Fig. 7  Male Reproductive system

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<thead>
<tr>
<th>Abbreviation</th>
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<tr>
<td>T</td>
<td>Testis</td>
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<td>SV</td>
<td>Seminal vesicles</td>
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<tr>
<td>VD</td>
<td>vas deferens</td>
</tr>
<tr>
<td>DED</td>
<td>Ductus ejaculatorius duplex</td>
</tr>
<tr>
<td>DES</td>
<td>Ductus ejaculatorius simplex</td>
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<tr>
<td>ASG</td>
<td>Accessory sex glands</td>
</tr>
<tr>
<td>P</td>
<td>proximal region</td>
</tr>
<tr>
<td>M</td>
<td>Mid region</td>
</tr>
<tr>
<td>D</td>
<td>Distal region</td>
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<tr>
<td>A</td>
<td>Aedeagus</td>
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**Fig. 8  Female Reproductive system**

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<tr>
<td>OV</td>
<td>Ovarioles</td>
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<tr>
<td>LO</td>
<td>Lateral oviduct</td>
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<tr>
<td>MD</td>
<td>Median oviduct</td>
</tr>
<tr>
<td>BC</td>
<td>Bursa copulatrix</td>
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<tr>
<td>SD</td>
<td>Seminal duct</td>
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<td>SP</td>
<td>Spermatheca</td>
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<tr>
<td>SPG</td>
<td>Spermathecal gland</td>
</tr>
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<td>ASG</td>
<td>Accessory sex glands</td>
</tr>
<tr>
<td>R</td>
<td>Reservoir</td>
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Fig. 81. SDS-PAGE profile of ASG proteins in PPN treated and control male insects
Lane 1. ASG protein profile of day 1 adult controls
Lane 2. ASG protein profile of day 1 adults treated with 20 μg PPN immediately after eclosion on day 0
Lane 3. ASG protein profile of adultoids
Lane 4. ASG protein profile of day 0 adult controls
Lane 5. Molecular weight markers
PLATE I

**Fig. 1.** Egg mass

**Fig. 2.** Fifth instar larvae
   a. Day 1 larva
   b. Day 2 larva

**Fig. 3.** Sixth instar larvae
   a. Day 0 larva
   b. Day 3 larva

**Fig. 4.** Sixth instar larvae
   a. Day 4 larva
   b. Prepupa

**Fig. 5.** Pupa
   a. Ventral view
   b. Dorsal view

**Fig. 6.** Adults
   a. Female
   b. Male
PLATE II

**Fig. 9.** Section through the epithelial cells in the proximal region of the ASGs of adult male showing nucleus (N) and secretion inside the lumen (S).

**Fig. 10.** Section through the mid region of the ASGs of adult male showing secretion inside the lumen (S).

**Fig. 11.** Section through the ASGs of adult female showing epithelium (E), chitinogenous cells (C), chitinous intima (I) and secretion inside the lumen (S).

**Fig. 12.** Section through the reservoir of the ASGs of adult female showing columnar cells (Cc), lumen of the gland (L) and secretion inside the lumen (S).
PLATE III

**Fig. 13.** Section through the glandular epithelium of proximal region of the ASGs of adult male showing basement membrane (Bm), longitudinal muscles (Lm), Rough Endoplasmic reticulum (RER) and circular muscle (Cm) X 23000

**Fig. 14.** Section through the glandular epithelium of the proximal region of the ASGs of adult male showing nucleus (N), heterochromatin (Hc), tracheoles (T) lumen (L) of the gland and secretory globules (Sg) X 6000
**PLATE IV**

**Figs. 15 and 16.** Section through the glandular epithelium of proximal region of the ASGs of adult male showing the circular muscles (Cm), nucleus (N), nucleolus (Nu), nuclear envelope (Ne), heterochromatin (Hc), RER and secretory vesicles (Sv) near the lumen of the gland. Arrows represent coalescence of secretion inside the lumen. Fig. 15X 6800; Fig. 16 X 20500
PLATE VIII

Fig. 24. Section through the glandular epithelium of mid region of the ASGs of adult male showing secretory globule (Sg) inside lumen (L) of the gland, villi (V) X 20500

Fig. 25. Section through the distal region of the ASGs of adult male showing longitudinal muscles (Lm), circular muscles (Cm) and the basement membrane (Bm) of the epithelium X 49000

Fig. 26. Section through the glandular epithelium of distal region of the ASGs of adult male showing RER X 49000
PLATE X

**Fig. 30.** Section through the glandular epithelium of ASG of adult female showing RER, mitochondria (M) and infoldings (If) on the basement membrane X 23000

**Fig. 31.** Section through the glandular epithelium of ASG of adult female showing RER and connective tissue X 30000
PLATE XI

**Fig. 32.** Section through the glandular epithelium of ASG of adult female showing nucleus (N), nucleous (Nu) heterochromatin (Hc), mitochondria (M) and intercellular channels (Ic) X 23000

**Fig. 33.** Section through the glandular epithelium of ASG of adult female showing distended RER and mitochondria (M). Arrows represent granules inside RER X 30000
PLATE XII

Fig. 34. Section through the glandular epithelium of ASG of adult female showing nucleus (N), nucleolus (Nu) enlarged mitochondria (M) and RER X 13000

Fig. 35. Section through the glandular epithelium of ASG of adult female showing specialized secretory apparatus (Sp) with radiating arms (Ra) and felt work like structure (F), RER and mitochondria (M) X 30000
PLATE XIX

**Fig. 53.** Reproductive system of day 6 female pupa showing Ovariole (OV), Bursa copulatrix (BC), Spermatheca (SP), Spermathecal gland (SPG), Accessory sex glands (ASG), Reservoir (R).

**Fig. 54.** Reproductive system of adult female showing Ovariole (OV), Bursa copulatrix (BC), Spermatheca (SP), Spermathecal gland (SPG), Accessory sex glands (ASG), Reservoir (R)
PLATE XVI

Fig. 42. Reproductive system of day 1 male pupa showing Testis (T), Seminal vesicle (SV), Ductus ejaculatorius duplex (DED), Accessory sex glands (ASG)

Fig. 43. Reproductive system of day 2 male pupa showing Testis (T), Seminal vesicle (SV), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)

Fig. 44. Reproductive system of day 3 male pupa showing Testis (T), Seminal vesicle (SV), Vas deferens (VD) Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)

Fig. 45. Reproductive system of day 4 male pupa showing Testis (T), Seminal vesicle (SV), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)
PLATE XVII

**Fig. 46.** Reproductive system of day 5 male pupa showing Testis (T), Seminal vesicle (SV), Vas deferens (VD), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)

**Fig. 47.** Reproductive system of day 7 male pupa showing Testis (T), Seminal vesicle (SV), Vas deferens (VD), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)

**Fig. 48.** Reproductive system of adult male showing Testis (T), Seminal vesicle (SV), Vas deferens (VD), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG), Proximal region (P), Mid region (M), Distal region (D), Aedeagus (A)
PLATE XVIII

**Fig. 50.** Reproductive system of day 1 female pupa showing Ovariole (OV), Oviduct (OD), Bursa copulatrix (BC), Spermatheca (SP), Spermathecal gland (SPG), Accessory sex glands (ASG), Reservoir (R)

**Fig. 51.** Reproductive system of day 2 female pupa showing Ovariole (OV), Bursa copulatrix (BC), Accessory sex glands (ASG), Reservoir (R)

**Fig. 52.** Reproductive system of day 5 female pupa showing Ovariole (OV), Bursa copulatrix (BC), Spermatheca (SP), Spermathecal gland (SPG), Accessory sex glands (ASG), Reservoir (R)
PLATE XX

Fig. 56. Reproductive system of male kept as control showing Testis (T), Vas deferens (VD), Seminal vesicles (SV), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)

Fig. 57. Male Reproductive system of male adultoid showing Accessory sex glands (ASG)

Fig. 58. Section through the ASG of the day 4 male pupa kept as control showing the multiple layer of epithelial cells and empty lumen

Fig. 59. Section through the ASG of the male adultoid showing the fused glands (FG).
PLATE XXI

Fig. 61. Section through the glandular epithelium of ASG of the male adultoid showing the epithelial cells (EC), Nucleus (N), Chromatin (C) and empty Lumen (L) X 2900

Fig. 62. Section through the glandular epithelium of ASG of male kept as control showing RER and secretory globules (SG) in the lumen (L) X 1900
**PLATE XXII**

**Fig. 63.** Section through the glandular epithelium of ASG of the male adultoid showing the desmosomes (D) and crumpled intercellular membrane (IC) X 9300

**Fig. 64.** Section through the necrotic area of glandular epithelium of ASG of male adultoids showing disintegrating nucleus (DN) X 4800
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Fig. 66. Section through ASG of male adultoid showing chromatin (C) and shrinking nucleus (SN). Arrows represent dense granules inside the nucleus X 13000
PLATE XXIV

Fig. 67. Section through the glandular epithelium of ASG of the male adultoid showing empty spaces (ES) X 9300

Fig. 68. Section through the glandular epithelium of ASG of male adultoids showing lumen (L). Arrows represent nuclei devoid of condensed heterochromatin X 2900
Fig. 82. Reproductive system of 3 μg methoxyfenozide treated male showing Testis (T), Seminal vesicles (SV), Ductus ejaculatorius duplex (DED), Accessory sex glands (ASG) and Ductus ejaculatorius simplex (DES). Arrow represents the voluminous region of ASG.

Fig. 83. Reproductive system of 30 μg methoxyfenozide treated male showing Testis (T), Seminal vesicles (SV), Vas deferens (VD), Ductus ejaculatorius duplex (DED), Accessory sex glands (ASG) and Ductus ejaculatorius simplex (DES)

Fig. 84. Reproductive system of 3μg methoxyfenozide treated female showing Ovarioles (O), Bursa copulatrix (BC), Accessory sex glands (ASG) and Reservoir (R)

Fig. 85. Reproductive system of 30 μg methoxyfenozide treated female showing Ovarioles (O), Bursa copulatrix (BC), Spermatheca (SP), Spermathecal gland (SPG), Accessory sex glands (ASG) and Reservoir (R)

Fig. 86. Reproductive system of male kept as control showing Testis (T), Seminal vesicles (SV), Ductus ejaculatorius duplex (DED), Ductus ejaculatorius simplex (DES), Accessory sex glands (ASG)

Fig. 87. Reproductive system of female kept as control showing Ovarioles (OV), Bursa copulatrix (BC), Spermatheca (SP), Spermathecal gland (SPG), Accessory sex glands (ASG) and Reservoir (R)
PLATE XXV

Fig. 69. Accessory sex glands (ASG) of female kept as control showing Reservoir (R)

Fig. 70. Accessory sex glands (ASG) of female adultoids showing Reservoir (R)

Fig. 71. Semithin section through the ASG of female adultoids showing empty lumen (L), small columnar cells (C) and degenerated muscle layer (M)
PLATE XXVI

Fig. 73. Section through the glandular epithelium of ASG of the female adultoid showing the epithelial cells (EC), nucleus (N) and ruptured chitinogenous cells (CC) and empty lumen X 2900

Fig. 74. Section through the glandular epithelium of ASG of female adultoids showing abnormal mitochondria (M) X 11000
PLATE XXVII

Fig. 75. Section through the glandular epithelium of ASG of the female adultoid showing the empty spaces (ES), nucleus (N) and lysosomes (L) X 4800

Fig. 76. Section through the glandular epithelium of glandular epithelium of ASG of female adultoids showing rough endoplasmic reticulum (RER), empty spaces (ES) and lysosomes (L) X 11000
PLATE IX

**Fig. 27.** Section through the glandular epithelium of distal region of the ASGs of adult male showing RER, nucleus (N) and heterochromatin (Hc) X 23000

**Fig. 28.** Section through the glandular epithelium of distal region of the ASGs of adult male showing Golgi bodies (G), mitochondria (M) and lumen containing secretory globules (Sg) X 13000

**Fig. 29.** Section through the distal region of the ASGs of adult male showing the lumen (L) containing secretory globules (Sg) and cytoplasmic debris (Cd) X 13000
PLATE V

Fig. 17. Section through the glandular epithelium of proximal region of the ASGs of adult male showing parallel arrays of RER near nucleus (N) X 11000

Fig. 18. Section through the glandular epithelium of the proximal region of the ASGs of adult male showing secretory globules (Sg) and multivesicular bodies (Mvb). Arrows represent electron dense patches on secretory globules X 30000
PLATE VI

**Fig. 19.** Section through the mid region of the ASGs of adult male showing multiple layer of epithelium (E) and nucleus (N) X 4200

**Fig. 20.** Section through the glandular epithelium of the ASGs of adult male showing longitudinal muscles (Lm), circular muscles (Cm), plasma membrane (P) and vesiculated rough endoplasmic reticulum (RER) X 20500

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PLATE VII

Fig. 22. Section through the glandular epithelium of the mid region of the ASGs of adult male showing abundant mitochondria (M) and nucleus (N) X 4200

Fig. 23. Section through the glandular epithelium of the mid region of the ASGs of adult male showing nucleus (N) and mitochondria (M) X 13000
PLATE XIII

**Fig. 36.** Section through the glandular epithelium of ASG of adult female showing the secretory apparatus. Arrows represent electron dense materials near the arms  X 13000

**Fig. 37.** Section through the glandular epithelium of ASG of adult female showing collection of mitochondria (M) near the specialized secretory apparatus X 30000
Fig. 40. Section through the ASG of adult female showing chitinous intima (I) and the lumen of the gland (L) X 30000

Fig. 41. Section through the chitinogenous cells of ASG of adult female showing septate desmosomes (Sd), looped plasma membrane (Lp) on the margin of the chitinogenous cells and microtubules (Mt) X 23000
PLATE XIV

Fig. 38. Section through the glandular epithelium of ASG of adult female showing chitinogenous cells (C), nucleus (N) and lumen of the gland (L) X 23000

Fig. 39. Section through the chitinogenous cells of ASG of adult female showing septate desmosomes (Sd), looped plasma membrane (Lp) on the margin of the chitinogenous cells and chitinous intima (I) X 48000
PLATE XXVIII

Fig. 77. Section through the glandular epithelium of ASG of female adultoids showing lysosomes (L) and ruptured chitinogenous cells (CC) X 6800

Fig. 78. Section through the glandular epithelium of ASG of female kept as Controls showing RER, nucleus (N), Specialized secretory apparatus (SP)
**Fig. 7 Male Reproductive system**

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Lane 5. Molecular weight markers
Fig. 8 Female Reproductive system

OV  Ovarioles
LO  Lateral oviduct
MD  Median oviduct
BC  Bursa copulatrix
SD  Seminal duct
SP  Spermatheca
SPG Spermathecal gland
ASG Accessory sex glands
R   Reservoir