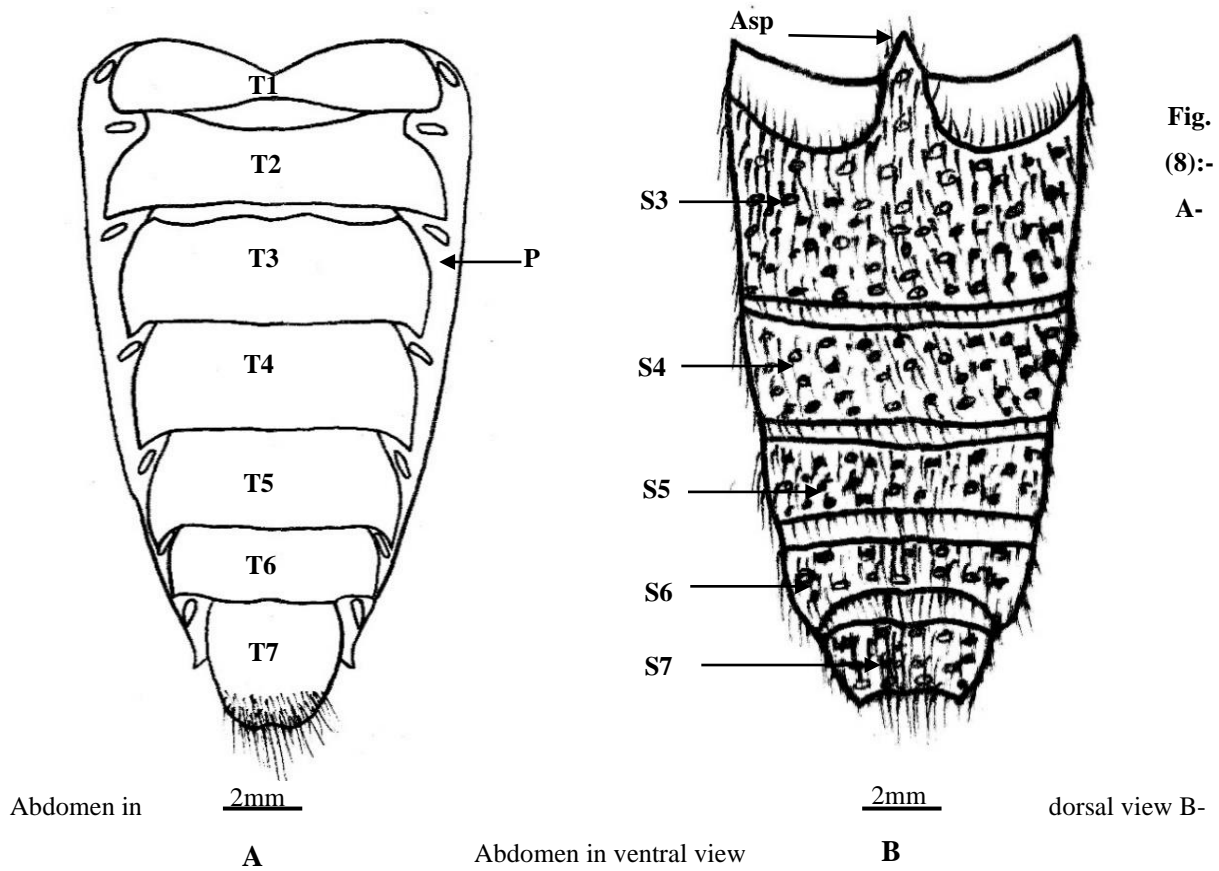


Fig. (8):-
A-

P: Pleuron; T1-7: first to seventh abdominal tergites; S3-7: third to seventh abdominal sternites

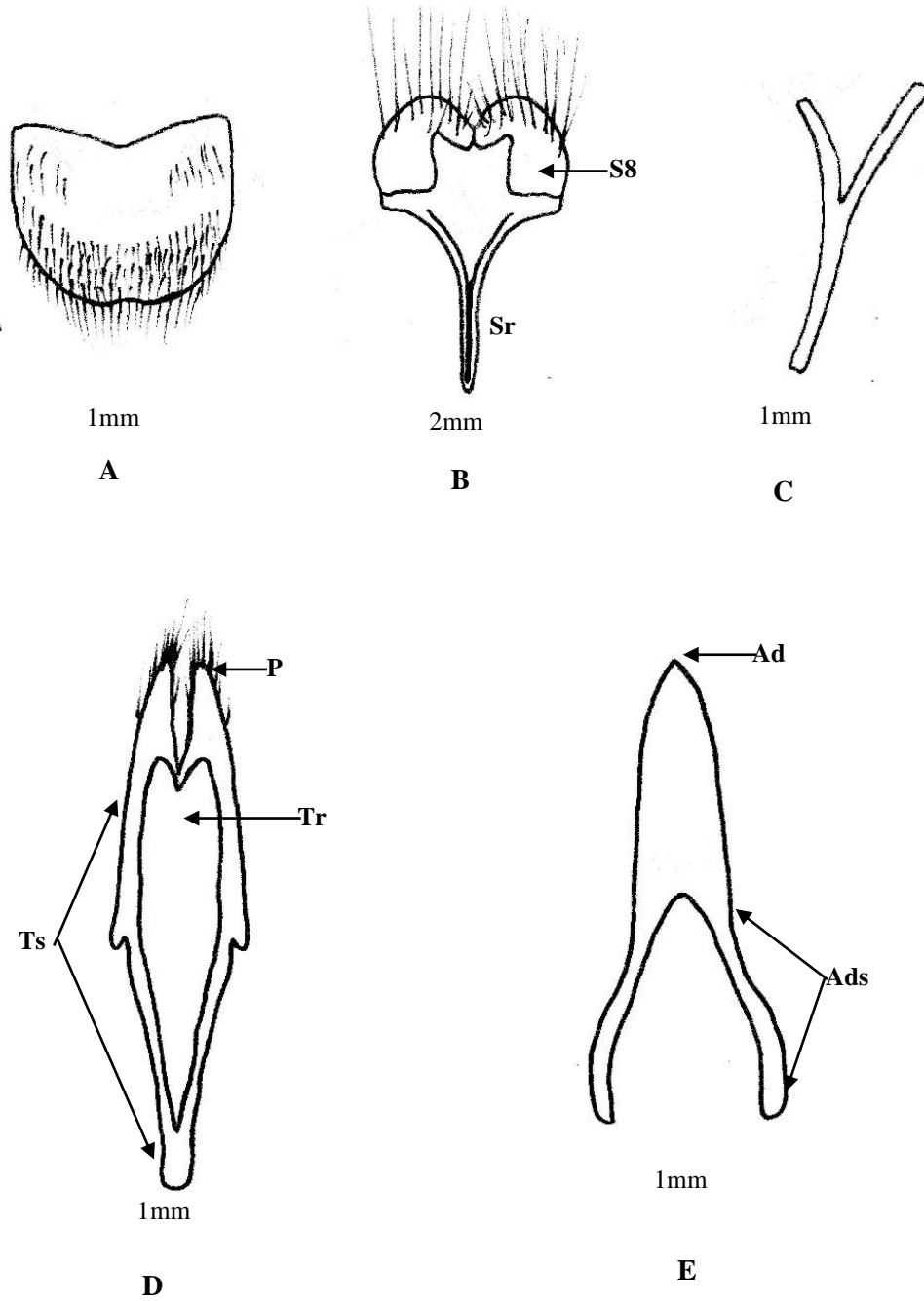


Fig. (9):- A- Tergite 8 B- Speculum relictum C- Speculum gastral D- Tegmem E- Aedeagus

Ad: Aedeagus; **Ads:** Aedeagal struts; **P:** Parameres; **Tr:** Tegminal ring; **Ts:** Tegminal struts; **S8:** Sternite 8; **Sr:** Speculum relictum.

REFERENCES

- Al-Ali, A. S. (1977). Phytophagous and Entomophagous insects and mites of IRAQ. Natural History Research Center, Publication 33. Al-Zahra press, Baghdad.
- Buse, J., Schröder, B. and Assmann, T. (2007). Modelling habitat and spatial distribution of an endangered longhorn beetle – A case study for saproxylic insect conservation. *Biological Conservation* 137: 372–381. <https://doi.org/10.1016/j.biocon.2007.02.025>.
- De Zan, L. R., Bardiani, M., Antonini, G., Campanaro, A., Chiari, S., Mancini, E., and Roversi, P. F. (2017). Guidelines for the monitoring of *Cerambyxcerdo*. *Nature Conservation*, 20, 129.
- Ismail, S. I. (1983). Taxonomic study of longhorned borer beetles (Cerambycidae, Coleoptera) of Iraq. Baghdad University, Faculty of Science, Master thesis, 200pp. (in Arabic, most parts unpublished).
- Latreille, P.A. (1802). Histoire naturelle, générale et particulière, des crustacés et des insectes. Ouvrage faisant suite à l'histoire naturelle générale et particulière, composée par Leclerc de Buffon, et rédigée par C.S. Sonnini, membre de plusieurs sociétés savantes. Tome troisième. Familles naturelles des genres. Dufart, Paris, xii + pp. 13–467 + [1 (errata)].
- López, K. P. G. (2022). Cladistic analysis and taxonomic revision of *Caciomorpha* Thomson, 1864 (Coleoptera, Cerambycidae, Lamiinae, Anisocerini) (Doctoral dissertation, Universidade de São Paulo).
- Özdikmen, H. and Ali, M. A. (2012). A preliminary list for longhorned beetles fauna of Iraq with additions to the Palaearctic catalogue of Löbl & Smetana (2010) (Coleoptera: Cerambycidae). *Mun. Ent. Zool*, 7(1), 174-183.
- Özdikmen, H. and Turgut, S. (2009). On Turkish *Cerambyx* Linnaeus, 1758 with zoogeographical remarks (Coleoptera: Cerambycidae: Cerambycinae). *Munis Entomology & Zoology*, 4(2), 301-319.
- Saad, A. H. and Amin, A. H. (1983). Economic insects of northern Iraq. University of Mosul, Ministry of high Education and Scientific Research, 426 pp.
- Saliba, L. J. (1974). The taxonomic status of *Cerambyx dux* Faldermann and *C. miles* Bonelli (Coleoptera: Cerambycidae). *Journal of Entomology Series B, Taxonomy*, 42(2), 171-182.
- Shalli R. A. and Fat-Hullah B. S. (1986). List of identified insects & Arachnids of Sulaimaniya region. Plant protection Research Section / Bekrajo, Ministry of Agriculture and Agrarian Reform, 63pp.
- Torson, A. S., Des Marteaux, L. E., Bowman, S., Zhang, M. L., Ong, K., Doucet, D., and Roe, A. D. (2020). Dissection of *Anoplophora glabripennis* (Coleoptera: Cerambycidae) larval tissues for physiological and molecular studies. *The Canadian Entomologist*, 152(3), 399-409.
- Villiers, A. (1978). Faune des Coleopteres de France, 1. Cerambycidae. Paris, 636 pp.
- Vives, E. (2000). Coleoptera, Cerambycidae. Fauna Iberica, Vol. 12. Museo Nacional de Ciencias naturales. CSIC. Madrid, 715 pp.